

Araldite® AW 4856 Hardener HW 4856 or Hardener HW 4856 Fast

Product Description

Araldite® AW 4856 Hardener HW 4856 or Hardener HW 4856 Fast Adhesive is a warm curing, toughened epoxy adhesive used in the assembly of large composite structures, where its thixotropy enables application of heavy beads on a vertical surface without slumping. It is ideally suited for wind turbine blade assembly by machine application.

Features

- Two component toughened epoxy adhesive
- Outstanding impact and fatigue resistance
- High resistance to crack formation after cure
- Non-slumping on vertical surfaces up to 50mm¹
- Low exotherm and shrinkage for thick bond lines
- Long working time
- Easy to pump and mix

Typical Properties²

Property	Araldite® AW 4856	Hardener HW 4856	Mixed System
Color	Yellow	Blue	Green
Density at 23°C, g/cm ³	1.30 - 1.40	1.10 - 1.15	1.25 - 1.35
Viscosity at 23°C, cP			Thixotropic
Pot life at 23°C, 500 g, min	--	--	240 - 280
Gel Time, min 158°F (70°C) 176°F (80°C)			40 - 50 25 - 35

- (1) A maximum thickness of 20-25 mm is recommended to avoid exotherm effect as well as excessive induced stresses in thick joint.
 (2) Properties are based on Huntsman test methods.

Processing

Mix Ratio

Product	Parts by weight	Parts by volume
Araldite® AW 4856	100	100
Hardener HW 4856 Hardener HW 4856 Fast	42	50

Pretreatment

The strength and durability of a bonded joint is dependent on proper treatment of the surfaces to be bonded. At the very least, joint surfaces should be cleaned with a good degreasing agent such as acetone, isopropanol (for plastics) or other proprietary degreasing agents in order to remove all traces of oil, grease and dirt. It is recommended to mechanically abrade the substrate surface in order to ensure consistent adhesion. The surface should be degreased following abrasion (as above). For composite laminates, the surface may be conveniently prepared by use of a peel ply which is removed immediately prior to bonding. Low grade alcohol, gasoline (petrol) or paint thinners should never be used for degreasing.

Mechanical Processing

Resin and hardener should be blended until they form a homogeneous green colored mix. The resin/hardener mix is applied 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. It is strongly recommend to apply the adhesive using a meter-mix machine.

Equipment Maintenance

All tools should be cleaned with hot water and suitable detergent or solvent 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.

Typical Physical Properties

Unless otherwise stated, the data were determined with typical production batches using standard test methods. They are typical values only, and do not constitute a product specification.

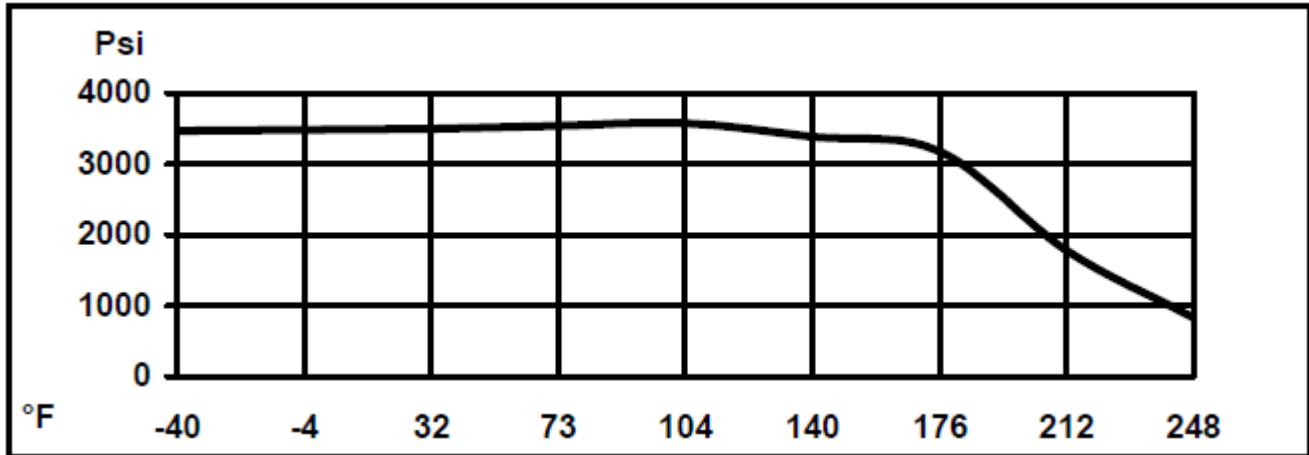
Unless a different specification is given, the figures below were all determined by testing standard specimens made by lap-jointing 4.5 x 1 x 0.063 in (114 x 25 x 1.6 mm) strips of aluminum alloy. The joint area was 0.5 x 1 in (12.5 x 25 mm) in each case. Samples were cured at 104°F (40°C) for 16 hours and tested at 23°C, unless otherwise noted.

Advanced Materials

Technical Datasheet

Property		AW 4856 HW 4856	AW 4856 HW 4856 Fast	Test Method
Glass transition temperature, DSC, °F (°C)	Cure Schedule: 7 days/73°F (23°C) 6h/122°F (50°C) 24h/122°F (50°C) 5h/158°F (70°C) 4h/158°F (70°C) + 3h/212°F (100°C) 4h/176°F (80°C)	124-135 (51-57) 129-140 (54-60) 158-169 (70-76) 164-174 (73-79) 174-185 (79-85) 176-185 (80-85)	49-51 57-61 67-71 74-78 79-85 -	IEC 1006
Linear Shrinkage, cured at 158°F (70°C), %		0.2-0.6	-	-
Flexural strength, ksi (MPa)		17.4-20.3 (120-140)	100-110	ISO 178
Flexural modulus, cured 5h 158°F (70°C), psi (GPa)		667-798 (4.6-5.5)	4.5-5.0	ISO 178
Flexural elongation, %		2.5-3.0	2.2-2.5	ISO 178
Tensile strength, ksi (MPa)		8.7-9.4 (60-65)	-	ISO 527
Tensile modulus, ksi (GPa)		711-754 (4.9-5.2)	-	ISO 527
Tensile elongation, %		1.3-2.0	-	ISO 527
Bend Notch test, cured 5 hours 70°C	Fracture toughness K_{1C} , MPa/m Fracture energy G_{1C} , J/m ²	3,187-3,517 7.98-9.69	2.3-3.0 1300-1700	ISO 13586
Hardness, shore D		78-82	-	ISO 868
Exotherm, 500g, 50mm thick Peak exotherm temperature, F (C) Time to reach peak, min		140-176 (60-80) 330-345	140-160C 40-50	-
Average lap shear strength, psi Aluminum, sand blasted at 23°C, joint thickness: 0.5mm 3.0mm at 50°C, joint thickness: 0.5mm 3.0mm Steel CR1 EP-GRP UP-GRP SMC CFRP		3.6-4.4 1.9-2.3 3.2-4.2 1.9-2.3 1.9-2.3 3.2-3.6 1.3-1.5 1.0-1.2 3.99-4.35	15-20MPa - 20-23MPa - - - - - -	ISO 4587

Figure 1. Lap Shear Strength vs. Temperature on acid etched Aluminum
(typical average values per ISO 4587). Cure: 5 hours at 70°C.



Storage

Araldite® 4856 Hardener HW 4856 Adhesive should be stored in a dry place, in the original sealed containers, at temperatures between 2°C and 40°C (36°F and 104°F). Under these storage conditions, the product has a shelf life of **3 years** (from date of manufacture). The product should not be exposed to direct sunlight.

If stored below 60°F, the adhesive should be brought to 60°F - 77°F and conditioned at this temperature for some time prior to use.

Precautionary Statement

Huntsman Advanced Materials Americas LLC maintains up-to-date Safety Data Sheets (SDS) on all of its products. These sheets contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. Users should review the latest MSDS to determine possible health hazards and appropriate precautions to implement prior to using this material.

First Aid!

Refer to SDS as mentioned above.

KEEP OUT OF REACH OF CHILDREN

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