LORD® 403, 406 and 410 Acrylic Adhesives
with LORD Accelerator 17, 19 or 19GB

Description

LORD® 403, 406 and 410 acrylic adhesives in combination with LORD Accelerator 17, 19 or 19GB can be used to replace welding, brazing, riveting and other mechanical fastening methods. These adhesives perform particularly well in low-temperature environments and applications that are subject to high impact or high peel loads. LORD 403, 406 and 410 acrylic adhesives provide 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 17, 19 or 19GB, create adhesive systems that bond a wide variety of prepared or unprepared metals and engineered plastics. These 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 17, 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 grey. For further detailed information, refer to applicable data sheet.

Features and Benefits

Versatile – bonds a wide range of unprepared metals with minimal substrate preparation, as well as engineered thermoplastics including XENOY®, polycarbonate, ABS and acrylics.

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

Note: Based on test results, LORD 406/19GB adhesive system exhibits post bake/powder coating temperature resistance up to 400°F (204°C) for 90 minutes. Customer specific substrates should always be evaluated for specific application performance.

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

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

UL Rated - when mixed with LORD Accelerator 19, adhesive system is UL 746C certified.

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 - 300,000	100,000 - 300,000	100,000 - 300,000
Density			
lb/gal	9.25 - 9.55	9.10 - 9.70	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.

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 17, 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.

Typical Properties* of Adhesive Mixed with Recommended Accelerator

	403	**406**	**410**
Mix Ratio by Weight, Adhesive to Accelerator			
A17	9.33:1	9.33:1	9.33:1
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 Grey	2.85:1	2.85:1	2.85:1
Mix Ratio by Volume, Adhesive to Accelerator			
A17	10:1	10:1	10:1
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 Grey	4:1	4:1	4:1
Solids Content, %	100	100	100
Working Time, min @ 75°F (24°C)	2-4	6-10	20-30
Time to Handling Strength, min @ 75°F (24°C) 50 psi Shear	4-6	12-17	60-120
Full Cure Time, hr @ 75°F (24°C)	24**	24	24
Mixed Appearance			
A17	Tan Paste	Tan Paste	Tan Paste
A19	Tan Paste	Tan Paste	Tan Paste
A19 Black	Grey Paste	Grey Paste	Grey Paste
A19GB	Tan Paste	Tan Paste	Tan Paste
A19GB Red	Light Red Paste	Light Red Paste	Light Red Paste
A19GB Grey	Grey Paste	Grey Paste	Grey Paste
Cured Appearance			
A17	Light Green	Light Green	Light Green
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 Grey	Grey	Grey	Grey

*Data is typical and not to be used for specification purposes.
**Reaches 90% of its full strength after 2 hours.

Typical Cured Properties* – LORD Adhesive/LORD Accelerator 19

	403	406	410
Tensile Strength at Break, psi (MPa) ASTM D638, modified	2700 (18.6)	2700 (18.6)	2700 (18.6)
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)

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

Bond Performance† – LORD 406 Adhesive/LORD Accelerator 19

Substrates	Aluminum to Aluminum	Galvanized Steel to Galvanized Steel	Powder Coated Steel to Powder Coated Steel
Lap Shear @ Room Temperature, psi (MPa)	3000 (20.7)	2500 (17.2)	2800 (13.3)
Failure Mode	C	C	C
Lap Shear @ Hot Strength [180°F (82°C)], psi (MPa)	1500 (10.3)	1830 (12.8)	1050 (7.2)
Failure Mode	TLC	TLC	CF
Lap Shear after 500 hours Salt Spray Exposure, psi (MPa) Test after 24 hours	2650 (18.3)	2500 (17.2)	1470 (10.1)
Failure Mode	TLC	TLC	CF
Lap Shear after 14 days @ 100°F (38°C), 100% RH, psi (MPa)	2900 (20.0)	2450 (16.9)	2400 (16.5)
Failure Mode	C	C	C
Lap Shear @ -30°F (-34°C), psi (MPa)	3000 (20.7)	2800 (19.3)	3300 (22.8)
Failure Mode	C	C	CF
T-Peel, pli (N/mm)	37 (6.5)	22 (3.9)	26 (4.6)
Failure Mode	C	C	C

Substrate	Surface Treatment
Aluminum, 0.032" thick 6061T6	Dry Rag Wipe
Galvanized Steel, 0.030" thick electrogalvanized	Dry Rag Wipe
Powder Coated Steel, 0.035" thick, polyester on cold rolled steel	Dry Rag Wipe

Bonded Parameters	Bond Area	Film Thickness	Cure	Mix Ratio
Metal Lap Shears (ASTM D1002)	1.0"x0.5"	0.010"	24 hr @ RT	4:1 by Volume
T-Peel (ASTM D1876 modified)	1.0"x3.0"	0.010"	72 hr @ RT	4:1 by Volume

Failure Mode Definition	Abbreviation
Cohesive Failure	C
Coating Failure	CF
Thin Layer Cohesive Failure	TLC

†Bond performance data was obtained using LORD 406 adhesive/Accelerator 19. Please contact LORD Corporation regarding the use and/or performance of using other accelerator combinations (+1 877 ASK LORD).

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.

Curing – Cure begins immediately once adhesive and accelerator are mixed. Time to handling strength is dependent on adhesive used. Complete cure requires 24 hours at room temperature. Mating surfaces must be held in contact during the entire curing process. Cured adhesive is colored to visually indicate a full cure; cure color depends on the accelerator used.

Cure rate can be accelerated by applying modest heat [<150°F (<66°C)]. Customer should evaluate adhesive strength and quality through a functional trial of their intended application process. Consult with LORD application engineer for recommended maximum temperature dependent on chosen adhesive cure speed.

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.

Shelf Life/Storage

Typical shelf life is nine months when stored below 80°F (27°C) in original, unopened container. Storage temperatures of 40-50°F (4-10°C) are recommended. If stored cold, allow product to return to room temperature before using. Protect from exposure to direct sunlight.

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 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.

LORD provides valuable expertise in adhesives and coatings, vibration and motion control, and magnetically responsive technologies. Our people work in collaboration with our customers to help them increase the value of their products. Innovative and responsive in an ever-changing marketplace, we are focused on providing solutions for our customers worldwide.

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