HUNTSMAN

Enriching lives through innovation

Advanced Materials

Aradur® 140-2

A MEDIUM VISCOSITY STANDARD POLYAMIDE HARDENER

GENERAL

Aradur® 140-2 hardener is a medium viscosity, high amine content hardener. When used to cure Araldite® epoxy resins, it provides excellent flexibility, toughness and good overall chemical resistance.

CHEMICAL DESCRIPTION

Aradur® 140-2 is a medium viscosity polyamide hardener.

APPLICATIONS

High solids general purpose industrial coatings
Adhesives
Marine finishes
Flooring
Maintenance coatings
Castings
Potting compounds

ADVANTAGES

Excellent water resistance
Good chemical resistance
Excellent mechanical properties
Excellent corrosion resistance
Excellent adhesion
Good electrical properties
Complies with FDA 21 CFR 175.300

TYPICAL PROPERTIES*

Visual Appearance	Clear, no contamination
Viscosity @ 40°C, mPa s (cPs)	3,000 - 6,000
Color, Gardner, max.	10
Amine Value, mg KOH/g	350 - 400
H^+ Active Equivalent, g/eq.	70 - 115
Density, @ 25°C (77°F), g/cm^3 (lb/gal)	0.96 (8.0)
Flash Point, Closed Cup, °C (°F)	>93 (>200)

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

STARTING FORMULATIONS

Aradur® 140-2 hardener may be used to cure both Araldite® liquid epoxy resins and low molecular weight solid epoxy resin solutions either at room or elevated temperatures. The ratio of epoxy resin to polyamide resin will determine the ultimate coating properties. The normal mixing ratio of Aradur® 140-2 hardener to epoxy resin is 35 to 60 parts per hundred parts of Araldite® GY 6010 epoxy resin.

The cure schedule depends upon the total formulation used (i.e., resin, hardener, pigmentation, solvents) and the conditions of application (i.e., temperature, film thickness, etc.). Time varies inversely with temperature. The following is a typical resin/hardener ratio:

Unpigmented Coating	**Pounds**	**Gallons**
Part A		
Araldite® GY 507[1]	682.8	71.90
Part B		
Aradur® 140-2	227.6	28.10
Total (Parts A&B)	910.4	100.00

Physical Constants (mix)	
Non-volatile content, %	100.0
Epoxy/hardener weight ratio	100/33
Weight per gallon @ 25°C, lb/gal	9.1
Pot life @ 25°C, hr	3.0
Viscosity @ 25°C, KU	98

Performance	
Substrate	Steel
Cure Schedule	7 days @ 25°C, 50% RH
Film thickness, mils	3.5
Dry time, 25°C, hr	
set-to-touch	>7:0
paper free	24.0
Flexibility, 1/8” mandrel	Pass
Adhesion	Good

Chemical Resistance, 25°C (77°F) (continuous immersion)	
Water, 7 days	No effect
MIBK	Slight film softening
10% NaOH	No effect
10% HCl	Few No. 9 blisters

[1] Modified liquid epoxy resin (EEW = 180 –192 g/eq)

White Gloss Enamel	**Pounds**	**Gallons**
Part A		
Araldite® GY 6010	543.2	56.00
Titanium Dioxide[1]	517.7	15.16

FORMULATIONS (CONTINUED)

Part B		
Aradur® 140-2	233.6	28.84
Total (Parts A & B)	1294.5	100.00

Physical Constants (mix)	
Non-volatile content, %	100.0
Epoxy/hardener weight ratio	100/43
Pigment/binder ratio	40/60
Weight per gallon, 25°C	12.9
Pot life, 25°C, hr	1.75
Viscosity, 25°C, cPs	60,000

Performance	
Substrate	Steel
Cure schedule	7 days @ 25°C, (77°F) and 50% RH
Film thickness, mils	12
Dry time, 25°C, hr	
set-to-touch	1.0
paper free	6.5
Flexibility, 1/8" mandrel	Fail
Adhesion	Good

Chemical Resistance, 25°C, (continuous immersion)	
Water, 7 days	No effect
MIBK, 3 hrs	No effect
10% NaOH, 7 days	No effect
10%, HCl, 3 hrs	No effect

The use of Aradur® 140-2 hardener in a flooring formulation gives overall good chemical resistance and very good mechanical properties.

Epoxy Flooring	**Parts by weight**
Araldite® GY 6010	100
Araldite® RD-1	10
Aradur® 840-2	45
Accelerator 960-1	2 - 3
Dimethylaminoethanol	3 - 5
Bettle 216-8[2]	1 - 3
Cure Schedule	7 days at R.T.

[2] American Cyanamid or equal

Mechanical Properties:	
Shrinkage during cure	0.0008 - 0.0015 in/in
Coefficient of thermal expansion, (x10^{-6} linear/°C)	50
Compressive strength, 25°C, psi	6,000 - 10,000
Tensile strength, 25°C, psi	1,400 - 2,000
Impact strength, ft-lb (1/4" thick specimen on concrete)	9 - 12
Abrasion resistance (in. of thickness loss per 1500 cycles)	0.004 - 0.008
Adhesion	Good

FORMULATIONS (CONTINUED)

Epoxy Flooring
Chemical Resistance @ 70°F

Reagents	
Acetic acid, 5%	P
Aliphatic solvents (mineral spirits)	E
Ammonium hydroxide	
10%	G
30%	F
Boric acid	E
Citric acid, 10%	E
Esters	E
Ethers (Ethyl ether)	F
Chlorinated solvents (Carbon tetrachloride)	F
Formaldehyde, 37%	G
Glycerine	G
Hydrocarbon	E
Hydrochloric acid	
10%	F
37%	F
Acetone	F
Nitric acid, 10%	P
Sulfuric acid, 10%	P
Sodium hydroxide	
10%	G
50%	F
Water (distilled)	E
Calcium chloride, 50% solution	E

E = Excellent - Suitable for long and perhaps permanent immersion
G = Good - Suitable for short immersion or prolonged spillage
F = Fair - Suitable for temporary spillage
P = Poor - Not recommended

FDA STATUS

Cured coatings made with this hardener and other approved components meet the requirements of the Food & Drug Administration regulation 21 CFR 175.300, for the safe use as a food-contact surface under the conditions described in this section. Solvents are not covered and must be removed in the final coating.

STORAGE

Aradur® 140-2 hardener is supplied in 420 pound steel drums. This product 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

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.

KEEP OUT OF REACH OF CHILDREN

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