



LORD TECHNICAL DATA

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 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 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 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, as well as engineered thermoplastics including XENOY®, polycarbonate, ABS and acrylics.

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.

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

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	9.15-9.60	9.15-9.60
(kg/m ³)	(1108-1144)	(1096-1150)	(1096-1150)
Flash Point, °F (°C)	59 (15)	59 (15)	59 (15)

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

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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.

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. Cure rate can be accelerated by applying modest heat [$<150^{\circ}\text{F}$ ($<66^{\circ}\text{C}$)]. Cured adhesive is colored to visually indicate a full cure; cure color depends on the accelerator used.

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
Full Cure Time, hr @ 75°F (24°C)	24**	24	24
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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**Reaches 90% of its full strength after 2 hours.



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Typical Cured Properties – LORD Adhesive/LORD Accelerator 19

	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[†] – 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) Failure Mode	3000 (20.7) C	2500 (17.2) C	2800 (13.3) C		
Lap Shear @ Hot Strength [180°F (82°C)], psi (MPa) Failure Mode	1500 (10.3) TLC	1830 (12.8) TLC	1050 (7.2) CF		
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	3000 (20.7) C	2800 (19.3) C	3300 (22.8) CF		
T-Peel, pli (N/mm) Failure Mode	37 (6.5) C	22 (3.9) C	26 (4.6) 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).

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

Shelf life is six 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 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.

Information provided herein is based upon tests believed to be reliable. In as much as LORD Corporation has no control over the manner in which others may use this information, it does not guarantee the results to be obtained. In addition, LORD Corporation does not guarantee the performance of the product or the results obtained from the use of the product or this information where the product has been repackaged by any third party, including but not limited to any product end-user. Nor does the company make any express or implied warranty of merchantability or fitness for a particular purpose concerning the effects or results of such use.

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LORD Corporation
World Headquarters

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