

Structural Adhesives

Araldite® 2027 (XD 4712/XD 4713) Two component PU adhesive system

Key properties

- For primerless SMC bonding
- Bonds well to most thermoplastics
- Flexible
- 10 minute assembly time
- Excellent gap filling capability

Description

Araldite 2027 is a two component, room temperature curing, beige coloured, thixotropic polyurethane adhesive specially designed for bonding of SMC. Araldite 2027 also bonds many other thermoset and thermoplastic materials and metals.

Product data

Properties	2027/A	2027/B	2027 (mixed)
Colour (visual)	beige	beige	beige
Specific gravity	ca 1.5	ca 1.45	ca 1.5
Viscosity (Pas)	ca. 18	ca. 20	highly thixotropic
Pot Life (5 gm at 25°C)	-	-	8 - 10 minutes

Processing

Pretreatment

The strength and durability of a bonded joint are dependant on proper pretreatment of the surfaces to be bonded.

At the very least, joint surfaces should be cleaned with a good degreasing agent such as acetone, iso-propanol (for plastics) or other proprietary degreasing agents 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. Abrading should be followed by a second degreasing treatment

Mix ratio	Parts by weight	Parts by volume
Araldite 2027/A	100	100
Araldite 2027/B	97	100

Resin and hardener are available in cartridges incorporating mixers and can be applied as ready-to-use adhesive with the aid of the tool recommended by Huntsman Advanced Materials.

Application of adhesive

The resin/hardener mix is applied directly or with a spatula, to the pretreated and dry joint surfaces.

A layer of adhesive 0.05 to 0.10 mm thick will normally impart the greatest lap shear strength to the joint.

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.

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 with hot water and soap 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.

Times to minimum shear strength

Temperature	°C	10	15	23	40	60	80
Cure time to reach	hours	5½	4	1½	-	-	-
LSS > 1N/mm ²	minutes	-	-	-	40	15	5
Cure time to reach	hours	27	22	8½	4	-	-
LSS > 10N/mm ²	minutes	-	-	-	-	20	14

LSS = Lap shear strength.

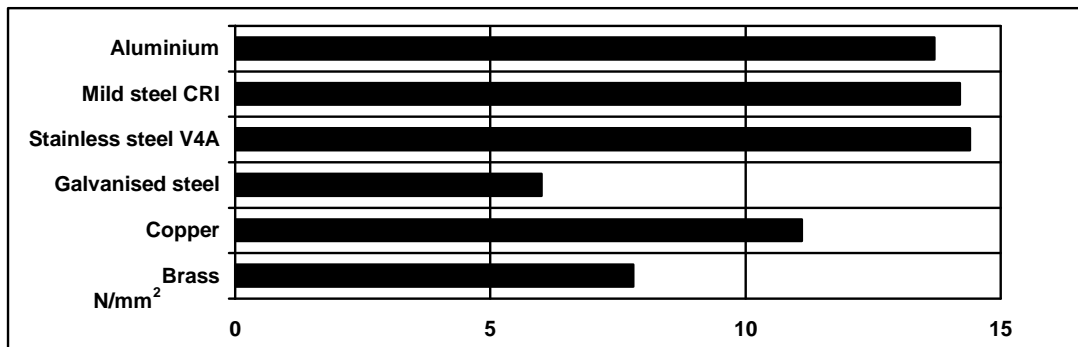
Typical cured properties

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 16 hours at 40°C and tested at 23°C

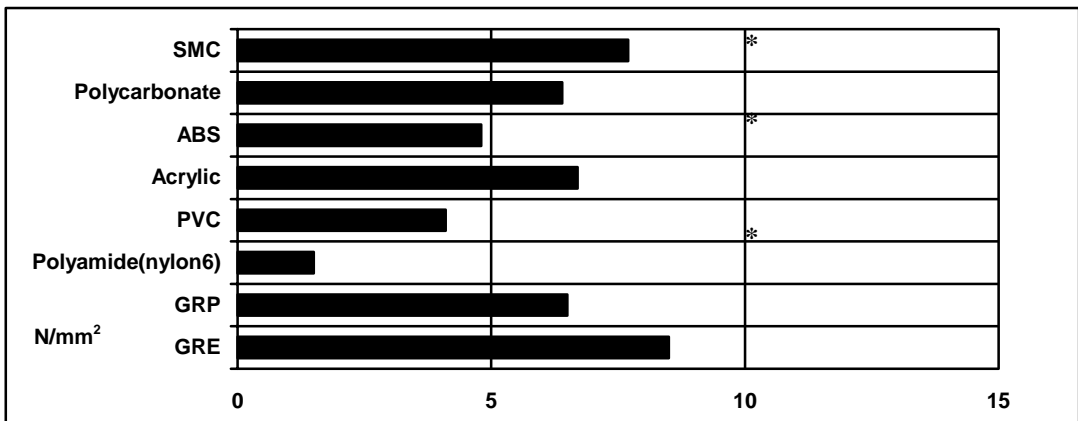
Pretreatment - Sand blasting



Average lap shear strengths of typical non-metallic joints (ISO 4587)

Cured for 16 hours at 40°C and tested at 23°C

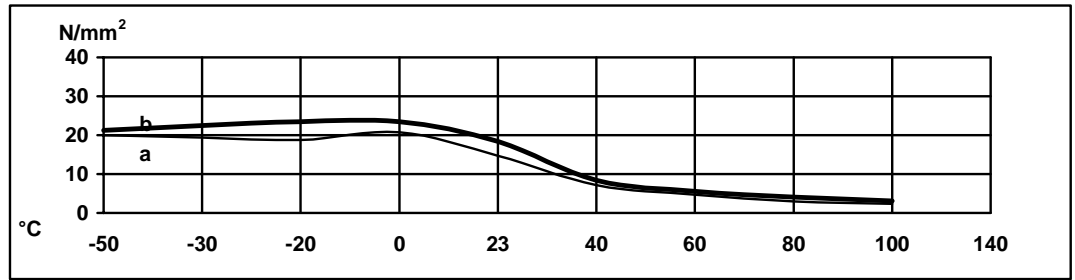
Pretreatment - Lightly abrade and alcohol degrease.



* denotes substrate failure

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

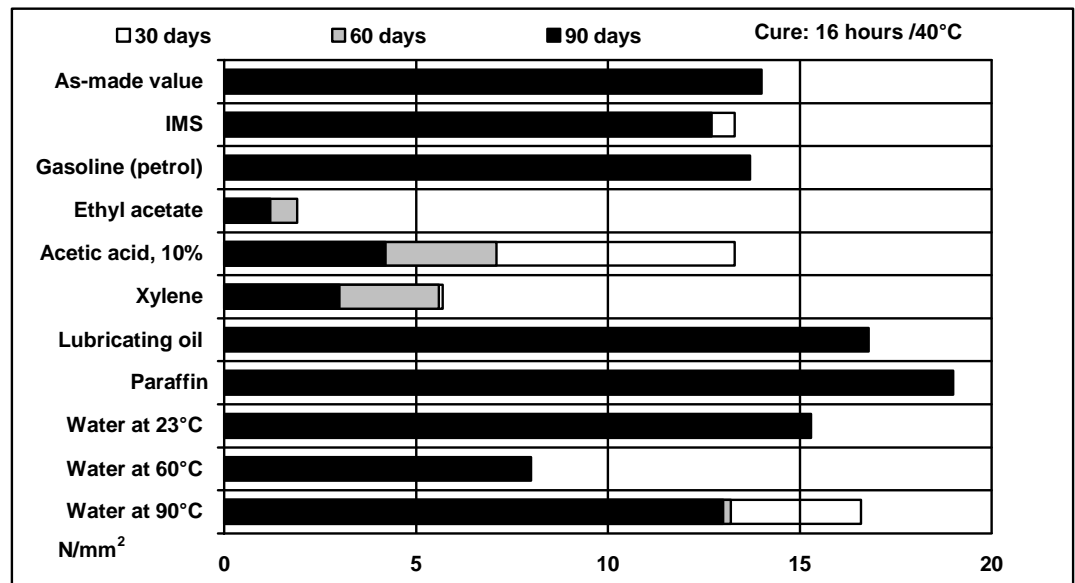
Cure: (a) = 7 days /23°C; (b) = 24 hours/23°C + 30 minutes/80°C



Roller peel test (ISO 4578)	8.1 N/mm
Cured 16 hours/40°C	
Coefficient of thermal expansion -30°C to 0°C	59 x 10 ⁻⁶ /°K
30°C to 60°C	95 x 10 ⁻⁶ /°K
Glass transition temperature	ca. 15°C
Tensile strength (ISO R527 type 1)	14 MPa
Tensile modulus	848 MPa
Elongation at break	15%

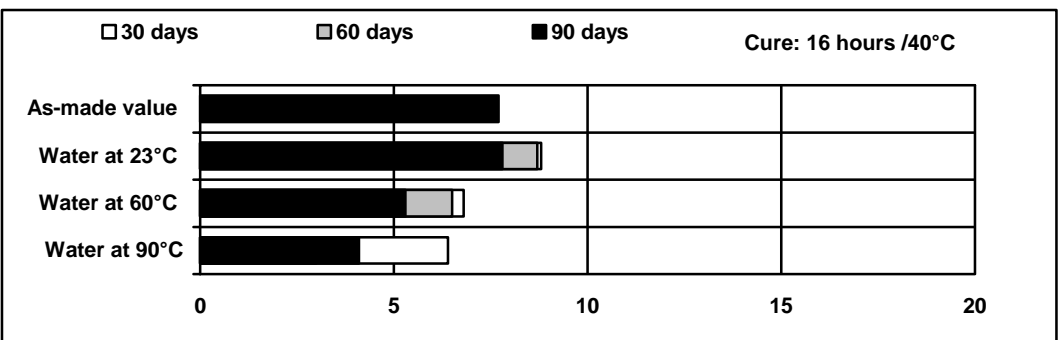
Lap shear strength on aluminium versus immersion in various media (typical average values)

Unless otherwise stated, L.S.S. was determined after immersion for 90 days at 23°C



Lap shear strength on SMC versus immersion in water (typical average values)

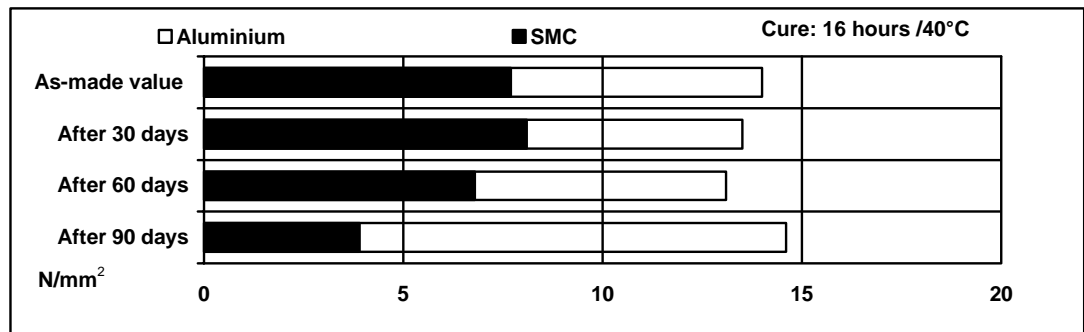
L.S.S. was determined at 23°C



Note- All water immersion tests gave substrate failures in the L.S.S. test.

Lap shear strength versus tropical weathering on aluminium and SMC

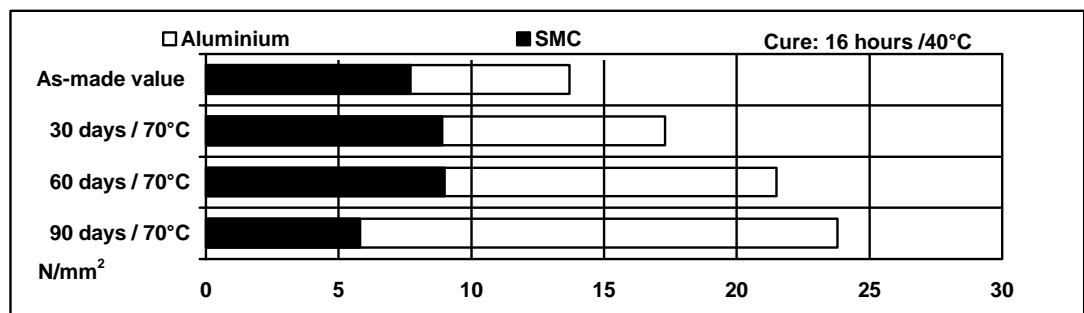
(40/92, DIN 50015; typical average values) Cure: 16 hours/40°C; Test: at 23°C



Note- All tropical weathering tests and thermal ageing tests on SMC gave substrate failure in the L.S.S. test.

Lap shear strength versus heat ageing on aluminium and SMC.

Cure: 16 hours/40°C; Test at 23°C



Thermal cycling

100 cycles of 6 hour duration from -30°C to 70°C: 9.2 N/mm²

Shear modulus G' (DIN 53345)

-60°C	2.4 GPa	20°C	1.3 GPa
-30°C	2.2 GPa	40°C	0.2 GPa
0°C	1.8 GPa		

Flexural Properties (ISO 178) Cure 16 hours/ 40°C tested at 23°C

Flexural Strength 9.48 MPa

Flexural Modulus 484.5 MPa

Storage

Araldite 2027/A and Araldite 2027/B may be stored at 6 - 28°C provided the components are stored in sealed containers. The expiry date is indicated on the label. Cartridges should not be stored for long periods after removal from the foil overpack.

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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