

Advanced Materials**Araldite® LY 1564 SP / Aradur® 917 / Accelerator 960-1****HOT CURING EPOXY SYSTEM**

Araldite® LY 1564 SP is a low-viscosity epoxy resin

Aradur® 917 is an anhydride hardener

Accelerator 960-1 is used as an amine accelerator

APPLICATIONS	Industrial composites (tubes, pipes, profiles)		
PROPERTIES	Araldite® LY 1564 SP with Aradur® 917 and Accelerator 960-1 exhibits a low-mix viscosity at room temperature in combination with a long pot life. However, very short cure cycles can be achieved at cure temperatures above 248 °F for an economical production. The system shows good fiber impregnation properties and is easy to process. The cured system has excellent mechanical properties.		
PROCESSING	<ul style="list-style-type: none"> • Filament Winding • Pultrusion • Wet lay-up • Resin Transfer Moulding (RTM) 		
KEY DATA	Araldite® LY 1564 SP		
	Aspect (visual)	clear liquid	
	Colour (Gardner,	1 - 2	
	Viscosity at 25 °C (ISO 12058-1))	1200 - 1400	[mPa s]
	Density at 25 °C (ISO 1675)	1.1 - 1.2	[g/cm ³]
	Flash point	185	[°C]
	Aradur® 917		
	Aspect (visual)	clear liquid	
	Colour (Gardner,	≤ 2	
	Viscosity at 25 °C (ISO 12058-1)	50 - 100	[mPa s]
	Density at 25 °C (ISO 1675)	1.20 - 1.25	[g/cm ³]
	Flash point	195	[°C]
	Accelerator 960-1		
	Aspect (visual)	light yellow liquid	
	Colour (Gardner,	≤ 8	
	Viscosity at 25 °C (ISO 12058-1)	150 - 300	[mPa s]
	Density at 25 °C (ISO 1675)	0.95 - 0.97	[g/cm ³]
	Flash point	110 - 120	[°C]

PROCESSING DATA

MIX RATIO	<i>Components</i>	<i>Parts by weight</i>	<i>Parts by volume</i>
	Araldite® LY 1564 SP	100	100
	Aradur® 917	98	93
	Accelerator 960-1	3	3.5

PROCESSING RECOMMENDATIONS The hardener and accelerator can be premixed to allow the use of two-component mixing/dosing equipment. The temperature where gelation is being carried out should not be higher than necessary. A high gelation temperature induces shrinkage and generates internal stress within the part.

INITIAL MIX VISCOSITY (HOEPLER, ISO 12058-1B)	<i>[°F]</i> at 78 at 104		<i>[cps]</i> 450 - 700 100 - 200
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POT LIFE (TECAM, 100 ML, 65 % RH)	<i>[°F]</i> at 73 at 122	<i>[h]</i> <i>[min]</i>	80 - 90 210 - 250
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GEL TIME (HOT PLATE)	<i>[°F]</i> at 176 at 212 at 230 at 248 at 266 at 284 at 302		<i>[min]</i> 30 - 40 8 - 13 5 - 8 3 - 5 2 - 4 1 - 2 0.5 - 1.5
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The values shown are for small amounts of pure resin/hardener mix. In composite structures the gel time can differ significantly from the given values depending on the fibre content and the laminate thickness.

TYPICAL CURE CYCLES
0.5 - 1 h 266 °F
or 4 h 212 °F
or 4 h 176 °F + 4 h 248 °F

The optimum cure cycle has to be determined case by case depending on the processing and the economic requirements.

PROPERTIES OF THE CURED, NEAT FORMULATION

GLASS TRANSITION TEMPERATURE (IEC 1006, DSC, 10 K/MIN)	<i>Cure:</i> 4 h 176 °F 4 h 212 °F 1 h 266 °F 4 h 176 °F + 4 h 248°F 4 h 176 °F + 4 h 284 °F 4 h 176 °F + 8 h 284 °F 4 h 176 °F + 4 h 320 °F		T_G [°C] 190 - 208 230 - 248 201 - 216 252 - 266 239 - 253 239 - 253 234 - 248
TENSILE TEST (ISO 527)	<i>Cure:</i> 4 h 176 °F + 4 h 248 °F		
	Tensile strength [Kpsi]		10.9 – 13.2
	Elongation at tensile strength [%]		4 - 5
	Ultimate strength [Kpsi]		10.9 – 13.2
	Ultimate elongation [%]		4.5 - 5.5
	Tensile modulus [Kpsi]		450 - 464
FLEXURAL TEST (ISO 178)	<i>Cure:</i> 4 h 212 °F 4 h 176 °F + 4 h 248 °F		
	Flexural strength [Kpsi]	21.8 – 23.9	20.3 – 21.8
	Elongation at flexural strength [%]	6 - 7	6 - 7
	Flexural modulus [Kpsi]	471 - 500	435 - 450
FRACTURE PROPERTIES	<i>Cure:</i> 4 h 80 °C + 4 h 120 °C		
BEND NOTCH TEST (PM 258-0/90)	Fracture toughness K_{1C} [vin*lb/in ²]		648 - 769
	Fracture energy G_{1C} [In*lb/in ²]		0.57 – 0.71
WATER ABSORPTION (ISO 62)	<i>Immersion:</i> 1 day H ₂ O 23 °C 10 days H ₂ O 23 °C	<i>Cure:</i> 4 h 176 °F + 4 h 248 °F	
		[%]	0.13 - 0.15
		[%]	0.40 - 0.45
FLEXURAL TEST (ISO 178)	Laminate comprising 12 layers unidirectional E-glass fabric (425 g/m ²) Fibre volume content: 59 - 64 % Laminate thickness t = 3.0 - 3.3 mm	<i>Cure:</i> 4 h 176 °F + 4 h 120 °F	
	Flexural strength [Kpsi]		127.6 – 142.1
	Elongation at flexural strength [%]		2.0 - 2.2
	Flexural modulus [Kpsi]		6380 - 6670
INTERLAMINAR SHEAR STRENGTH (ASTM D 2344)	Short beam: Laminate comprising 12 layers unidirectional E-glass fabric (425 g/m ²) Fibre volume content: 59 - 64 % Laminate thickness t = 3.0 - 3.3 mm	<i>Cure:</i> 4 h 176 °F + 4 h 248 °F	
	Shear strength [Kpsi]		7.8 – 8.4

STORAGE

Araldite® LY 1564 SP should be stored in a dry place, in the sealed original container, away from heat and humidity, at temperatures between +2°C and +40°C (+35.6°F and +104°F). Under these storage conditions, the shelf life is 6 years. The product should not be exposed to direct sunlight.

Aradur® 917 should be stored in a dry place, in the sealed original container, away from heat and humidity, at temperatures between +2°C and +40°C (+35.6°F and +104°F). Under these storage conditions, the shelf life is 2 years. The product should not be exposed to direct sunlight. Because Aradur® 917 is sensitive to moisture, storage containers should be ventilated with dry air only.

Accelerator 960-1 should be stored in a dry place, in the sealed original container, away from heat and humidity, at temperatures between +2°C and +40°C (+35.6°F and +104°F). Under these storage conditions, the shelf life is 3 years. The product should not be exposed to direct sunlight.

Partly emptied containers should be closed immediately after use.

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First Aid!

Refer to MSDS as mentioned above.

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