



Advanced Materials

Raising performance in composites bonding



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Adhesives are the 1st class choice

- Assembly of similar and dissimilar substrates
- Weight reduction compared to other mechanical assembly
- Reduce the stress concentration
- Superior fatigue resistance
- Easily processable (manually / automatically)
- No damage to the substrates (no holes)
- Sealed joints
- Compensation of dimensional tolerances
- Aesthetic aspect

Requirements for composites bonding

- Good adhesion to the substrates
- High mechanical resistance
- High peel resistance
- High temperature resistance
- High toughness
- Good chemical / environmental resistance
- Low temperature cure

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From adhesives with long open times for large area applications to fast-curing adhesives for early removal from fixtures and rapid through-put, these ranges include adhesives which are resistant to high temperature, water and chemicals. Liquid adhesives as well as thixotropic adhesives for gap-filling or vertical applications can be found in these ranges.

Adhesives with highest strength can be selected from these range as well as tough and impact-resistant adhesives with well-balanced combination of strength and flexibility and also elastic adhesives to cope with different thermal expansions when bonding larger structures of dissimilar materials.

Products from the Araldite® adhesives core range & 2000+ range are available in a variety of packaging including easy-to-use cartridges with static mixers and working packs for manual applications as well as in hobbocks and drums for higher volume applications.

The Araldite® adhesives core range & 2000+ range will continuously be updated to meet the newest demands of innovative design using the bonding technology.

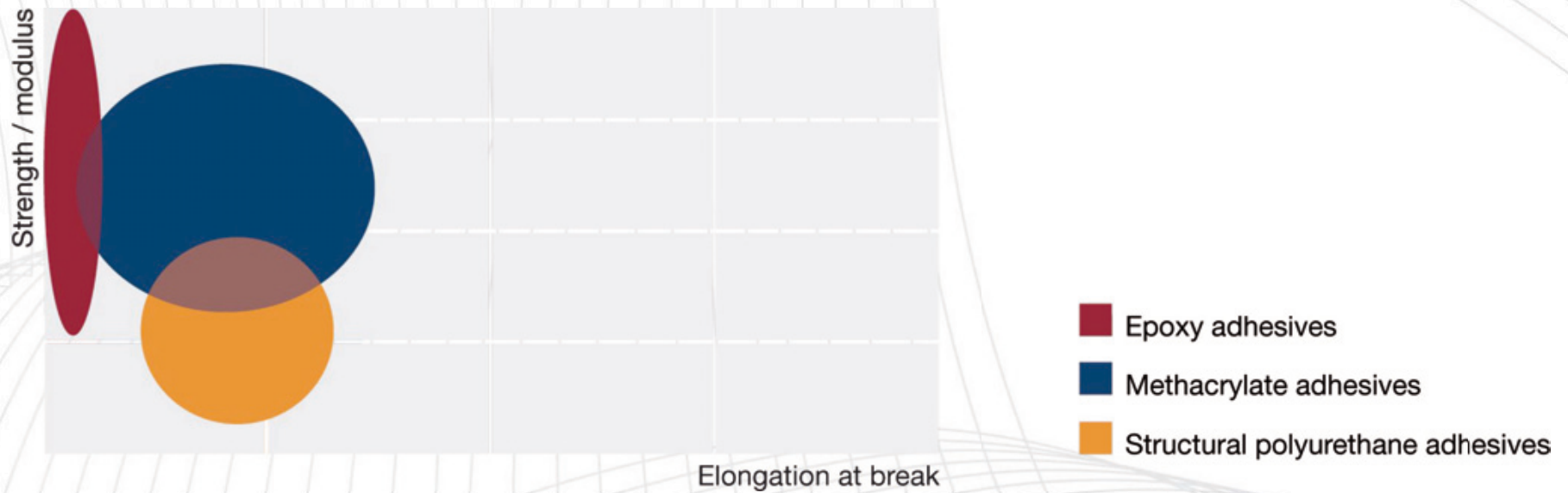
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Typical mechanical properties



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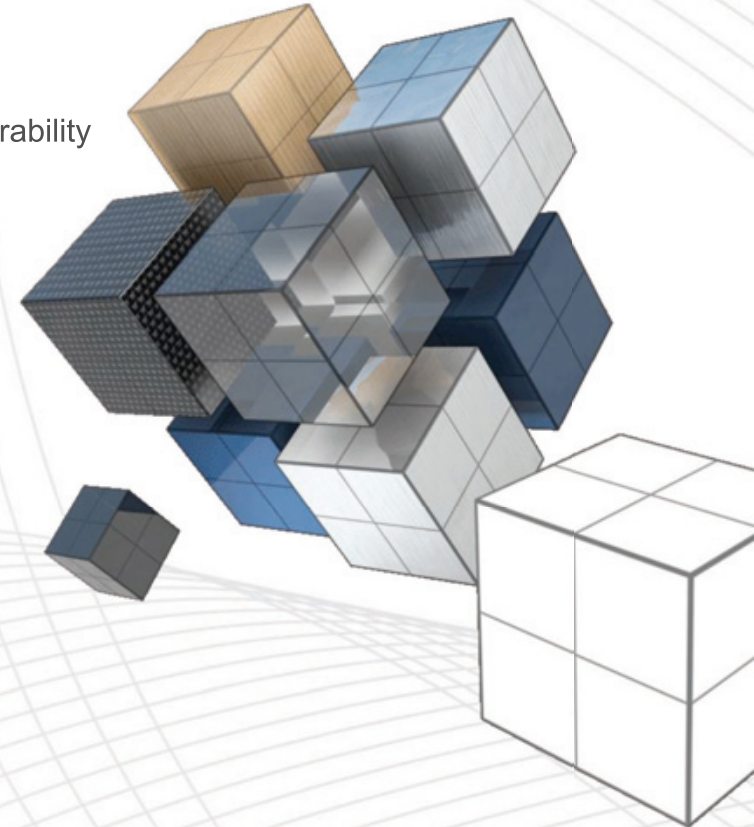
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Epoxy adhesives

- Excellent adhesion to metals and thermoset composites
- High strength and high stiffness
- High creep resistance
- High fatigue resistance
- High temperature resistance (up to 190°C)
- Excellent chemical resistance and long-term durability



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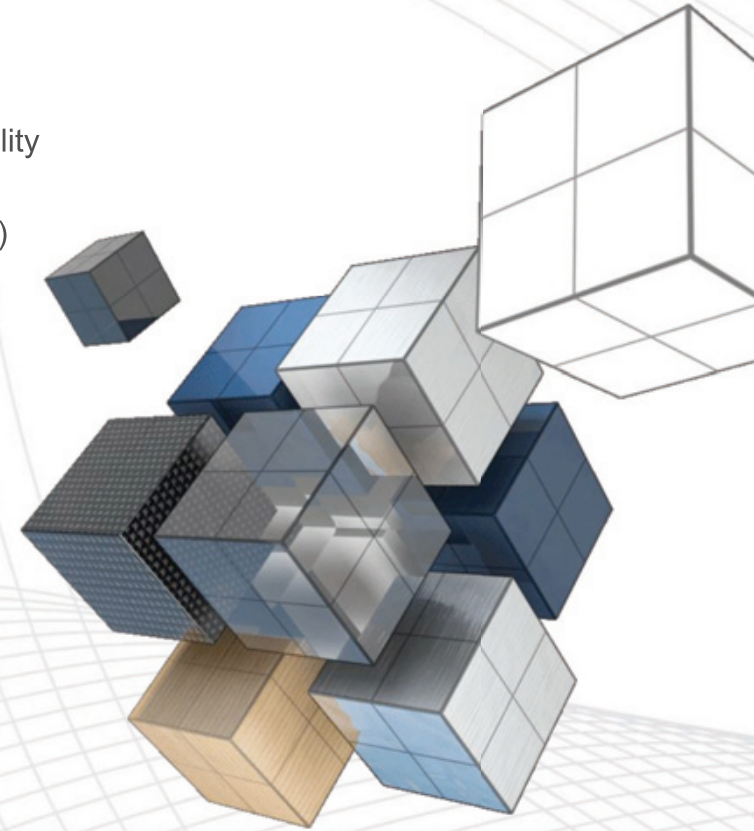
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Methacrylate adhesives

- Excellent adhesion to metals, thermoset composites and most thermoplastics
- Surface contamination tolerant
- High strength combined with high toughness
- High fatigue resistance
- Good chemical resistance and long-term durability
- Very fast-curing adhesives available
- Possibility for hardener lacquer method (no mix)

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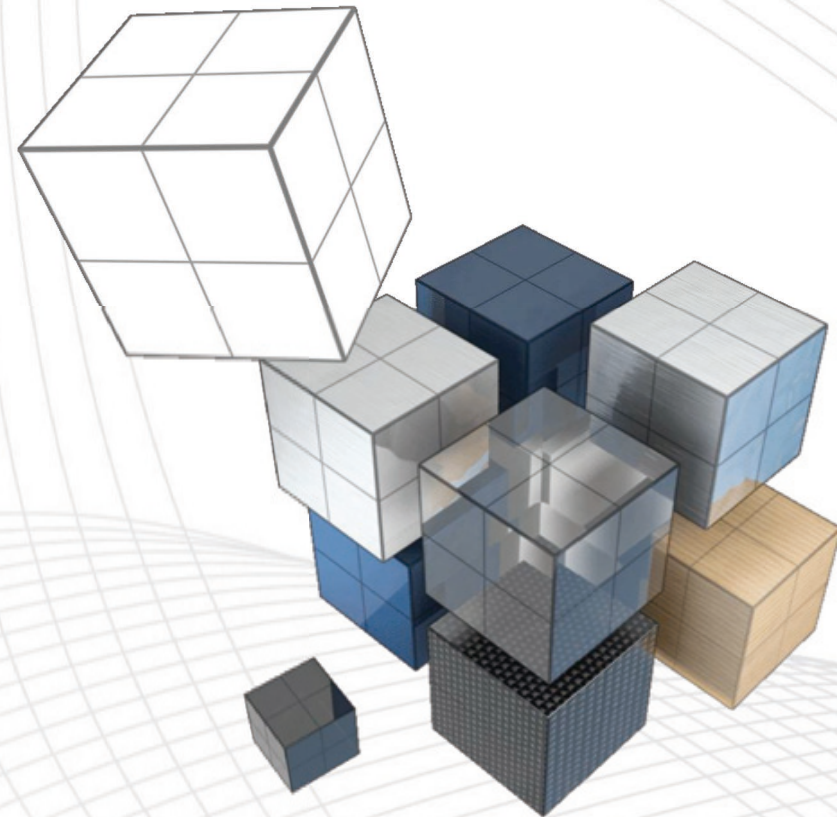
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Polyurethane adhesives

- Excellent adhesion to most composite materials and plastics
- Good adhesion to metals
- Mechanical properties from rigid to flexible
- High fatigue resistance
- Good long-term durability



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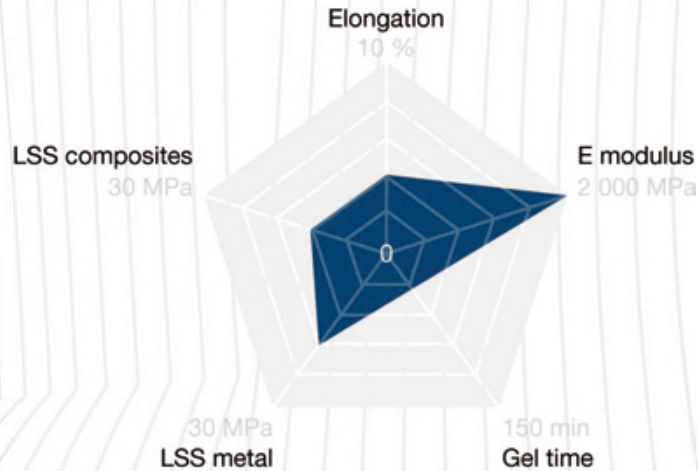
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2K epoxy adhesive (1:1 v/v)

Main properties

- High mechanical performance
- Gap filling
- Toughened
- Bonds well dissimilar substrates

Benefits

- Low shrinkage
- Good thermal resistance
- $T_g = 65^\circ\text{C}$

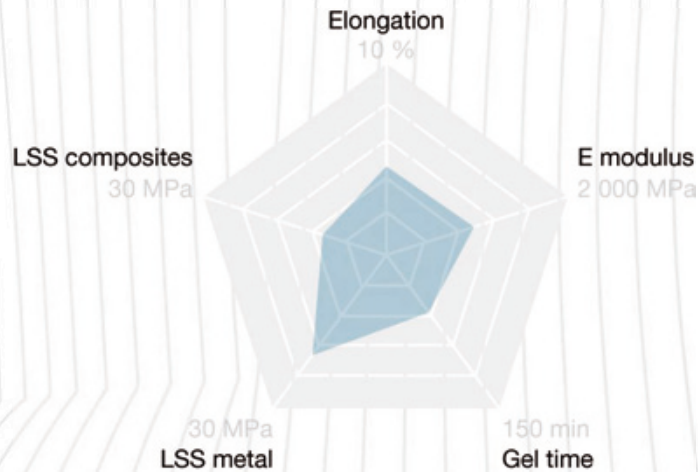
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2K epoxy adhesive (1:1 v/v)

Main properties

- High mechanical performances
- Mat black
- Toughened
- Multipurpose

Benefits

- Ideal for big parts
- Good thermal resistance
- $T_g = 65^\circ\text{C}$

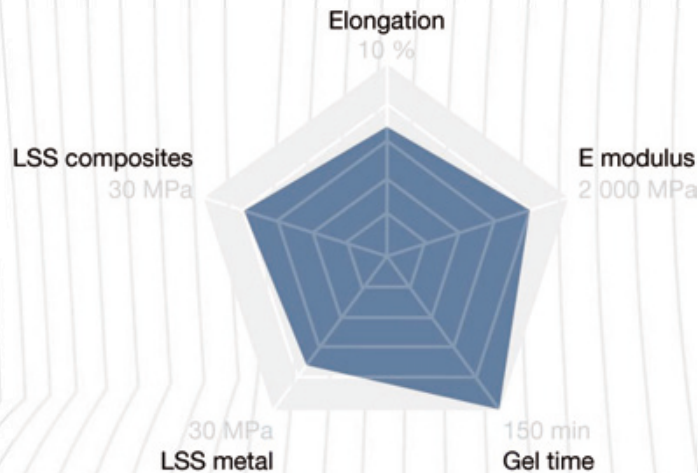
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2K epoxy adhesive (2:1 v/v)

Main properties

- High LSS on metal & FRP
- High peel resistance, toughened
- Shiny black, gap filling
- Multipurpose

Benefits

- Ideal for big CFRP parts bonding
- Open time > 1 hour
- $T_g = 67^\circ\text{C}$

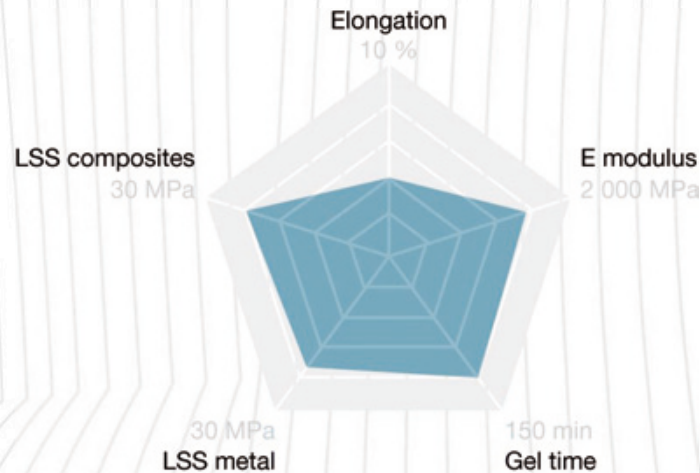
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2K epoxy adhesive (2:1 v/v)

Main properties

- High LSS on metals & FRP
- High peel resistance, toughened
- Shiny black, gap filling
- Multipurpose

Benefits

- Resistant up to 140°C
- Open time > 1.5 hours
- T_g = 120°C

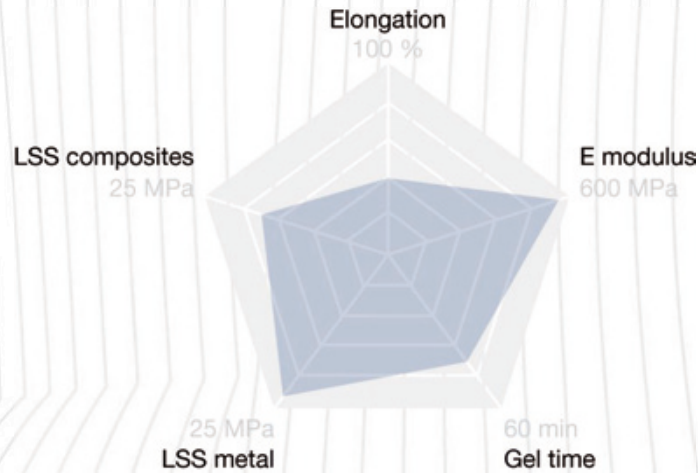
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2K polyurethane adhesive (1:1 v/v)

Main properties

- High LSS on metal & FRP
- Gap filling
- Flexible (>40% elongation)
- Multipurpose

Benefits

- Ideal for large parts bonding
- High performance PU, flexible
- T_g = 28°C

Araldite® adhesives for CFRP bonding

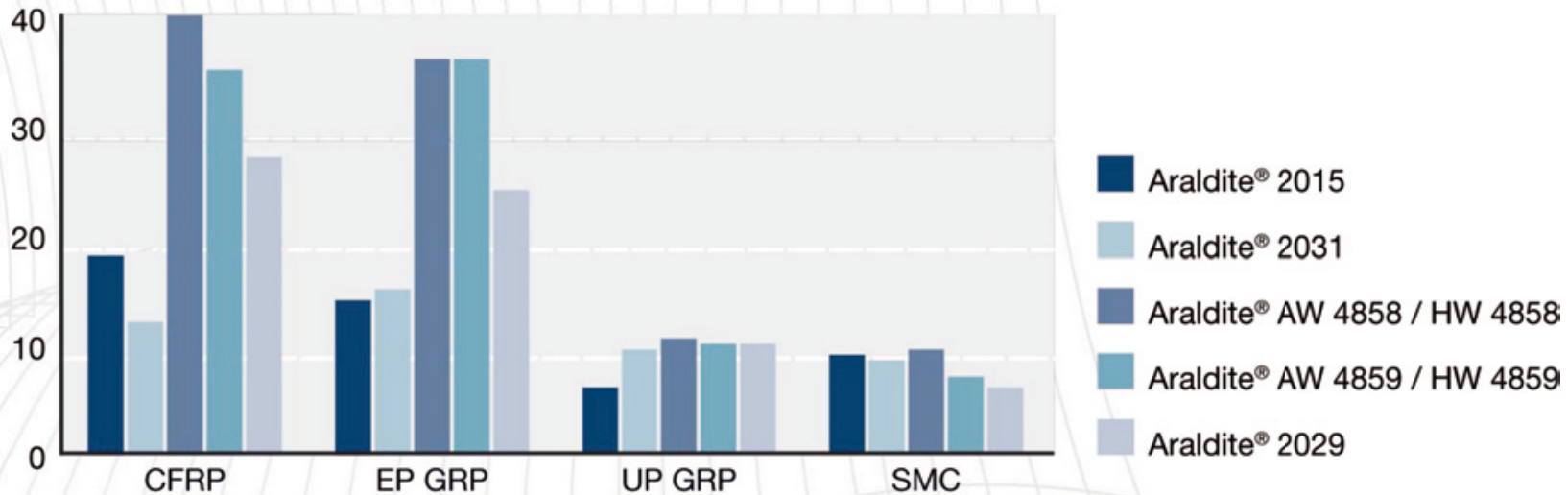
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Performance on composites Lap Shear Strength at 23°C (MPa)



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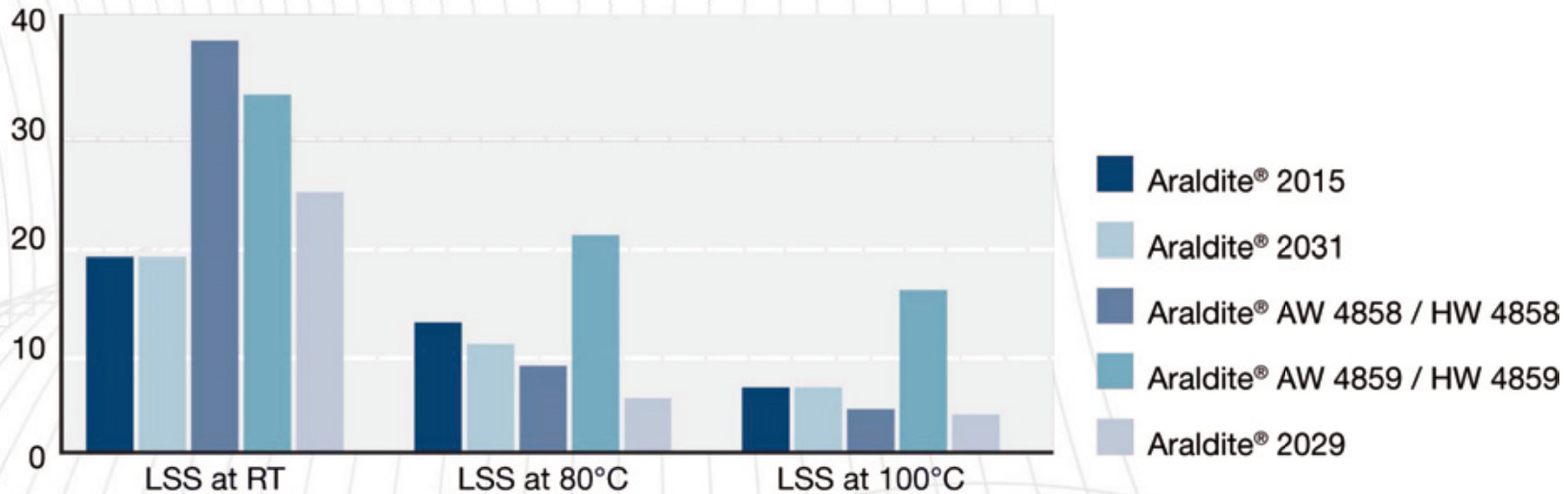
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Performance on aluminium versus temperature Lap Shear Strength (MPa)



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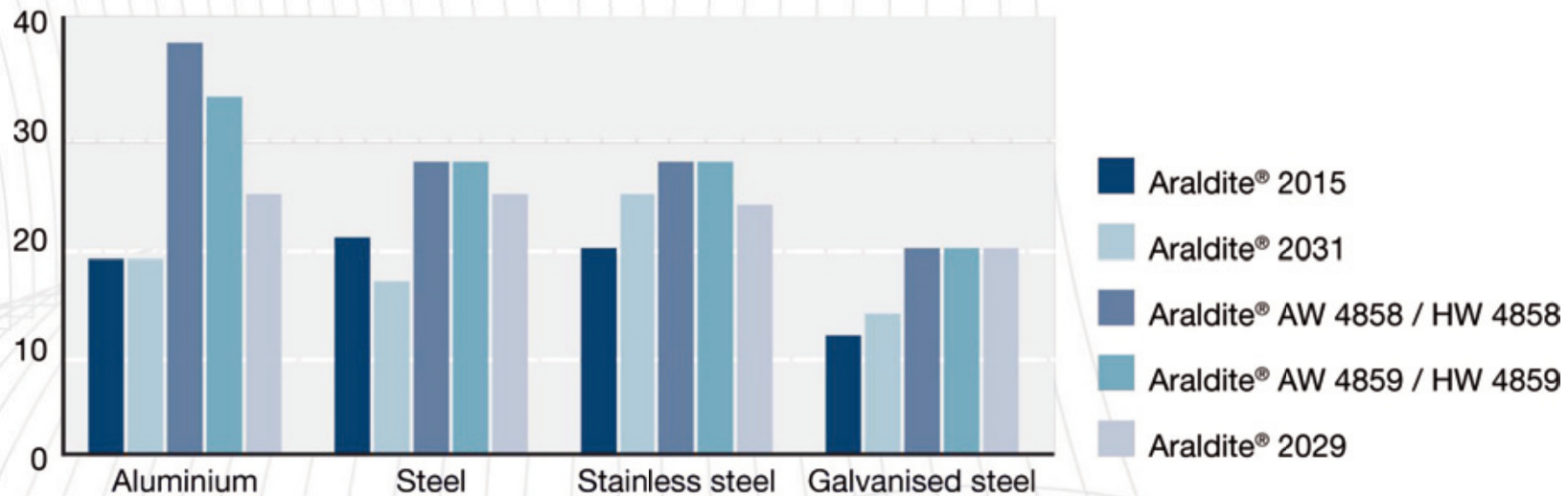
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Performance on metals

Lap Shear Strength at 23°C (MPa)



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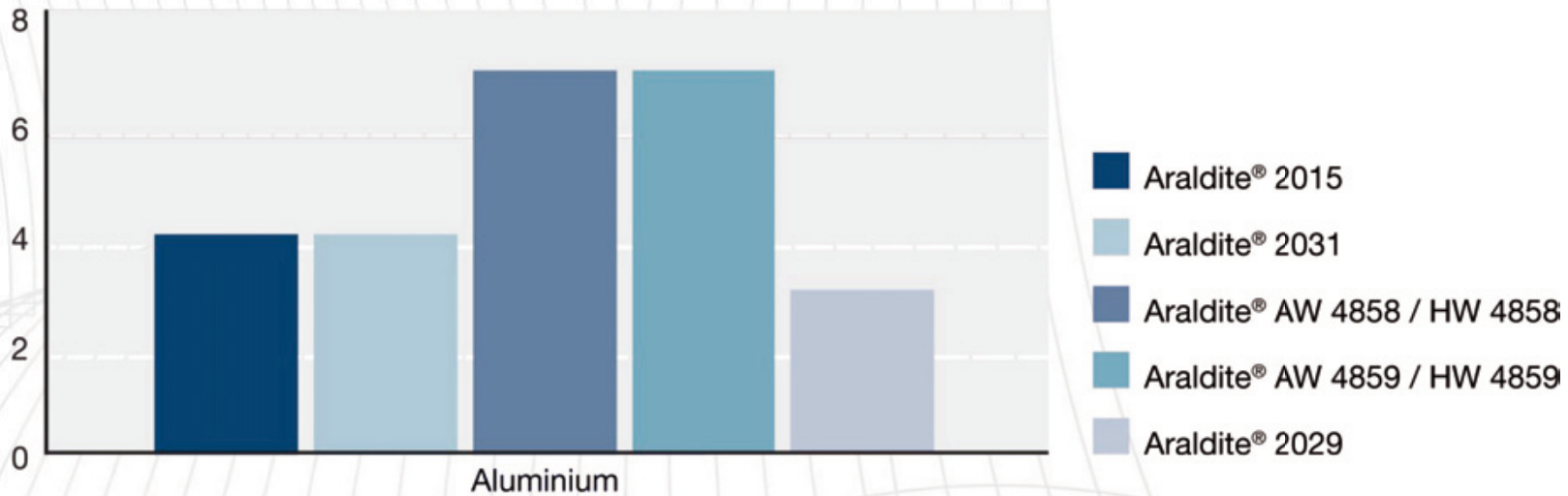
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Performance on aluminium

Peel strength at room temperature (N/mm)



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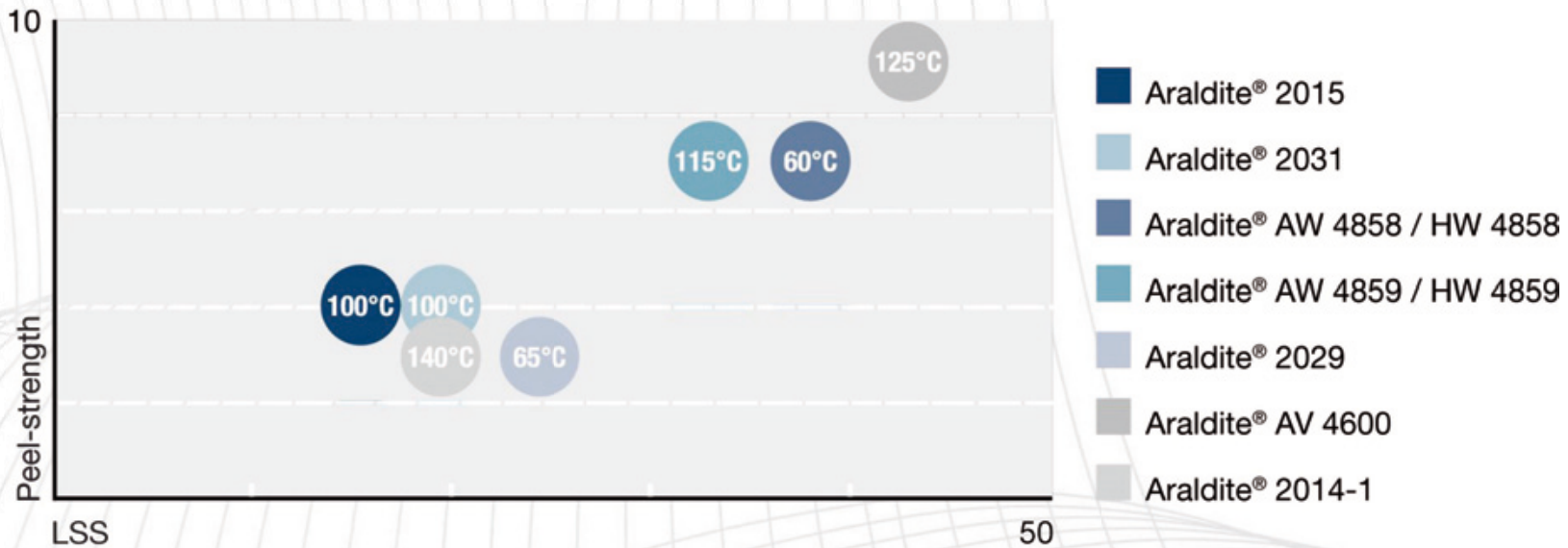
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Strength on aluminium : comparison to epoxy adhesive references

Peel strength at 23°C (N/mm) / Lap Shear Strength (MPa) / Service temperature



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Assembly of composites : main properties overview

Product designation	LSS performance	Peel performance	Thermal resistance	Chemical resistance	Elongation at break
Araldite® 2015	+	++	++	+++	++
Araldite® 2031	+	++	++	+++	++
Araldite® AW 4858 / Araldite® HW 4858	+++	+++	+	++	++
Araldite® AW 4859 / Araldite® HW 4859	+++	+++	+++	++	+
Araldite® 2029	++	++	++	+	+++

Selection for specific requirements

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High service temperature

- Araldite® AV 4415 / Hardener HV 4416
(1/3 of initial LSS at 180°C)

Flame retardant properties

- Araldite® 2033
(UL 94 V0 and EN 45545 qualified)

Fast curing epoxy

- Araldite® AW 2101 / Hardener HW 2951
(5 min gel time – 60 min handling time)

Fast curing methacrylates

- Araldite® 2021, Araldite® 2022, Araldite® 2048
(5-10 min gel time, 15-20 min handling time, tolerant to surface preparation)

Araldite® adhesives in high-end applications

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Araldite® 2013

used for bonding GRP drivers cabin

- excellent adhesion on GRP
- high strength
- toughened for high fatigue resistance
- high durability in ambient weather conditions
- gap filling and sag resistant

Araldite® AW 2104 / Araldite® HW 2934

used for bonding metal hinges to GRP interior panels

- fast curing
- good thermal stability
- no visible joints
- thixotropic for compensation of dimensional tolerances

Araldite® 2029

used for side panel frame bonding for flexible gangway systems

- excellent adhesion on composites and many metals and plastic substrates
- well balanced strength and flexibility
- gap filling and sag resistant

Araldite® adhesives in high performance cars

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Araldite® 2031

used for bonding CFRP-roof to chassis

- black, good color match with CFRP
- tough and resilient for good impact and fatigue resistance
- gap filling and sag resistant

Araldite® 2015

used for bonding CFRP-side blade

- excellent adhesion on composites and many metals
- tough and resilient for good impact and fatigue resistance
- gap filling and sag resistant

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Araldite® AW / HW 4858, Araldite® AW / HW 4859, Araldite® 2022, Araldite® 2031 **used for bonding in high performance boats**

- hull- & superstructure
- bulkheads
- masts
- attachments and auxillary parts

Araldite® AW 4859 / HW 4859 **specifically used for bonding CFRP masts**

- extremely tough and resilient adhesive
- excellent fatigue resistance
- excellent creep resistance
- high temperature resistance
- room temperature cure + 12 hours at 80°C
- black

Araldite® 2022 **used for bonding metal inserts into CFRP hulls of racing rowing**

- fast cure
- toughened with excellent impact and fatigue resistance

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Araldite® AW 4859 / HW 4859

used for bonding of CFRP-tubes to PA66-junction knots

- fast cure
- toughened with excellent impact and fatigue resistance

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View the brochure on SlideShare

With this brochure get an overview of “Araldite® adhesives core range”.



Download our mobile app on your smartphone

With this app select immediately the right Araldite® industrial adhesive for your specific need and a successful bond. Access the product description or send us an email to request the technical data sheet.



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