

Advanced Materials

Aradur[®] 837 Hardener

A MODIFIED, MEDIUM VISCOSITY LIQUID ALIPHATIC AMINE ADDUCT

GENERAL:

Aradur[®] 837 hardener is a medium viscosity hardener for high solids and solvent-free coatings. Coatings based on liquid epoxy resins and Aradur[®] 837 hardener are characterized by the fast cure, excellent adhesion, light color and outstanding chemical resistance. Formulations based on Aradur[®] 837 hardener are particularly suitable for application with two-component spray equipment and demonstrate excellent curing properties even at low temperatures (5°C, 42°F).

CHEMICAL DESCRIPTION:

A modified, long chain aliphatic amine adduct

ADVANTAGES:

- Light color
- Medium viscosity
- Excellent chemical resistance
- High gloss
- Good cure response at low temperatures (5°C)
- Good resistance to blushing and exudation
- Good mechanical properties and toughness

APPLICATIONS:

- Solvent-free and high solids formulations
- Clear decorative wood and metal coatings
- Maintenance coatings
- Tank / pipe linings
- Flooring compounds and sealants
- Suitable as an accelerator for polyamidoamine and polyamide hardeners
- Castings
- Adhesives

TYPICAL PROPERTIES*:

Visual Appearance	Clear, no contamination
Color, Gardner	7 max
H ⁺ Active Equivalent, g/eq.	68
Amine Value, mg KOH/g	395 - 415
Viscosity @ 25°C (77°F), mPa s (cPs)	2,700 - 3,700
Density @ 25°C (77°F), g/cm ³ (lb/gal.)	0.98 (8.2)
Flash Point, Closed Cup, °C (°F)	>93 (>200)

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

STARTING FORMULATIONS:**Clear Coating Starting Formulations**

Parts by weight	1	2	3	4	5	6
Araldite [®] GY 6005 ⁽²⁾	100					
Araldite [®] GY 6010 ⁽¹⁾		100				
Araldite [®] GY 502 ⁽²⁾			100			
Araldite [®] GY 507 ⁽²⁾				100		
Araldite [®] GY 509 ⁽²⁾					100	
Araldite [®] GY 9513 ⁽²⁾						100
Aradur [®] 837	35	35	30	35	35	33
Mix viscosity ⁽³⁾ @ 23°C, cPs	>4000	>4000	-	-	-	-
Gel time ⁽⁴⁾ 100 g, 23°C, min	-	22	-	-	-	-
Exotherm, 100 g, °C (°F)	125 (257)	140 (284)	70 (158)	104 (219)	110 (230)	100 (212)

Curing Properties ⁽⁵⁾

(@ 23°C / 50% Relative Humidity)

Dust-free time, (hours)	-	1.5	-	-	-	-
Cure-through time, (hours)	2.5	-	-	-	-	-
Film appearance	-	Glossy	-	-	-	-

(@ 5°C / 80% Relative Humidity)*

Dust-free time, (hours)	-	4.0	-	-	-	-
Cure-through time, (hours)	8.5	-	-	-	-	-
Film appearance	-	Matte	-	-	-	-

Coating properties after 7 day cure at 23°C

Dry film thickness, 10-11mil

Glass transition temp., T _g , ⁽⁷⁾ °C	-	53	-	-	-	-
Pencil hardness ⁽⁸⁾	-	2H	-	-	-	-
Cross hatch adhesion ⁽⁹⁾	-	4	-	-	-	-
Impact (direct/reverse), ⁽¹⁰⁾ in-lbs.	-	16/0	-	-	-	-

* Slightly tacky surfaces (exudation) may result from curing at low temperatures and high atmospheric humidity. This tack can be removed by washing the surface with a 2% (approximate) solution of hydrochloric or acetic acid, then rinsing with warm water. Adding up to 15% benzyl alcohol to the formulation can prevent surface tack.

- (1) Standard bis A liquid epoxy resin (epoxy equivalent weight: 182 - 192)
- (2) Reactive diluent modified bis A epoxy resins (see product data sheet for details)
- (3) ASTM D 4440 (ICI Cone & Plate)
- (4) Tested by TECAM gelation timer
- (5) Tested by Gardner Circular Drying Time Recorder on a 10 mil wet coating
- (6) Visual
- (7) Tested by DSC (Differential Scanning Calorimetry)
- (8) ASTM D 3363
- (9) ASTM D 3359 (0 = worst, 5 = best)
- (10) ASTM D 2794

Chemical Resistance @ 25°C (77°F) after curing 7 days

Formulation No.	1				2				3				4				5			
	1	2	4	8	1	2	4	8	1	2	4	8	1	2	4	8	1	2	4	8
Distilled water	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sea water	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sulfuric acid, 30%	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sulfuric acid, 70%	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid, 10%	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid, 20%	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Acetic acid, 5%	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ammonia, 10%	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Toluene	+	a	a	a	+	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
MIBK	+	a	a	a	+	+	a	a	a	a	a	a	a	a	a	a	a	a	a	a
Ethanol, 50%	+	+	+	a	+	+	+	a	a	d	d	d	a	a	a	a	+	+	+	+
Gasoline, high test	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pine oil	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

+ = Resistant
a = Affected
d = Destroyed

Film thickness 12 - 16 mils
Cure Schedule 7 days at 21°C
Substrate, Sandblasted steel

Extended chemical resistance data on formulation 2 (film thickness 12-16 mil)

Duration in months	1	2	3	4	5	6	7	8	9	10	11	12
Sea water, synthetic	+	+	+	+	+	+	+	+	+	+	+	+
Sulfuric acid, 10%	+	+	+	+	+	+	+	+	+	+	+	+
Sulfuric acid, 30%	+	+	+	+	+	+	+	+	+	+	+	+
Sulfuric acid, 50%	+	+	+	+	+	+	+	+	+	+	+	+
Sulfuric acid, 70%	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid, 10%	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid, 20%	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid, 36%	+	+	a	a	a	a	a	a	a	a		
Caustic Soda, 10%	+	+	+	+	+	+	+	+	+	+	+	+
Caustic Soda, 30%	+	+	+	+	+	+	+	+	+	+	+	+
Ammonia, 10%	+	+	+	+	+	+	+	+	+	+	+	+
Ammonia, 25%	+	+	+	+	+	+	+	+	+	+	+	+
Ethanol, 50%	+	a	a	a	a	a	a	a	a	a	a	a
Ethanol, 96%	a	a	a	a	a	a	a	a	a	a	a	a
Butanol	+	+	+	+	+	+	+	+	+	+	+	+
Octanol	+	+	+	+	+	+	+	+	+	+	+	+
Xylene	+	+	+	+	+	+	+	+	+	+	+	+
Toluene	a	a	a	a	a	a	a	a	a	a	a	a
Benzene	d											
Crude oil	+	+	+	+	+	+	+	+	+	+	+	+

+ = Resistant
a = Affected
d = Destroyed

Film thickness 12 - 16 mils
Cure Schedule 7 days at 21°C
Substrate, Sandblasted steel

WHITE PIGMENTED COATING:

	Pounds	Gallons
Araldite® GY 6005	603.1	62.18
Titanium dioxide ¹	349.7	10.19
Talc ²	42.2	1.87
Aradur® 837	211.1	25.75
Total	1,206.1	99.99

Physical properties

Viscosity @ 25°C (77°F), cPs	8500
Pot life, 100 g, @ 25°C (77°F), min	20
PVC,%	12

Film properties — 6 mil on steel

Dust free time, hr	2.5
Cure schedule @ 25°C (77°F)	7 days
Impact resistance (direct) in-lb	10
Gloss, 60°	100%

BOILING WATER RESISTANT COATING:

	Pounds	Gallons
Araldite® GY 6010	654.9	67.52
Red iron oxide	3.1	0.10
Barium sulphate ³	173.7	4.72
Aradur® 837	229.2	27.70
Total	1,060.9	100.04

Physical properties

Viscosity @ 25°C (77°F), cPs	5500
Pot life, 100 g, @ 25°C (77°F), min	25
PVC,%	4.7

Film properties — 6 mil on steel

Cure schedule @ 25°C (77°F)	7 days
Impact resistance (direct), in-lb	8-12
Gloss, 60°	96

Resistance to boiling water immersion

1 week	No effect
4 weeks	No effect
8 weeks	No effect
10 weeks	No effect

¹ Ti-Pure R-900, DuPont or equal² CP 38-33, Pfizer Inc. or equal³ Barytes No. 1, Pfizer Minerals or equal**SAND FILLED FLOORING SYSTEM:**

	Pounds
Araldite® GY 6005	24.7
Sand 200 mesh	26.7
100 mesh	26.7
25 mesh	13.3
Aradur® 837	8.6
Total	100.0

Physical properties

Usable life, 2 lb @ 25°C (77°F), min	20-25
Sand:binder ratio	2:1

Cured properties

Film thickness, mil	15-20
Hard to light traffic, hr @ 25°C (77°F) @ 5°C (41°F)	3-3½ 24-28
Cure schedule	7 days @ 25°C (77°F)
Compression strength, psi	11,500
Flexural strength, psi	5,900
Tensile strength, psi	2,700

PACKAGING & STORAGE:

Aradur® 837 is supplied in standard containers of 400 pounds. This material should be stored at room temperature in the original sealed container (actual expiration date appears on the label).

HANDLING/SAFETY PRECAUTIONS:

Danger! Corrosive to eyes and skin. Harmful if swallowed, inhaled or absorbed through skin. May cause dermatitis and sensitization.

Do not get in eyes, on skin, on clothing.
Do not breathe vapor, mist or spray.
Store in tightly closed containers in dry area.
Use only with adequate ventilation.
Wash thoroughly after handling.

**Read Material Safety Data Sheet Before Using.
For Industrial Use Only.**

FIRST AID:**In case of contact:**

Eyes: Immediately flush the eyes with plenty of water for at least 15 minutes. Call a physician.

Skin: Immediately wash skin with plenty of water and soap. Remove contaminated clothing and launder before reuse.

Inhalation: Remove to fresh air. Give oxygen or artificial respiration if breathing is difficult.

Ingestion: If conscious give plenty of water to drink. **Do not** induce vomiting. Get immediate medical attention.

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Main Offices :

Huntsman Corporation

10003 Woodloch Forest Dr.

The Woodlands

Texas 77380

(281) 719-6000

Huntsman Advanced Technology

Center

8600 Gosling Rd.

The Woodlands

Texas 77381

(281) 719-7400

Website :

www.huntsman.com/advanced_materials