

Aradur[®] 2964 Hardener

Product Description

Aradur[®] 2964 is a modified curing agent based on aliphatic and cycloaliphatic polyamines. This epoxy curing agent is a very low viscosity hardener designed for solvent-free high performance coatings and floorings.

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

Features

- 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

Typical Properties*

Property	Value
Appearance	Clear, no contamination
Color, Gardner, max	2
H ⁺ Active Equivalent, g/eq	93
Amine value, mg KOH/g	320 - 340
Viscosity @ 25°C, cP	40 - 70
Density @ 25°C (77°F), g/cm ³	1.0
Flash point, closed cup, °C	> 93

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

Processing

Mix Ratio Formulations

Product	1	2
Araldite [®] GY 6010, ¹ pbw	100	90
Araldite [®] DY-E Reactive Diluent, ² pbw	-	10
Aradur [®] 2964, pbw	50	50

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

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

Processing Data

Product	1	2	Test Method
Mix viscosity @ 25°C, cP	1100	600	ASTM D4440 (ICI Cone & Plate)
Gel time, 100 g, 23°C, min	37	44	Gardco [®] Standard gelation timer, Model GT-S

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. Properties were tested on 10-mil samples, cured for 7 days @ 23°C / 50% Relative Humidity.

Property	1	2	Test Method
Tack-free time, hours @ 23°C / 50% R.H. @ 5°C / 50% R.H.	2.5 6	5 15	Gardner circular drying time recorder on 10 mil wet coating
Cure-through time, hours @ 23°C / 50% R.H. @ 5°C / 50% R.H.	4 13	6.5 22	Gardner circular drying time recorder on 10 mil wet coating
Film appearance @ 23°C / 50% R.H. @ 5°C / 50% R.H.	Clear, glossy Matte	Clear, glossy Glossy	Visual
Gloss (20° / 60°), % @ 23°C / 50% R.H. @ 5°C / 50% R.H.	- -	112 / 121 99 / 100	ASTM D523
Glass transition temperature, T _g , °C	52.8	48.5	DSC
Pencil hardness	2H	F	ASTM D 3363
Persoz Hardness, s	-	240	ANSI/ISO 1522
X-Cut adhesion	2A	5A	ASTM D 3359
Impact resistance (direct/reverse), in-lbs	14 / 0	22 / 2	ASTM D 2794
Mandrel Bend	Fail 1"	Fail 1"	ASTM D 522
Shore D Hardness, 1/8" thickness 1 day 3 days 7 days	- - -	- - 75	ASTM D 2240
Time to water spot resistance,* h	-	3 days	--
Taber abrasion, mg	-	144.1	ASTM C1353
Pull-off adhesion, 5-mil wet film (psi): Sandblasted concrete (failure mode) Sandblasted steel (failure mode)	- -	- >1000	ASTM D4541
Flexural strength, kpsi	-	10.3	ASTM D790
Flexural modulus, kpsi	-	356.9	ASTM D790
Compressive strength, kpsi	-	8.8	ASTM D695
Compressive modulus, kpsi	-	213.1	ASTM D695
Max. compression load, lb	-	1 892	ASTM D695

Tensile strength, kpsi	-	6.1	ASTM D638
Tensile modulus, kpsi	-	372.6	ASTM D638
Tensile elongation, %	-	2.9	ASTM D638
Heat deflect. temp, °C			ASTM D648
66 psi	-	41.3	
264 psi	-	39.55	

*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.

Chemical Resistance (Spot Test)*

Formulation 1

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

*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 2, yellowing resistance (ASTM E-313)*

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

*Cure: 23°C / 50% Relative Humidity; coating: 3-mil film on Laneta contrast panels; exposure conditions: QUV-A (340 nm) bulbs, 50°C, 8 h UV / 4 h condensation. Initial measurements - Yellow Index: 1.9, Gloss (20°/60°), %: 81/107.

Storage

Aradur® 2964 Hardener 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** (from date of manufacture). The product should not be exposed to direct sunlight.

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First Aid!

Refer to SDS as mentioned above.

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