

LORD[®] 403E and 406E Acrylic Adhesives with LORD Accelerator 17, 19 or 19GB

Technical Data Sheet – EMEA only

LORD[®] 403E and 406E 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 loads.

LORD 403E and 406E acrylic adhesives, when cured 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 403E and 406E acrylic adhesives can be mixed prior to application with either LORD Accelerator 17, LORD Accelerator 19 or LORD Accelerator 19GB. LORD Accelerator 19GB contains 0.25 mm diameter, high compression strength solid glass spheres, which enable precise control of the adhesive bondline thickness. LORD Accelerator 19 can be used when bondline thickness is controlled by other means, or is greater than 0.25 mm. LORD Accelerator 19 is available in off-white or black. For further detailed information, refer to applicable data sheet.

Features and Benefits:

Environmentally Compliant – contains no H351 components.

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°C to +150°C; can withstand exposure to powdercoat or E-coat temperatures up to 205°C.

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

Flame/Smoke/Toxicity Resistant – when mixed with LORD Accelerator 17, adhesive system meets requirements R1 HL3 and R7 HL3 according to EN 45545-2 “Railway applications - Fire protection on railway vehicles - Part 2: requirements for fire behavior of materials and components”.

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 403E or 406E 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.

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 material 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 Parker Lord representative if assistance is needed using this equipment.

Typical Properties*

	403E	406E
Appearance	Off-white to Tan Paste	Off-white to Tan Paste
Viscosity, cP @ 25°C Brookfield	100,000 - 300,000	100,000 - 300,000
Density, kg/m ³	1100 - 1150	1090 - 1162
Flash Point, °C	14	14

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

Curing – Cure begins immediately once adhesive and accelerator are mixed. Depending on the adhesive version, handling strength is achieved within 5-15 minutes at 24°C. Complete cure requires 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 66°C.

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 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.

Typical Properties* of Adhesive Mixed with Recommended Accelerator

	403E	406E
Mix Ratio by Weight, Adhesive to Accelerator		
A17	9.33:1	9.33:1
A19	3.02:1	3.02:1
A19 Black	3.00:1	3.00:1
A19GB	2.91:1	2.91:1
Mix Ratio by Volume, Adhesive to Accelerator		
A17	10:1	10:1
A19	4:1	4:1
A19 Black	4:1	4:1
A19GB	4:1	4:1
Solids Content, %	100	100
Working Time, minutes @ 24°C	2 - 4	6 - 10
Time to Handling Strength, minutes @ 24°C 60 psi (0.4 MPa) Shear	4 - 6	12 - 17
Mixed Appearance		
A17	Tan Paste	Tan Paste
A19	Tan Paste	Tan Paste
A19 Black	Grey Paste	Grey Paste
A19GB	Tan Paste	Tan Paste
Cured Appearance		
A17	Light Green	Light Green
A19	Tan to Green	Tan to Green
A19 Black	Black	Black
A19GB	Tan to Green	Tan to Green

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

Typical Cured Properties** - LORD Adhesive/LORD Accelerator

	403E	406E
Tensile Strength at Break, MPa		
A17	31.2	31.2
A19, A19 Black, A19GB	32.1	32.1
Elongation, %		
A17	25	25
A19, A19 Black, A19GB	25	25
Young's Modulus, MPa		
A17	ND	ND
A19, A19 Black, A19GB	ND	ND
Glass Transition Temperature (T _g), °C		
A17	64	64
A19, A19 Black, A19GB	76	77

ND = Not Determined

**Data is typical and not to be used for specification purposes. Tests with LORD Accelerator 17 were performed according to ISO 527-1 modified; tests with LORD Accelerator 19, Accelerator 19 Black and Accelerator 19GB were performed according to ASTM D 638.

Shelf Life/Storage:

Typical shelf life is nine months when stored below 27°C in original, unopened container. For maximum shelf life, storage temperatures of 4- 10°C are recommended. If stored at these cooler temperatures, allow product to return to room temperature before using. Protect from exposure to direct sunlight.

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

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.

Bond Performance* – LORD Adhesive/LORD Accelerator 19 or 19GB

Substrates	Aluminum to Aluminum	Galvanized Steel to Galvanized Steel	Powder Coated Steel to Powder Coated Steel	GRP to GRP	ABS to ABS
Lap Shear @ Room Temperature, MPa	20.7	17.2	13.3	7.27	5.85
Failure Mode	COH	COH	COH	DF	SF
Lap Shear @ Hot Strength (82°C), MPa	10.3	12.8	7.2	2.81	1.46
Failure Mode	TLC	TLC	CF	ADH	ADH
Lap Shear after 500 hours Salt Spray Exposure, MPa	18.3	17.2	10.1	5.5	4.7
Test after 24 hours					
Failure Mode	TLC	TLC	COH	DF	SF
Lap Shear after 14 days @ 38°C, 100% RH, MPa	20	16.9	16.5	6.1	5.4
Failure Mode	COH	COH	COH	DF	SF
Lap Shear @ -34°C, MPa	20.7	19.3	22.8	7.90	5.37
Failure Mode	COH	COH	CF	DF	SF
T-Peel, N/mm	4.4	5.2	ND	4.3	4.7
Failure Mode	COH	COH	—	COH	COH

Substrate

Surface Treatment

Aluminum, 0.8 mm thick 6061T6	Dry Rag Wipe
Galvanized Steel, 0.75 mm thick electrogalvanized	Dry Rag Wipe
Powder Coated Steel, 0.9 mm thick, polyester on cold rolled steel	Dry Rage Wipe
GRP Polyester Resin, 30% fibers, 3 mm thick	MEK
ABS, 3.0 mm thick hair cell	Dry Rag Wipe

Bonded Parameters	Bond Area	Film Thickness	Cure	Mix Ratio
Metal Lap Shears (ASTM D 1002)	25.0x 12.5 mm	0.25 mm	24 hr @ RT	4:1 by Volume
GRP Lap Shears (DIN 1465)	25.0x 12.5 mm	0.25 mm	24 hr @ RT	4:1 by Volume
ABS Lap Shears (DIN 1465)	25.0x 12.5 mm	0.25 mm	24 hr @ RT	4:1 by Volume
T-Peel [ASTM D 1867 (modified)]	25.0x 75.0 mm	0.25 mm	72 hr @ RT	4:1 by Volume

Failure Mode Definition

Abbreviation

Adhesive Failure	ADH
Coating Failure	CF
Cohesive Failure	COH
Delamination of Top Layers Failure	DF
Substrate Failure	SF
Thin Layer Cohesive Failure	TLC

ND = Not Determined

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Bond Performance* – LORD Adhesive/LORD Accelerator 17

Substrates	Aluminum to Aluminum	Galvanized Steel to Galvanized Steel	GRP to GRP	ABS to ABS
Lap Shear @ Room Temperature, MPa	17.7	ND	7.33	6.42
Failure Mode	COH	—	DF	SF
Lap Shear @ Hot Strength (82°C), MPa	7.6	ND	3.84	2.39
Failure Mode	ADH	—	DF	ADH
Lap Shear after 500 hours Salt Spray Exposure, MPa	17.1	ND	7.41	5.4
Test after 24 hours				
Failure Mode	COH	—	DF	SF
Lap Shear after 14 days @ 38°C, 100% RH, MPa	18.0	ND	6.86	5.92
Failure Mode	COH	—	DF	SF
Lap Shear @ -34°C, MPa	16.8	ND	7.48	6.68
Failure Mode	COH	—	SF	SF
T-Peel, N/mm	4.1	ND	4.2	4.6
Failure Mode	COH	—	COH	COH

Substrate	Surface Treatment
Aluminum, 0.8 mm thick 6061T6	Dry Rag Wipe
Galvanized Steel, 0.9 mm thick electrogalvanized	Dry Rag Wipe
GRP Polyester Resin, 30% fibers, 3 mm thick	MEK
ABS, 3.0 mm thick hair cell	Dry Rag Wipe

Bonded Parameters	Bond Area	Film Thickness	Cure	Mix Ratio
Metal Lap Shears (DIN EN 1465)	25.0x 12.5 mm	0.25 mm	24 hr @ RT	10:1 by Volume
GRP Lap Shears (DIN 1465)	25.0x 12.5 mm	0.25 mm	24 hr @ RT	10:1 by Volume
ABS Lap Shears (DIN 1465)	25.0x 12.5 mm	0.25 mm	24 hr @ RT	10:1 by Volume
T-Peel [ASTM D 1867 (modified)]	25.0x 12.5 mm	0.25 mm	72 hr @ RT	10:1 by Volume

Failure Mode Definition	Abbreviation
Adhesive Failure	ADH
Cohesive Failure	COH
Delamination of Top Layers Failure	DF
Substrate Failure	SF

ND = Not Determined

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Values stated in this document 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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