

Advanced Materials**ARALDITE® AY 103 Resin or
ARALDITE® AY 557 Resin with
HARDENER HY 951 or HARDENER HY 956****MEDIUM VISCOSITY EPOXY ADHESIVES****Description**

ARALDITE® AY 103 resin and ARALDITE® AY 557 epoxy resins with either Hardener HY 951 or Hardener HY 956 produce medium-viscosity adhesives that are ideal for bonding metals, ceramics, glass, rubber and plastics. The solvent-free epoxy adhesives produce chemical-resistant, electrically insulating joints with good mechanical strength.

**Typical
Properties****Test Values**

<u>Property</u>	AY 103/ HY 951	AY 103/ HY 956	AY 557 HY 951	AY 557 HY 956
Mix Ratio (by weight)	100R/ 8-10H	100R/ 16-18H	100R/ 10-12H	100R/ 22-24H
Mix Ratio (by volume)	100R/ 9.5-12H	100R/ 18-20H	100R/ 12-14H	100R/ 26-27H

NOTE: Resin and hardener must be thoroughly mixed before application to bonding surfaces.

Typical Mixed Properties	Property	Test Method	Test Values ⁽¹⁾	
	Pot Life, 50 gram mass	ASTM D-2471	AY 103 + HY 951 or HY 956	AY 557+ HY 951 or HY 956
	@ 77°F (25°C) or		1.5-2 hrs.	45-60 min.
	@ 104°F (40°C) or		35-45 min.	20-30 min.
	@ 140°F (60°C)		~15 min.	~20 min.

¹Tested @ 77°F (25°C)

Processing

Because of heat generated by the exothermic reaction between resin and hardener, the application time of the mixed epoxy adhesive will be noticeably shortened if more than 250 grams of mixture is allowed to stand in a compact mass, as in a mixing container.

Since the resin system has a limited usable life, it is good practice to prepare only the quantity of adhesive needed for immediate use or to use automatic mixing/dispensing equipment.

Adhesive Application

The resin/hardener mix may be applied manually or robotically to the pretreated and dry joint surfaces. Huntsman's technical support group can assist the user in the selection of a suitable application method as well as suggest a variety of reputable companies that manufacture and service adhesive dispensing equipment.

A layer of adhesive 0.002 to 0.004 in (0.05 to 0.10 mm) thick will normally impart the greatest lap shear strength to the joint. Huntsman stresses that proper adhesive joint design is also critical for a durable bond. The joint components should be assembled and secured in a fixed position as soon as the adhesive has been applied.

For more detailed explanations regarding surface preparation and pretreatment, adhesive joint design, and the dual syringe dispensing system, visit www.araldite.com.

Recommended Cure Schedules

<u>Temperature</u>	<u>Minimum Cure Time</u>	
	<u>AY 103 + HY 951 or HY 956</u>	<u>AY 557 + HY 951 or HY 956</u>
@ 77°F (25°C) or	24 hrs.	—
@ 104°F (40°C) or	8 hrs.	12 hrs.
@ 140°F (60°C) or	3 hrs.	3 hrs.
@ 212°F (100°C)	20 min.	20 min.

Typical Properties

Property	Test Values			
	AY 103/ HY 951	AY 103/ HY 956	AY 557/ HY 951	AY 557/ HY 956
Initial Viscosity at 77°F (25°C), PaS	0.5-1.0	0.8-1.5	1.5-3.0	2.0-3.5
Shear Strength*, psi (MPa)				
At -76°F (-60°C)				
After 1 hr. @ 248°F (120°C)	2102 (14.5)	1812 (12.5)	2102 (14.5)	1812 (12.5)
At 68°F (20°C)				
After 24 hrs. @ 68°F (20°C)	2538 (17.5)	2538 (17.5)	--	--
After 12 hrs. at 104°F (40°C)	2538 (17.5)	2538 (17.5)	2538 (17.5)	2538 (17.5)
After 20 min. at 212°F (100°C)	2828 (19.5)	2828 (19.5)	2828 (19.5)	2828 (19.5)
At 194°F (90°C)				
After 20 min. @ 212°F (100°C)	290 (2.0)	290 (2.0)	1232 (8.5)	1232 (8.5)
After 1 hr. @ 248°F (120°C)	406 (2.8)	406 (2.8)	1812 (12.5)	1812 (12.5)
Deflection temperature, BS 2782, Method 121A, °F (°C)	113 - 140 (45 - 60)	113 - 140 (45 - 60)	185 - 194+ (85 - 90)	185 - 194+ (85 - 90)
Coefficient of thermal expansion, ASTM D-696-70, in./in./°C	90 - 95 $\times 10^{-6}$	95 - 100 $\times 10^{-6}$	65 - 70 $\times 10^{-6}$	65 - 70 $\times 10^{-6}$
Modulus of elasticity, BS 2782, Method 335A, ksi (GPa)	391.6 - 435.1 (2.7 - 3.0)	435.1 - 478.6 (3.0 - 3.3)	551.1 - 609.2 (3.8 - 4.2)	478.6 - 536.6 (3.3 - 3.7)

* Average shear strength of a 0.04 in (0.91 mm) BS L152 aluminum alloy lap joint (joint area was 0.5 x 1 inch (12.5 mm x 2.5 cm in each case.)

+ Average deflection temperature after curing for 3 hrs. at 140°F (60°C). Prolonged curing at temperatures above 140°F (60°C) will give a deflection temperature above 212°F (100°C) with HY 951 or approaching 212°F (100°C) with HY 956:

System	Cure Schedule	Deflection Temperature, °F (°C)
ARALDITE AY 557 + HY 951	16 hrs. @ 77°F (25°C)	
	+ ½ hr. @ 248°F (120°C)	203 - 212 (95 - 100)
	3 hrs. @ 140°F (60°C)	
	+ 2 hrs. @ 248°F (120°C)	257 - 266 (125 - 130)
ARALDITE AY 557 + HY 956	16 hrs. @ 77°F (25°C)	
	+ ½ hr. @ 248°F (120°C)	203 - 212 (95 - 100)
	3 hrs. @ 140°F (60°C)	
	+ 2 hrs. @ 248°F (120°C)	203 - 212 (95 - 100)

Storage

ARALDITE® epoxy adhesive components should be stored in a dry place, in the sealed original container, at temperatures between +2°C and +40°C (+36°F and 104°F). Under these storage conditions, the shelf life is 3 years. 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 Material Safety Data Sheets (MSDS) 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 MSDS as mentioned above.

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