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Uple of
Advanced Materials

Aradur® HY 906

A LIQUID ANHYDRIDE

GENERAL

Aradur® HY 906 is a low viscosity anhydride, which is compatible with liquid epoxy resins at room temperature.

CHEMICAL DESCRIPTION

Methyl 4-endomethylene-tetrahydrophthalic anhydride (nadic methyl anhydride)

APPLICATIONS

Filament winding
Casting
Laminating
Potting

ADVANTAGES

Excellent mechanical and electrical properties
Easily mixed at room temperature
No-staining or fuming
Low viscosity
Long pot life
Light color
Very good thermal resistance

TYPICAL PROPERTIES*

Visual Appearance	Clear liquid
Color, Gardner, max	3
Viscosity @ 25°C (77°F), mPa s (cPs)	175 - 225
Boiling point, °C	
@ 760 mm	278
@ 50 mm	180
@ 1.5 mm	100
Density @ 25°C (77°F), g/cm^3 (lb/gal)	1.14 (9.5)
Flash Point, Closed Cup, °C (°F)	141 (285)

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

FORMULATIONS

Araldite® epoxy resins and Aradur® HY 906 mixtures require heat cures. The system can be gelled at low temperatures (80-100°C) depending upon the accelerator. Prolonged curing at elevated temperatures produces products with exceptionally high heat deflection temperature. Varying the cure schedule can result in heat deflection temperature variations from 90-160 °C.

Formulation No. 1	**Parts by weight**
Araldite® GY 6005	100
Aradur® HY 906	80
Accelerator DY 062	2

Viscosity @ 25°C, cPs	
Initial time	2,380
4 hours	4,120
8 hours	6,000
24 hours	14,750

Pot life (30 g mass), min	
@ 100°C	25 - 30
@ 120°C	15
@ 140°C	10
@ 150°C	5

Suggested Post Cures	**Heat Deflection Temperature, °C**
2 hours @ 150°C+2 hours @ 200°C	150
3 hours @ 150°C+4 hours @ 200°C	160

Cure schedule: gel @ 80°C + 3 hrs @ 150°C + 4 hrs @ 200°C

Mechanical Properties (typical)

Flexural strength, psi	
@ 23°C	15,000
@ 121°C	10,000
@ 150°C	4,000

Elastic modulus, psi	
@ 23°C	0.4×10^6
@ 121°C	0.3×10^6
@ 150°C	0.2×10^6

Tensile strength, psi	12,000
Modulus of elasticity, psi	0.5×10^6
Water absorption (2 hr boil)	0.4%

Electrical Properties @ 25°C

Dielectric constant, ξ, 60 Hz	3.3
Dissipation factor, tan δ, 60 Hz	0.008

FORMULATIONS (CONTINUED)

Formulation No. 2	**Parts by weight**
Araldite® GY 6010	100
Aradur® HY 906	80
Accelerator 960-1	1
Initial mixed viscosity, cPs	
@ 60°C	500
@ 120°C	25
Pot life (30 g mass)	
@ 60°C, hrs	3-4
@ 120°C, min	10
Minimum gel temperature, °C	80
Minimum cure time, hrs	20-24
Minimum demolding time, hrs	
@ 120°C	14-18
@ 140°C	12-14
Mechanical Properties (typical)	
Tensile strength, psi	6,550
Compressive strength, psi	20,000
Flexural strength, psi	19,900
Modulus of elasticity, psi	6.15×10^5
Impact strength, ft-lb/in	215
Coefficient of linear thermal expansion, in/in/°C	$55\text{-}65 \times 10^6$
Heat deflection temp, °C	130
Electrical Properties @ 25°C (typical)	
Water absorption,	
@ 20°C, 10 days, %	0.45
@ 100°C, 1 hours, %	0.225
Dielectric constant @ ξ	
60 Hz constant	
@ 25°C	3.4
@ 90°C	3.4
Dissipation factor, tan δ	
@ 60 Hz	0.008
Volume resistivity, ohm-cm,	
@ 25°C	7×10^{16}
@ 90°C	2×10^{16}

FORMULATIONS (CONTINUED)

Formulation No. 3	**Parts by weight**
Araldite® GY 6010	100
Aradur® HY 906	80
Accelerator DY 062	2
Quartz flour	200-250
Mixed viscosity @ 25°C, cPs	1500-2000
Pot life (30 g mass)	
@ 25°C, days	10-14
@ 70°C, days	5-7
@ 120°C, hours	5
Gel time (500 g mix)	
@ 25°C, days	10
@ 70°C, days	7
@ 120°C, hours	8

Cure schedule: gel @ 80°C + 3 hrs @ 150°C + 24 hrs @ 200°C

Mechanical Properties (optimum)	
Tensile strength, psi	64,000
Elongation, %	2-3
Compressive strength, psi	20,000
Flexural strength, psi	19,000
Modulus of elasticity, psi	6.04 x 10^6

Formulation	**4**	**5**	**6**	**7**
	Parts by weight			
Araldite® GY 6005	100	-	-	100
Araldite® GY 6010	-	100	-	-
Araldite® GY 6020	-	-	100	-
Aradur® HY 906	80	85.5	82	80
Accelerator DY 062	-	2	0.5	2
Accelerator 960-1	3	-	-	-
Pot life @ 25°C, hrs	2	-	-	3
Cure schedule, hrs/°C	16/65+ 2/149+ 1/182	4/79+ 15/149	16/120+ 1/180	3/149+ 4/200
Mechanical Properties @ 25°C				
Tensile strength, psi	11,000	-	12,500	12,500
Flexural strength, psi	20,000	14,300	11,200	12,800
Flexural modulus, psi x 10^5	24.3	4.9	3.6	3.7
Compressive strength, psi	-	14,870	18,800	-
Electrical Properties @ 25°C				
Dielectric constant, ξ				
@ 60 Hz	3.27	3.17	3.39	-
@10^6 Hz	2.73	3.01	3.20	-
Dissipation factor, tan δ				
@ 60 Hz	-	0.002	0.006	-

@ 10^6 Hz	-	0.018	0.019	-

FORMULATIONS (CONTINUED)

Formulation No. 8
(Glass Reinforced Systems)

	Parts by weight
Araldite® GY 6005	100
Aradur® HY 906	80
Accelerator DY 062	2
Reinforcement	14 plies E glass fibers
Resin content	30-35%

Cure schedule: 2 hrs @ 150°C + 1 hr @ 180°C

Mechanical Properties @ 23°C, psi

Flexural strength	74,000
Wet: after 2 hr boil	67,500
Dry: after 1/2 hr @ 71°C	66,000
Modulus of elasticity,	
Wet: after 2 hr boil	2.8×10^6
Dry: after 1/2 hr @ 71°C	3.0×10^6
Tensile strength	56,000
Wet: after 2 hr boil	52,000
Compressive strength	44,000

Chemical resistance after 30 days immersion @ 23°C

Reagent	**Weight Gain %**	**Flexural Strength Retained %**
3% H_2SO_4	0.15	81
10% NaCl	0.30	92
H_2O, distilled	0.45	89
10% HNO_3	1.60	41
5% Acetic acid	0.45	88
3% H_2O_2	0.71	48
1% NaOH	2.58	28
Petrohol 99	0.15	100
Hydrocarbon test fluid	0.10	100
Ethylene glycol	0.20	100
Hydraulic oil	0.07	100

PACKAGING & STORAGE	Aradur® HY 906 is supplied in 500 pound drums. The product has a minimum shelf life of one year when stored in a dry place at room temperature sealed in the original container.
HANDLING/SAFETY PRECAUTIONS	**Danger ! Corrosive. May cause chemical burns. May cause sensitization and dermatitis. Harmful if swallowed, inhaled or absorbed through skin.** Do not get in eyes, on skin or clothing. Do not breathe vapor, mist or spray. Use with good ventilation. Wash thoroughly after handling. Store in tightly closed, moisture impermeable containers (reacts with water) in dry, ventilated area away from heat, oxidizing agents and alkaline materials. **Read Material Safety Data Sheet Before Using.** **For Industrial Use Only.**
FIRST AID	**In case of contact :** **Eyes :** Immediately flush with water for at least 15 minutes. Call a physician. **Skin :** Promptly wash thoroughly with mild soap and water. **Inhalation :** Remove to fresh air. Give oxygen if breathing is difficult. Call a physician. **Ingestion :** Get immediate medical attention. If conscious, give plenty of milk or water. Do not induce vomiting.

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