L&L Products

SOLUTION
L&L Bond

VERSION
April 2021

TECHNICAL PACKAGE

TOUGHENED STRUCTURAL ADHESIVES

A-K321 & A-K322.

A new approach to structural bonding

Product overview

The use of structural adhesives has significantly grown in recent years along with the use of composites and combinations of different materials to create lightweight components.

Bond designs for these lightweight constructions become more complex and designers often cannot avoid undesirable peel forces.

L&L Products has found a solution and we are proud to announce a portfolio of methyl methacrylate structural adhesives with a peel resistance of 14N/mm without sacrificing strength, elongation, or modulus.

L&L Bond A-K321 and A-K322 are fast and medium curing two-component toughened structural adhesives based on methyl methacrylate and provide primerless adhesion to most metals, thermoplastics and composites.

The ratio between open time and fixture time has been optimized versus other methyl methacrylate systems minimizing cycle times.

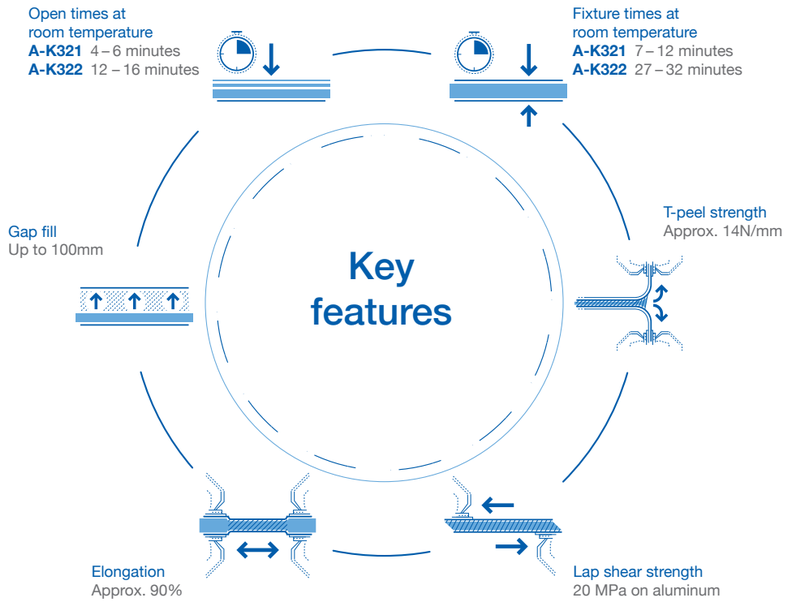
These products do not boil at higher bonding gaps – an ideal solution for repair or backfill of large composite structures.

Product attributes

Due to their low odor compared to current MMA based adhesives, these products can be used in metal-working shops and other places where the typical distinctive MMA odor is restricted.

L&L Bond A-K321 and A-K322 are 10:1 mix-ratio, thixotropic adhesives that also create value due to fast-mixing and rapid extrusion without sacrificing non-sag properties:

- A-K321 Open time 4 - 6 minutes
Fixture time 7 - 12 minutes
- A-K322 Open time 12 - 16 minutes
Fixture time 25 - 32 minutes
- Up to 100mm of gap-fill without boiling
- Ultra low odor
- High elongation – approx. 90%
- High T-peel strength – approx. 14N/mm
- High shear strength – 18–21 MPa
- REACH compliant



Adhesion and fast handling

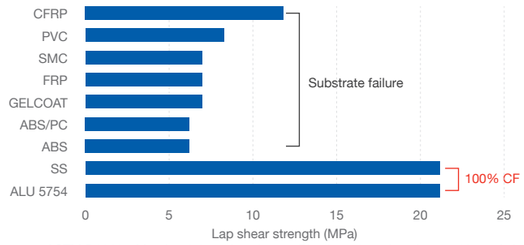
L&L Bond A-K321 and A-K322 are two-component toughened structural adhesives that provide primerless adhesion to most metals, thermoplastics, composites and other substrates common to many industries, including Composites, Marine, Rail, Commercial Vehicles, Automotive, Wind.

Before attempting any bonding application, users should test the adhesion to the surface using their specific material and application. For further instruction please reference the product technical data sheet and/or consult L&L Products Technical Service and support staff.

Designed for lightweight construction

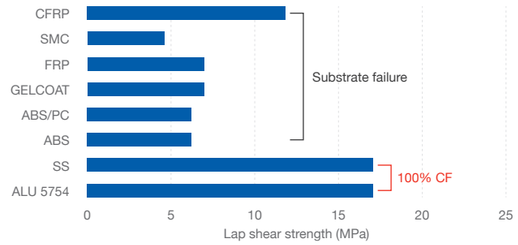
Bond designs for lightweight constructions are getting more complex and undesirable peel forces sometimes cannot be avoided in the design. With a combination of relative high modulus and a peel resistance of 14N/mm, this product is designed for these kind of applications.

A-K321 ADHESION



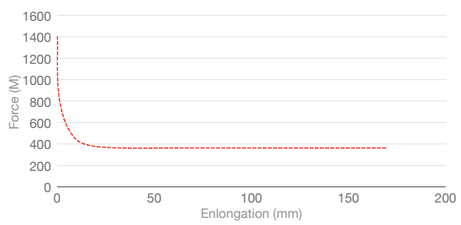
ASTM D1002 - Metals - 0.3mm bond gap - Plastics - 1mm bond gap - 10 mm/min

A-K322 ADHESION



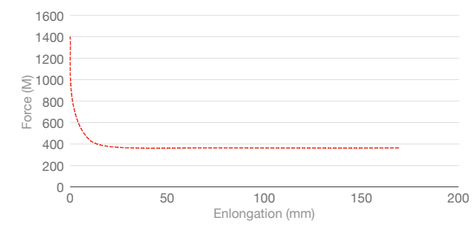
STM D1002 - Metals - 0.3mm bond gap - Plastics - 1mm bond gap - 10 mm/min

A-K321 PEEL RESISTANCE



ASTM D1876 — Aluminum — 0.3mm bond gap — 10mm/min

A-K322 PEEL RESISTANCE

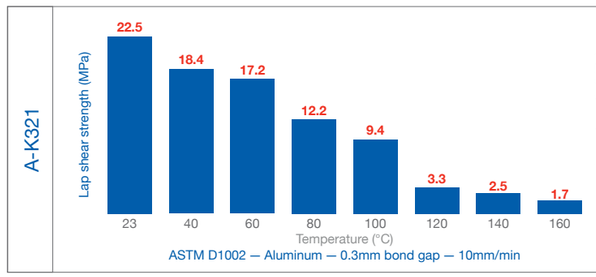


ASTM D1876 — Aluminum — 0.3mm bond gap — 10mm/min

Fast handling strength

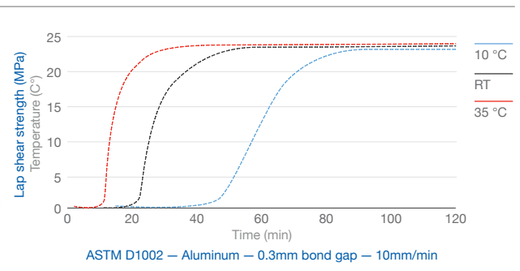
These fast-curing adhesives, based on methyl methacrylate, have good temperature resistance and develop strength in only a few minutes.

LAP SHEAR STRENGTH VS. TEMPERATURE

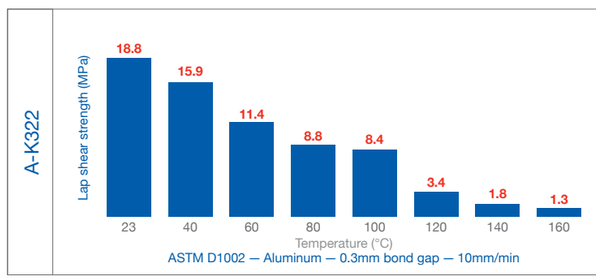


ASTM D1002 — Aluminum — 0.3mm bond gap — 10mm/min

STRENGTH BUILD UP CURVES



ASTM D1002 — Aluminum — 0.3mm bond gap — 10mm/min



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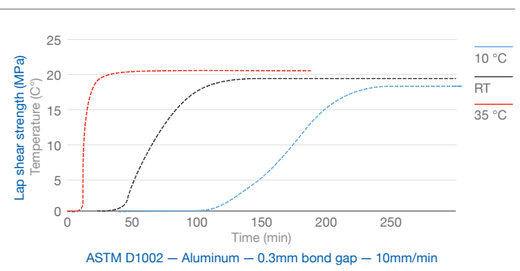
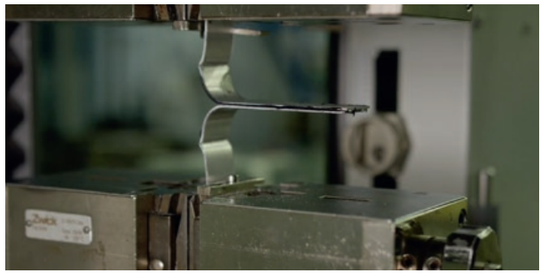
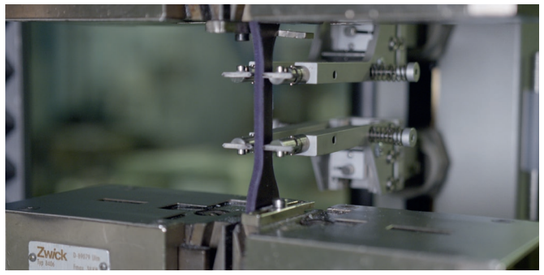
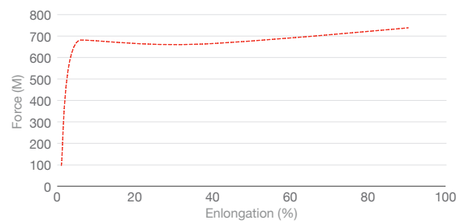


ASTM D1002 — Aluminum — 0.3mm bond gap — 10mm/min





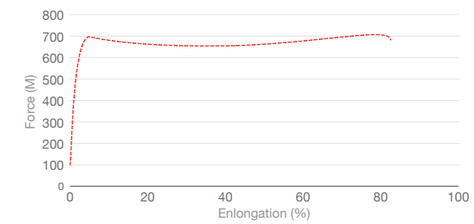
A-K321 TENSILE PROPERTIES



ASTM D638 — 10mm/min

Tensile Strength	Modulus	Elongation
17 – 19 MPa	700 – 900 MPa	70 – 90%

A-K322 TENSILE PROPERTIES



ASTM D638 — 10mm/min

Tensile Strength	Modulus	Elongation
17 – 19 MPa	700 – 900 MPa	70 – 90%

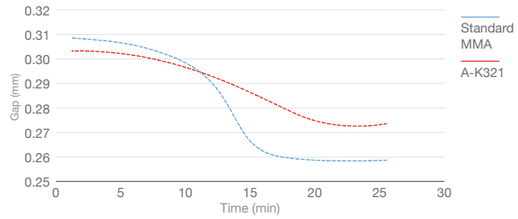
Shrinkage, fatigue and gap filling

Low shrinkage

Standard methacrylate adhesives exhibit significant shrinkage during the curing process – often 16% or more – resulting in read-through or distortion of the substrate or bond area.

L&L Bond A-K321 and A-K322 show significantly better results, shrinking only 10–11%. Multiple tests and applications bonding ABS/PC and GRP produce excellent results, showing no distortion or read-through for perfect visible surfaces.

SHRINKAGE



Excellent fatigue resistance

L&L Bond A-K321 and A-K322 have superior fatigue resistance. Their fatigue properties are tested by cyclic loading according to ASTM D3166, with the result that A-K321 and A-K322 resist a minimum of $2x10^6$ cycles.

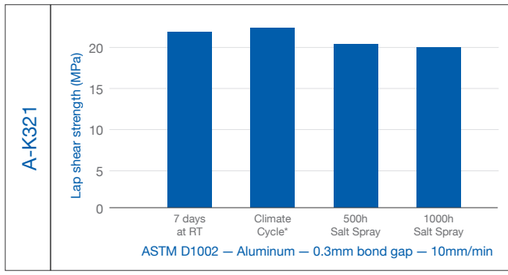
Ideal solution for large composite structures

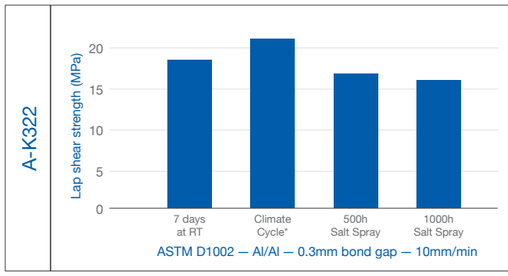
L&L Bond A-K321 and A-K322 do not boil at high bonding gaps and therefore are an ideal solution for repair or backfill of large composite structures.

Durability

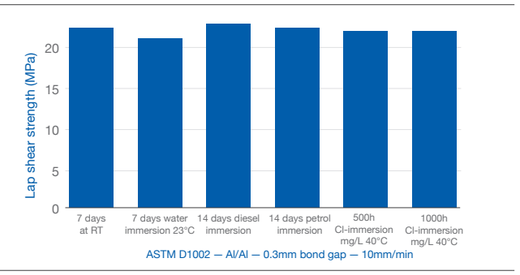
Resistance to common durability tests in commercial vehicle industry.

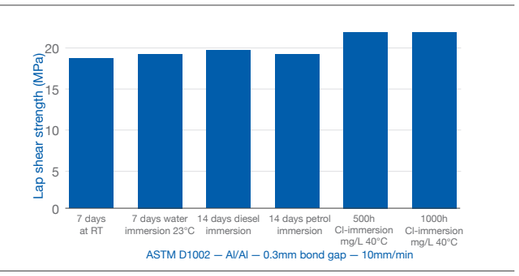
AGEING TEST



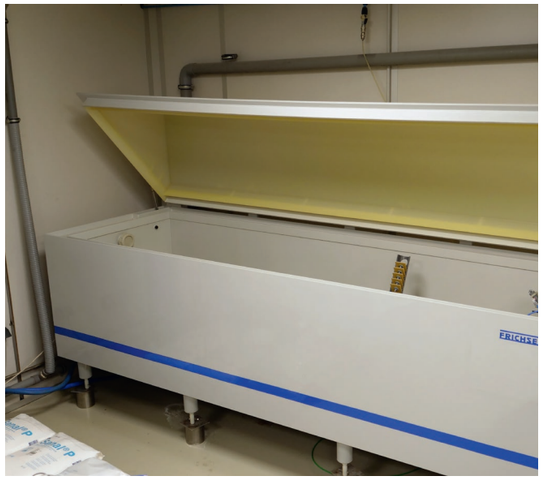


IMMERSION TEST





** 4 hours at -30°C + 4 hours at 80°C + 16 hours at 30°C/80%RH. Repeated 8 times. Cohesive failure is at 100%.*



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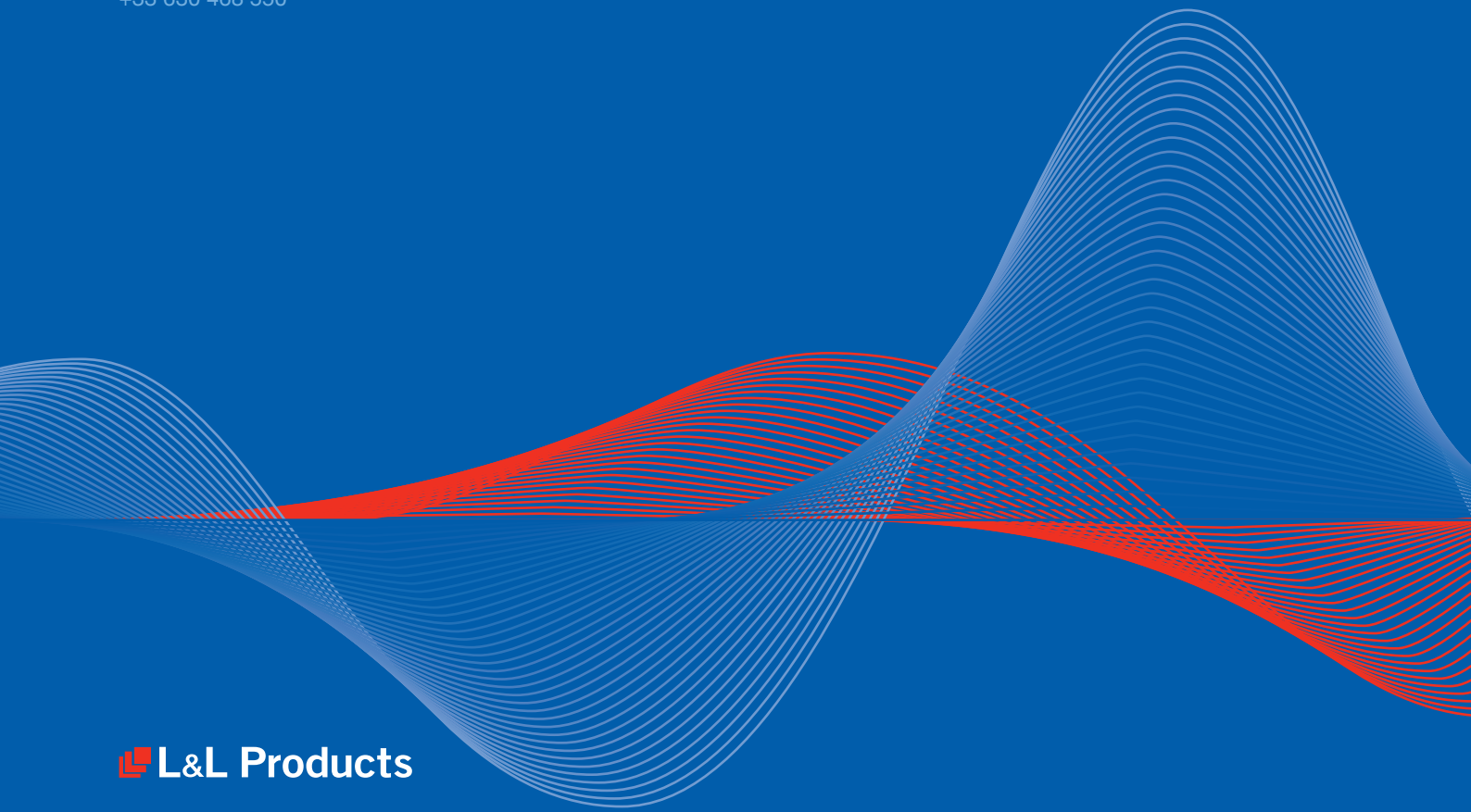

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