

## Araldite® Structural Adhesives

### Agomet® F310 A with F310 B and hardener powder/paste Methacrylate adhesive for “No-mix” application

#### Key properties

- “No mix” adhesive – components can be applied to separate surfaces or bead-on-bead
- 10 minute work-life, 20 minute handling strength
- High shear strength and peel strength
- Bonds well to a wide range of metals and plastic materials
- Good thermal stability

#### Description

Agomet F 310 A/B is a two component, room temperature curing, “No-mix” methacrylate adhesive suitable for bonding metals and plastics. Its high setting rate at room temperature allows handling of the bonded parts within a very short time. The adhesive has an assembly time of 10 minutes. As early as 20 minutes after joining (curing at room temperature), the parts can be handled. The final strength is attained within 24 hours. Bonds produced with Agomet F310 A/B show good tensile shear and peel strengths as well as good thermal stability between -40°C and +130°C.

#### Product data

##### as supplied

Properties	F310 A	F310 B	Hardener Powder
Colour (visual)	Beige	Beige	White Powder
Specific gravity	ca. 1.0	ca. 1.0	-
Viscosity (Pas)	ca. 18	ca. 20	-
Gelation time (mins) at 23°C	ca. 10 minutes after the two surfaces are in contact		

#### Processing

##### Pretreatment

The strength and durability of a bonded joint are dependant on proper pretreatment of the surfaces to be bonded, however the methacrylate adhesives can be used effectively with little surface preparation. Ideally joint surfaces should be cleaned with a good degreasing agent such as acetone, isopropanol, or proprietary degreasing agent in order to remove all traces of oil, grease and dirt. Low grade alcohol, gasoline (petrol) or paint thinners should never be used. The strongest and most durable joints are obtained by either mechanically abrading or chemically etching (“pickling”) the degreased surfaces.

##### Application of adhesive

The two components are applied directly to the prepared and dry joint surfaces.

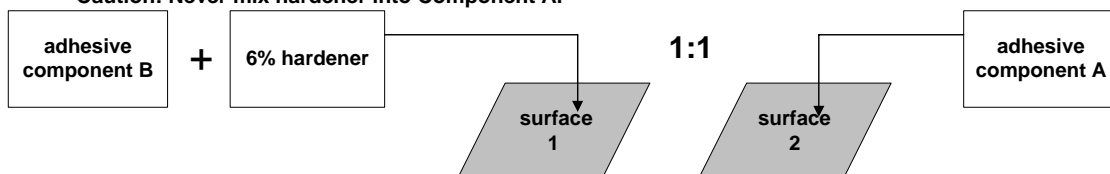
A layer of adhesive 0.15 to 0.25 mm thick will normally impart the greatest lap shear strength to a joint, although joints of up to 0.8mm gap can be assembled.

The joint components should be assembled and clamped as soon as the adhesive has been applied. An even contact pressure throughout the joint area will ensure optimum cure.

Add 4 to 10 % (preferably 6 %) of hardener powder or hardener paste to component B and mix homogeneously, then apply together with the ready-to-use component A in a 1:1 ratio.

Apply component A to one of the surfaces to be joined, then coat the second surface with an equal layer of (hardener containing) component B. Then join the parts and clamp under contact pressure. Since the setting of the adhesive starts only after the two surfaces have been mated, this method of separate processing allows bonding operations practically independent of the pot life.

**Caution: Never mix hardener into Component A!**



As an alternative to the separate processing method (A/B procedure), the two components A and B (without hardener) can be mixed in a 1:1 ratio in advance. In this case, a "normal" Agomet F 310 reaction adhesive is created, which will cure only after adding 2 - 5 % Hardener powder or paste immediately before the actual bonding process. This allows assembly of joints up to 4mm thickness.

**Mechanical processing**

Specialist firms have developed metering, mixing and spreading equipment that enables the bulk processing of adhesive. We will be pleased to advise customers on the choice of equipment for their particular needs.

**Equipment maintenance**

All tools should be cleaned before adhesives residues have had time to cure. The removal of cured residues is a difficult and time-consuming operation.

If solvents such as acetone are used for cleaning, operatives should take the appropriate precautions and, in addition, avoid skin and eye contact.

**Curing speed**

**Times to minimum shear strength**

Temperature	°C	0	10	15	23	40
Cure time to reach	hours	2	-	-	-	-
LSS > 1N/mm <sup>2</sup>	minutes	-	35	25	20	10
Cure time to reach	hours	2½	-	-	-	-
LSS > 10N/mm <sup>2</sup>	minutes	-	40	35	25	12

LSS = Lap shear strength.

**Typical cured properties**

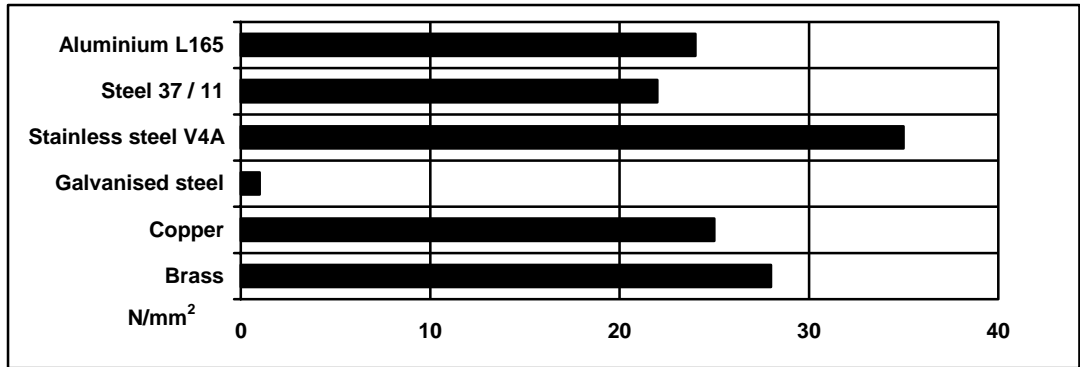
Unless otherwise stated, the figures given below were all determined by testing standard specimens made by lap-jointing 170 x 25 x 1.5 mm strips of aluminium alloy. The joint area was 12.5 x 25 mm in each case.

The figures were determined with typical production batches using standard testing methods. They are provided solely as technical information and do not constitute a product specification.

**Average lap shear strengths of typical metal-to-metal joints (ISO 4587)**

Cured for 7 days at 23°C and tested at 23°C

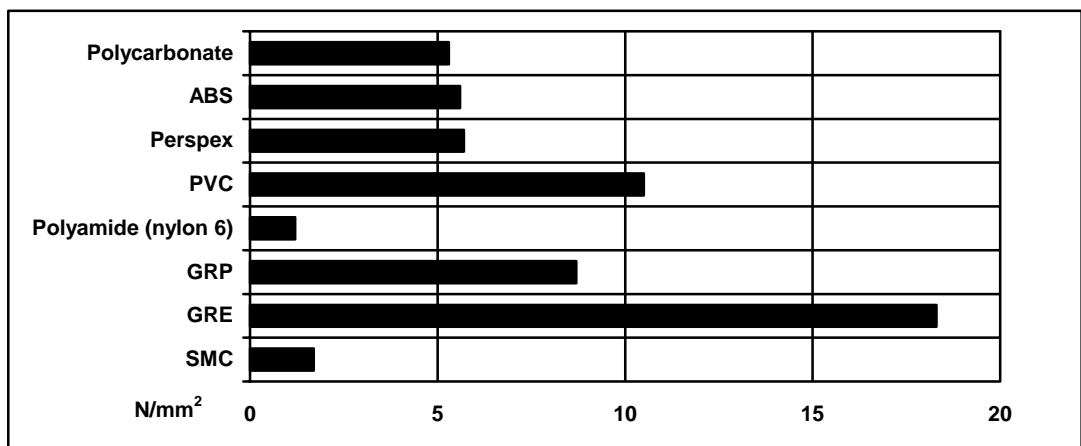
Pretreatment - Sand blasting



**Average lap shear strengths of typical plastic-to-plastic joints (ISO 4587)**

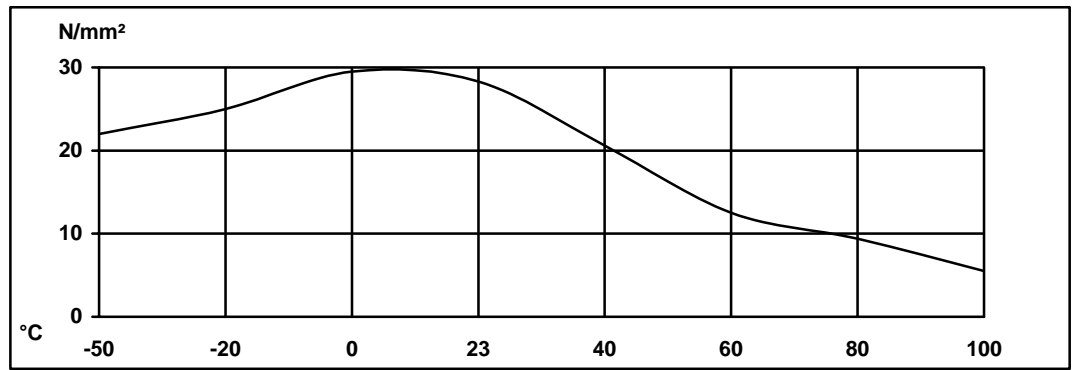
Cured for 7 hours at 23°C and tested at 23°C

Pretreatment - Lightly abrade and isopropanol degrease.



**Lap shear strength versus temperature (ISO 4587) (typical average values)**

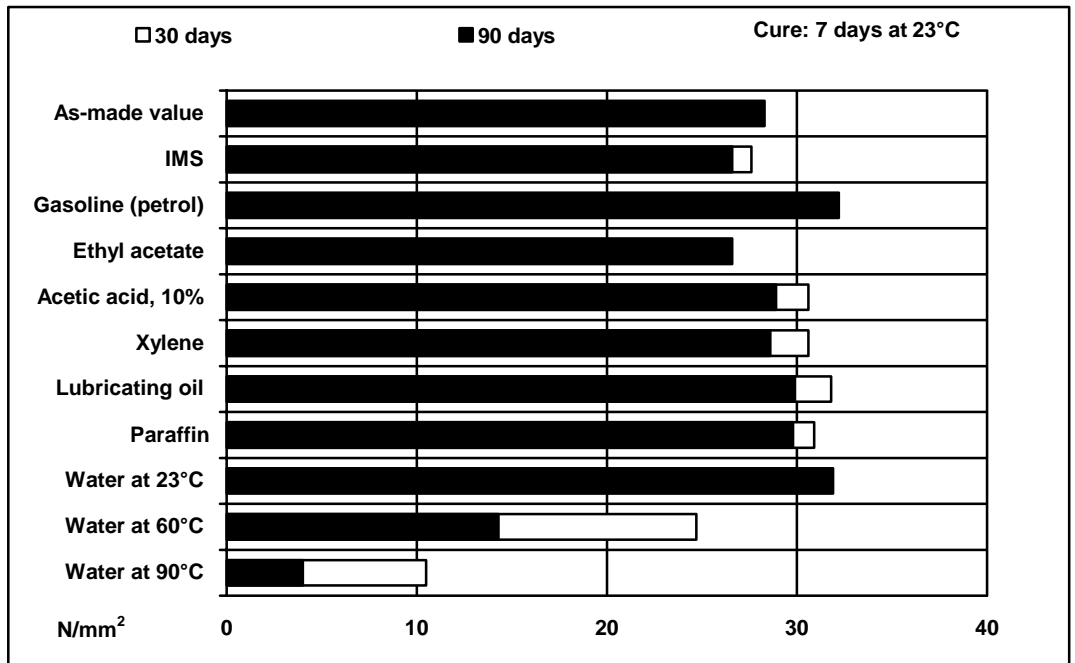
Cure: = 7 days at 23°C



<b>Roller peel test (ISO 4578) at 23°C</b>	8.1 N/mm (cured 7 days at 23°C)
<b>Glass transition temperature (Tg)</b>	54°C (cured 7 days at 23°C)
<b>Tensile strength ISO R527 type 1</b>	25 MPa (cured 7 days at 23°C)
<b>Elongation at break ISO R527 type 1:</b>	2.3 %
<b>Coefficient of thermal expansion (-30°C/+30°C)</b>	74 x 10 <sup>-6</sup> /°K (cured 7 days at 23°C)

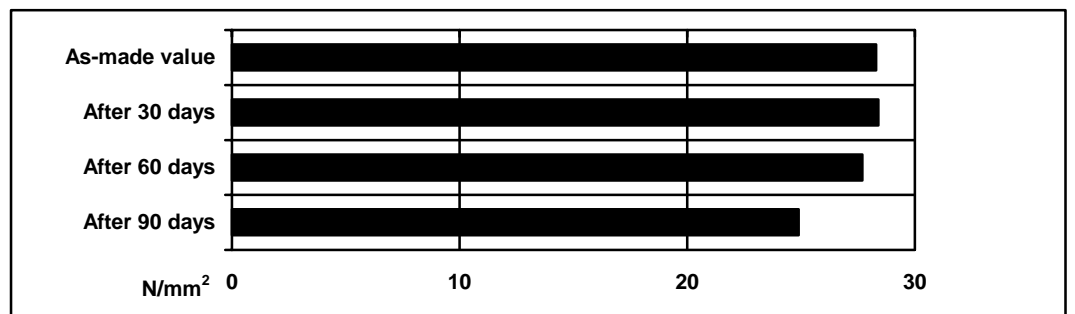
**Lap shear strength versus immersion in various media at 23°C (typical average values)**

Substrate – sandblasted aluminium



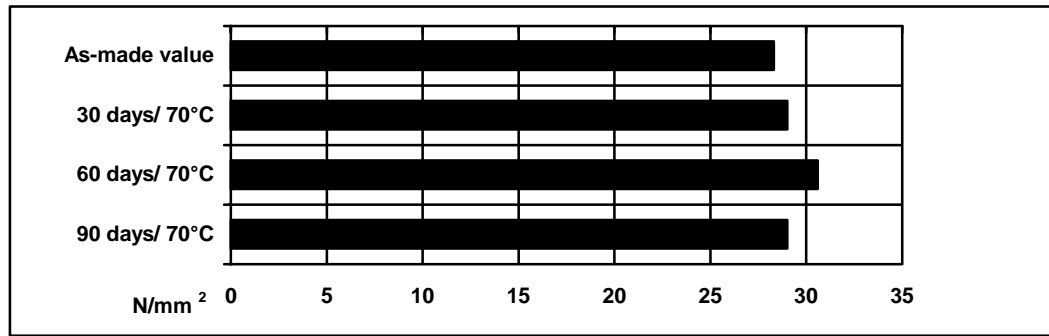
**Lap shear strength versus tropical weathering (40/92, DIN 50015; typical average values)**

Cure: 7 days at 23°C



### Lap strength versus heat ageing

Cure: 7 days at 23°C



### Thermal cycling

100 cycles of 6 hour duration from -30°C to 70°C: 31.2 N/mm<sup>2</sup>

### Shear modulus (DIN 53345)

cured 7 days at 23°C

Temperature	G' modulus	Tan delta
0°C	0.7 GPa	$6.4 \times 10^{-2}$
20°C	0.7 GPa	$6.8 \times 10^{-2}$
40°C	0.6 GPa	$7.15 \times 10^{-2}$
60°C	0.45 GPa	$9 \times 10^{-2}$
80°C	0.25 GPa	$2 \times 10^{-1}$
100°C	60 MPa	$4.5 \times 10^{-1}$

### Storage

Agomet F310 A and B may be stored for up to 36 months at 2-8°C provided the components are stored in sealed containers. When stored at 23°C the life is a maximum of 6 months. The expiry date, assuming 2-8°C storage, is indicated on the packaging.

After mixing hardener powder with component B, the shelf life of this component is reduced to 2 - 3 weeks

### Handling precautions

#### Caution

Our products are generally quite harmless to handle provided that certain precautions normally taken when handling chemicals are observed. The uncured materials must not, for instance, be allowed to come into contact with foodstuffs or food utensils, and measures should be taken to prevent the uncured materials from coming in contact with the skin, since people with particularly sensitive skin may be affected. The wearing of impervious rubber or plastic gloves will normally be necessary; likewise the use of eye protection. The skin should be thoroughly cleansed at the end of each working period by washing with soap and warm water. The use of solvents is to be avoided. Disposable paper - not cloth towels - should be used to dry the skin. Adequate ventilation of the working area is recommended. These precautions are described in greater detail in the Material Safety Data sheets for the individual products and should be referred to for fuller information.

### Huntsman Advanced Materials

All recommendations for the use of our products, whether given by us in writing, verbally, or to be implied from the results of tests carried out by us, are based on the current state of our knowledge. Notwithstanding any such recommendations the Buyer shall remain responsible for satisfying himself that the products as supplied by us are suitable for his intended process or purpose. Since we cannot control the application, use or processing of the products, we cannot accept responsibility therefor. The Buyer shall ensure that the intended use of the products will not infringe any third party's intellectual property rights. We warrant that our products are free from defects in accordance with and subject to our general conditions of supply.

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