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Advanced Materials

Araldite® LY 564 / Aradur® 956-2 / Accelerator 960-1

COLD CURING EPOXY MATRIX SYSTEM

APPLICATIONS	Industrial composites (tubes, pipes, profiles)
GENERAL	Araldite® LY 564 with Aradur® 956-2 and Accelerator 960-1 exhibits high reactivity at low temperatures with good mechanical properties.
CHEMICAL DESCRIPTION	Araldite® LY 564 is a low viscosity epoxy resin. Aradur® 956-2 is an aliphatic amine Accelerator 960-1 is used as an amine accelerator
PROCESSING	Resin Transfer Molding (RTM) Pressure Molding Wet Lay-up
ADVANTAGES	Ease of mixing Complete impregnation of fibers Room temperature processing Good mechanical properties

TYPICAL PROPERTIES*

Araldite® LY 564

Visual Appearance	Clear, no contamination
Color, Gardner, max	2
Epoxy Value, eq./kg	5.7 - 6.0
Epoxy Equivalent, g/eq.	165 - 175
Viscosity @ 25°C (77°F), mPa s (cPs)	1200 - 1400
Density @ 25°C (77°F), g/cm^3 (lb/gal.)	1.15 - 1.18 (9.6 - 9.8)

Aradur® 956-2

Visual Appearance	clear liquid
Color, Gardner, max	4
Viscosity @ 25°C (77°F), mPa s (cps)	290 - 500
Density @ 25°C (77°F), g/cm^3 (lb/gal.)	1.02 (8.5)

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TYPICAL PROPERTIES* (CONTINUED)

Accelerator 960-1

Visual Appearance	clear liquid
Color, Gardner, max	8
Viscosity @ 25°C (77°F), mPa s (cps)	150 - 300
Density @ 25°C (77°F), g/cm^3 (lb/gal.)	1.00 - 1.02 (8.4 - 8.5)

* Typical properties are based on Huntsman's test methods. Copies are available upon request.

MIX RATIOS

Components	Parts by weight	Parts by volume
Araldite® LY 564	100	100
Aradur® 956-2	24.8	28.5
Accelerator 960-1	2.2	2.5

The two hardeners should be premixed and then added to the resin. The components should be mixed thoroughly to ensure homogeneity.

CURING

Typical Curing Schedules

15 hrs @ 50°C
or 4 hrs @ 80°C
or 2 hrs @ 100°C

PROCESSING

Initial Viscosity (cPs)

@ 25°C	600 - 1000
@ 40°C	200 - 250

Viscosity build-up

@25°C	to 1500 cPs	15 - 25 min
@25°C	to 3000 cPs	20 - 50 min
@40°C	to 1500 cPs	17 - 25 min
@40°C	to 3000 cPs	22 - 30 min

Gel Times (Hot Plate)

@ 40°C	75 - 85 min
@ 60°C	20 - 30 min
@ 80°C	5 - 9 min
@ 100°C	1 - 3 min
@ 120°C	0.5 - 1.5 min

GLASS TRANSITION TEMPERATURE (DSC)

Cure:	Tg (°C)
7 days 25°C	46 - 55
15 h 50°C	74 - 85
15 h 60°C	77 - 86
4 h 80°C	90 - 100
4 h 100°C	90 - 100

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CURED PROPERTIES

Neat Resin Properties

Cure	7 days RT	15h 50°C	4 h 80°C
Tensile Strength (kpsi)	9.3	11.5	11.2
Tensile Elongation (%)	2.1	5.3	6.0
Tensile Modulus (ksi)	540	502	450
Flexural strength (kpsi)			19.0
Flexural Modulus (kpsi)			450
Flexural Elongation (%)			9.5
Fracture Toughness K_{IC} ($\sqrt{in \bullet lb/in^2}$)		650 ± 45	
Fracture Energy G_{IC} ($in \bullet lb/in^2$)		0.74 ± 0.05	

WATER ABSORPTION

Immersion: Cure:	7 days RT	15h 50°C	4 h 80°C
4 day H_2O 23°C (%)	0.68	0.54	0.34
10 days H_2O 23°C (%)	1.15	1.02	0.72
30min H_2O 100°C (%)	0.80	0.74	0.66
60 min H_2O 100°C (%)	1.14	1.10	1.04

COEFFICIENT OF LINEAR THERMAL EXPANSION

Mean Value:	Cure:	15h 50°C
α from 20-90°C (10^{-6}/K)		72

POISSON'S RATIO 0.35

LAMINATE PROPERTIES

Flexural

Samples: E-glass fabric 1:1 ($300 g/m^2$), 16 layers
Fiber volume content: 45 - 46%
Laminate thickness t = 4mm

Cure:	7 days RT	15 h 50°C
Unconditioned		
Flexural strength (kpsi)	65	73
Flexural Modulus (kpsi)	3180	2900
Flexural Elongation (%)	2.8	3.2

Interlaminar Shear Strength (ILSS)

Short Beam:
Samples: E-glass fabric($425 g/m^2$), 12 layers unidirectional
Fiber volume content: 59 - 64%
Laminate thickness t=3.0 - 3.3mm

Cure:	7 days RT	15 h 50°C
Unconditioned		
Shear Strength (psi)	6500	7500

PACKAGING & STORAGE	Store at 40 - 104°F. Partially used containers should be immediately closed after use and stored in a dry environment. Araldite® LY 564 is supplied in 55 pound steel drums. Aradur® 956-2 is supplied in 450 pound steel drums. Accelerator 960-1 is supplied in 440 pound steel drums.
HANDLING/SAFETY PRECAUTIONS	**Read Material Safety Data Sheet For Each Product Before Using.** **For Industrial Use Only.**
FIRST AID	**In case of contact :** **Ingestion :** If swallowed, immediately give at least 3-4 glasses of water, but do not induce vomiting. If vomiting occurs, give fluids again. Do not give anything by mouth to an unconscious or convulsing person. Get immediate medical attention. Have a physician determine whether vomiting or stomach evacuation is necessary. **Skin :** Under a safety shower, immediately remove contaminated clothing and shoes. Wash affected areas thoroughly with large amounts of water, and soap if available, for at least 15 minutes. Get immediate medical attention. Discard or decontaminate clothing before re-use and destroy contaminated shoes. **Inhalation :** Remove from area to fresh air. If not breathing, give artificial respiration. Get immediate medical attention. If breathing is difficult, transport to medical care and, if available, give supplemental oxygen. **Eyes :** Immediately flush eyes for at least 15 minutes with running water. Hold eyelids apart to ensure rinsing of the entire eye surface and lids with water. If physician is not available, flush for an additional 15 minutes. Get immediate medical attention.

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