

DESCRIPTION

Ancamine Z curing agent is a liquid aromatic amine eutectic designed for curing liquid epoxy resins at elevated temperatures. Ancamine Z curative can be used at lower relative loadings while still maintaining similar performance to other MDA based aromatic amines with respect to excellent chemical resistance, high mechanical strength, and high temperature tolerance.

APPLICATIONS

- Laminates and Composites
- Filament Wound Pipe / Liners / Fittings
- Electrical and Electronic Encapsulation
- Tooling
- Adhesives

RECOMMENDED PROCESSING

- Filament Winding
- Resin Transfer Molding
- Wet Lay-Up Laminates

ADVANTAGES

- Low viscosity
- High heat resistance
- Good pot life
- Excellent chemical resistance

TYPICAL CURE SCHEDULE

(will vary with application)

- 2 hours at 176°F, then 3 hours at 302°F
- 2 hours at 80°C, then 3 hours at 150°C

SHELF LIFE

At least 60 months from the date of manufacture in the original sealed container at ambient temperature. Store away from excessive heat and humidity in tightly closed containers.

STORAGE AND HANDLING

Refer to the Safety Data Sheet for Ancamine Z curing agent.

TABLE 1: TYPICAL PROPERTIES

Appearance	Dark Liquid
Viscosity @ 77°F / 25°C	2,200 cPs
Specific Gravity @ 77°F / 25°C	1.14
Equivalent Wt/{H}	38
Use Level (PHR)	21.0

TABLE 2: TYPICAL HANDLING PROPERTIES ⁽¹⁾

Mixed Viscosity @ 140°F / 60°C	185 cPs
Gel Time (150g mix @ 77°F / 25°C)	480 min
Time to 10,000 cPs @ 140°F / 60°C	155 min

TABLE 3: THERMAL PERFORMANCE ⁽¹⁾

	SI	English
Glass Transition Temperature (DSC second scan)	155°C	311°F

TABLE 4: MECHANICAL PERFORMANCE — CAST PANEL ⁽¹⁾

	SI	English
Flexural Strength	164 MPa	23.8 ksi
Flexural Modulus	3.7 GPa	0.54 Msi
Tensile Strength	74 MPa	10.7 ksi
Tensile Modulus	3.7 GPa	0.54 Msi
Tensile Elongation @ Break	4.4%	
Compressive Strength	129 MPa	18.7 ksi
Compressive Modulus	3.1 GPa	0.45 Msi

TABLE 5: MECHANICAL PERFORMANCE — COMPOSITE PANEL ⁽¹⁾

	SI	English
ILSS 0° Longitude	72 MPa	10.5 ksi
Flexural Strength - Composite 0° Longitude	1282 MPa	186.0 ksi
Flexural Modulus - Composite 0° Longitude	53.8 GPa	7.81 Msi

(1) Ancamine Z curing agent formulated with standard Bisphenol-A based (DGEBA, EEW=180) epoxy resin

MDA-BASED AROMATIC AMINES

SUPPLEMENTARY DATA

REACTIVITY AND DEVELOPMENT OF CURE

Ancamine® DL50, Ancamine 1482, Ancamine Y, and Ancamine Z curing agents offer a range of reactivity with epoxy resin while maintaining the high mechanical properties and chemical resistance typical of aromatic amines. Blended with standard diglycidyl ether of bisphenol-A (DGEBA) epoxy resin, systems can provide a 2 to 3.5 hour pot life even at 60°C. Figure 1 shows the viscosity build of aromatic amines with EEW=180DGEBA resin at 60°C.

FIGURE 1: AROMATIC AMINE DGEBA (EEW-180) MIX VISCOSITY BUILD AT 60°C

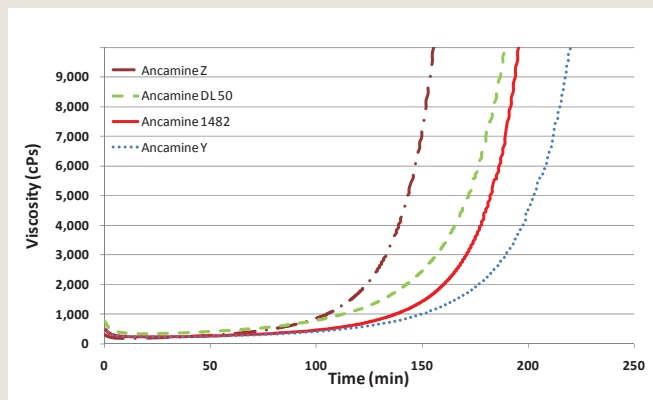


TABLE 6: CHEMICAL RESISTANCE TEST

Formulation: DGEBA Epoxy Resin Mix (EEW-180)				
Cure Schedule: 2 h @ 80°C, then 3 h @ 150°C				
Specimen: 1" X 3" X 1/8" Disc				
Test: % Weight gain after 120 days immersion @ 73°F / 24°C				
Reagent	Ancamine DL 50	Ancamine 1482	Ancamine Y	Ancamine Z
Water (Distilled)	0.6%	0.9%		
Jet Fuel C	0.1%		0.6%	0.3%
Toluene	0.2%	0.4%	0.2%	0.1%
Acetone	10.7%		15.9%	20.1%
Ethanol	0.8%	0.5%	0.6%	0.7%
Methanol	5.0%	1.4%		
HNO ₃ (20%)	0.9%	1.0%	0.3%	0.3%
Acetic Acid (25%)	1.4%	0.7%	1.1%	1.1%

CHEMICAL RESISTANCE

DGEBA epoxy resin cured with Ancamine DL-50, Ancamine 1482, Ancamine Y, and Ancamine Z curatives exhibits excellent chemical resistance. with DGEBA resin. Chemical resistance can be further enhanced using novalac epoxy resins.

PERFORMANCE PROPERTIES

Ancamine® DL50, Ancamine 1482, Ancamine Y, and Ancamine Z curing agents are mixtures of aromatic amines designed for the curing of liquid epoxy resins at elevated temperatures. See table 7 for a comparison of typical properties.

TABLE 7: PERFORMANCE PROPERTIES

Typical Properties	Ancamine DL 50		Ancamine 1482		Ancamine Y		Ancamine Z	
	SI	English	SI	English	SI	English	SI	English
Appearance	Yellow to Light Brown		Dark Brown		Liquid Yellow to Light Brown		Dark Liquid	
Color (Gardner)	9		18		6		No Data	
Viscosity @ 77°F / 25°C	55,000 @ 30°C		1,900 cP		1,200 cP		2,200 cP	
Specific Gravity @ 77°F / 25°C	1.10		1.15		1.14		1.14	
Equivalent Wt/{H}	51		42		48.5		38	
Use Level (PHR)	28.0		23.0		27.0		21.0	
Typical Handling Properties ⁽¹⁾								
Mixed Viscosity @ 140°F / 60°C	335 cP		235 cP		235 cP		185 cP	
Gel Time (150g mix @ 77°F / 25°C)	480 min		960 min		480 min		480 min	
Time to 10,000 cPS @ 140°F / 60°C	189 min		195 min		220 min		155 min	
Thermal Performance ⁽¹⁾								
Glass Transition Temperature (DSC second scan)	161°C	322°F	160°C	320°F	167°C	333°F	155°C	311°F
Mechanical Performance - Cast Panel ⁽¹⁾								
Flexural Strength	175 MPa	25.4 ksi	123 MPa	17.8 ksi	177 MPa	25.7 ksi	164 MPa	23.8 ksi
Flexural Modulus	3.4 GPa	0.49 Msi	2.5 GPa	0.36 Msi	3.7 GPa	0.54 Msi	3.7 GPa	0.54 Msi
Tensile Strength	73 MPa	10.6 ksi	81 MPa	11.7 ksi	60 MPa	8.7 ksi	74 MPa	10.7 ksi
Tensile Modulus	3.2 GPa	0.46 Msi	2.8 GPa	0.41 Msi	3.3 GPa	0.48 Msi	3.7 GPa	0.54 Msi
Tensile Elongation @ Break	4.4%		5.3%		4.2%		4.4%	
Compressive Strength	121 MPa	17.5 ksi	122 MPa	17.7 ksi	120 MPa	17.4 ksi	129 MPa	18.7 ksi
Compressive Modulus	2.0 GPa	0.29 Msi	2.2 GPa	0.32 Msi	2.1 GPa	0.30 Msi	3.1 GPa	0.45 Msi
Izod Impact Strength			45.6 J/m	0.3 ft-lb/in	33.6 J/m	0.2 ft-lb/in		
Mechanical Performance - Composite Panel ⁽²⁾								
ILSS 0° Longitude	74 MPa	10.7 ksi	71 MPa	10.4 ksi	70 MPa	10.1 ksi	72 MPa	10.5 ksi
Flexural Strength - Composite 0° Longitude	1172 MPa	170.0 ksi	1310 MPa	190.0 ksi	1269 MPa	184.0 ksi	1282 MPa	186.0 ksi
Flexural Modulus - Composite 0° Longitude	52.8 GPa	7.66 Msi	54.1 GPa	7.85 Msi	55.2 GPa	8.0 Msi	49.0 GPa	7.81 Msi

(1) Curing agents formulated with standard Bisphenol-A based (DGEBA, EEW=180) epoxy resin

(2) VARTM Process using E-glass (275g/m²) unidirectional fiber; 60% Volume ±3%; Cured for 2 hours at 80°C ad 3 hours at 150°C

Epoxy Curing Agents and Modifiers

ANCAMINE® Z Curing Agent

EVONIK CORPORATION

7201 Hamilton Blvd.
Allentown, PA 18195
1 800 345-3148
Outside U.S. and Canada 1 610 481-6799

For Technical Information and Support:

Americas: picus@evonik.com
EMEA: apcse@evonik.com

Disclaimer

The information contained herein is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto.

