

Advanced Materials**Aradur[®] 2964 Epoxy Curing Agent**

Low Viscosity Modified Aliphatic and Cycloaliphatic Polyamines

COATINGS AND CONSTRUCTION

GENERAL	Aradur [®] 2964 epoxy curing agent is a very low viscosity modified cycloaliphatic amine hardener designed for solvent-free high performance coatings and floorings.	
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CHEMICAL DESCRIPTION	Modified curing agent based on aliphatic and cycloaliphatic polyamines.	
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KEY PERFORMANCE PROPERTIES	<ul style="list-style-type: none">• Low viscosity• Good cure properties at low temperature and high relative humidity• Good resistance to blushing and exudation• Excellent surface appearance and high gloss• Good color stability• Good all-round resistance to chemicals (acids, alkali and solvents)• Easily applied by conventional spray equipment, roller or brush	
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APPLICATIONS	High performance solvent-free coatings Chemical resistant coatings for pipes, tanks and containers Commercial and industrial floorings Self leveling floorings Light colored or clear topcoats	
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TYPICAL PROPERTIES (are based on Huntsman's test methods. Copies are available upon request.)	Visual Appearance	Clear, no contamination
	Color, Gardner, max	2
	H ⁺ Active Equivalent Weight (g/eq.)	93
	Amine Value (mg KOH/g)	320 - 340
	Viscosity @ 25 °C (77°F), (cP)	40 - 70
	Density @ 25 °C (77°F), (g/cm ³ / lb/gal)	1.0 / 8.3
	Flash Point, Closed Cup (°C)	> 93

FORMULATIONS**Clear Coating Starter Formulation**

Formulation No.	1	2
Araldite® GY 6010 Epoxy Resin ¹	100	90
Araldite® DY-E Reactive Diluent ²	-	10
Aradur® 2964 Epoxy Curing Agent	50	50
Mixed Viscosity³, 25°C (cP)		
	1 100	600
Gel time⁴, 100 g, 23°C (min)		
	37	44
Curing Properties⁵ @ 23°C / 50% Relative Humidity		
Tack-free time (hr)	2.5	5
Cure-through time (hr)	4	6.5
Film Appearance	Clear, glossy	Clear, glossy
Gloss (20° / 60°) ⁶ (%)	-	112 / 121
@ 5°C / 50% Relative Humidity		
Tack-free time (hr)	6	15
Cure-through time (hr)	13	22
Film Appearance	Matte	Glossy
Gloss (20° / 60°) ⁶ (%)	-	99 / 100

¹ Standard bisphenol-A liquid epoxy resin (epoxy equivalent weight: 182 - 192)

² Reactive diluent (mono-glycidyl ether of C₁₂ - C₁₄ alcohol; epoxy equivalent weight: 275 - 315)

³ ASTM D4440 (ICI Cone & Plate)

⁴ Tested by Gardco® Standard gelation timer, Model GT-S

⁵ Tested by Gardner® Circular Drying Time Recorder on a 10 mil wet coating

⁶ ASTM D523

TYPICAL CURED PROPERTIES

Unless otherwise stated, the data were determined with typical production batches using standard testing methods. They are provided solely as technical information and do not constitute a product specification.

Formulation No.	1	2
Araldite [®] GY 6010 Epoxy Resin	100	90
Araldite [®] DY-E Reactive Diluent	-	10
Aradur [®] 2964 Epoxy Curing Agent	50	50
Coating Properties (10-mil, 7 days @ 23°C / 50% Relative Humidity)		
Pencil Hardness ⁷	2H	F
Persoz Hardness ⁸ (s)	-	240
X-Cut Adhesion ⁹	2A	5A
Impact Resistance ¹⁰ (Direct/Rev.) (in-lb)	14 / 0	22 / 2
Mandrel Bend ¹¹	Fail 1"	Fail 1"
Glass Transition Temp. ¹² , T _g , (°C)	52.8	48.5
Shore D Hardness ¹³ , 1/8" thickness		
- 1 day	-	-
- 3 days	-	-
- 7 days	-	75
Time to Water Spot Resistance ¹⁴ (hr)	-	3 days
Taber Abrasion ¹⁵ (mg)	-	144.1
Pull-Off Adhesion ¹⁶ , 5-mil wet film (psi):		
- Sandblasted Concrete (failure mode)	-	-
- Sandblasted Steel (failure mode)	-	> 1000

⁷ ASTM D3363

⁸ ANSI/ISO 1522

⁹ ASTM D3359

¹⁰ ASTM D2794

¹¹ ASTM D522

¹² Determined by Differential Scanning Calorimetry (DSC)

¹³ ASTM D2240

¹⁴ Place a droplet of deionized water on coating periodically beginning at the tack-free time and continually throughout the cure cycle. Record the time at which no visible defect is seen on the coating film after evaporation of the droplet.

¹⁵ ASTM C1353

¹⁶ ASTM D4541

Formulation No.	1	2
Araldite [®] GY 6010 Epoxy Resin	100	90
Araldite [®] DY-E Reactive Diluent	-	10
Aradur [®] 3374 Epoxy Curing Agent	50	50
Mechanical Properties (7 days @ 23°C / 50% Relative Humidity)		
Flexural Strength ¹⁷ (kpsi)	-	10.3
Flexural Modulus, (kpsi)	-	356.9
Compressive Strength ¹⁸ (kpsi)	-	8.8
Compressive Modulus (kpsi)	-	213.1
Max. Compression Load (lb)	-	1 892
Tensile Strength ¹⁹ (kpsi)	-	6.1
Tensile Modulus (kpsi)	-	372.6
Tensile Elongation (%)	-	2.9
Heat Deflect. Temp. ²⁰ , 66 psi (°C)	-	41.3
Heat Deflect. Temp., 264 psi (°C)	-	39.55

¹⁷ ASTM D790¹⁸ ASTM D695¹⁹ ASTM D638²⁰ ASTM D648

Chemical Resistance (Spot Test)

Cure: 7 days @ 23°C / 50% Relative Humidity

Coating: 10-mil film on cold rolled steel

Evaluated by change in pencil hardness and appearance

Formulation No. 1

Initial pencil hardness: 2H

Exposure Time	24 hr	48 hr	72 hr
Acetic Acid, 10%	(destroyed)	(destroyed)	(destroyed)
Ammonia, 25%	2B (white)	H (white)	HB (white)
Brake Fluid	6B (outline)	6B (tacky)	6B (tacky)
Ethanol, 50%	6B (outline)	6B	6B
Hydrogen Peroxide, 3%	2H (white)	2H (yellow)	(destroyed)
Hydrochloric Acid, 20%	2H (white)	2H	2B
Methyl Isobutyl Ketone	H	2B (outline)	2B
Nitric Acid, 10%	2H (yellow)	2H (yellow)	(destroyed)
Skydrol 500B	6B (tacky)	6B (tacky)	6B (tacky)
Tap Water	2H (white)	2H (white)	2H (white)
Xylene	H	B	B

Yellowing Resistance (ASTM E-313)

Cure: 23°C / 50% Relative Humidity

Coating: 3-mil film on Laneta contrast panels

Exposure Conditions: QUV-A (340 nm) bulbs, 50°C, 8hr UV / 4hr condensation

Formulation No. 2

Initial Measurements - Yellow Index: 1.9, Gloss (20°/60°), %: 81/107

QUV Exposure Time	1 day	3 day	7 day
1 Day Cure			
- Yellow Index	8.8	19.7	35.3
- Gloss (20°/60°), %	90 / 94	89 / 98	84 / 99
3 Day Cure			
- Yellow Index	7.1	13.9	31.1
- Gloss (20°/60°), %	93 / 95	82 / 92	86 / 92
7 Day Cure			
- Yellow Index	7.0	13.7	37.6
- Gloss (20°/60°), %	88 / 96	85 / 92	87 / 98

STORAGE

Aradur® 2964 epoxy curing agent should be stored in a dry place, in the sealed original container, 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.

**PRECAUTIONARY
STATEMENT**

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First Aid!

Refer to MSDS as mentioned above.

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