Product information

ANCAMINE® 1618

Curing Agent

DESCRIPTION

Ancamine 1618 curing agent is a low color, low viscosity modified cycloaliphatic amine intended for ambient or low temperature curing of liquid epoxy resins. Ancamine 1618 gives high gloss films that are resistant to a variety of chemicals.

These properties make it ideal for formulating floorings, maintenance coatings, tank linings, and secondary containment linings. It's very low color and good color stability make it appropriate for clear and pastel shade coating.

TYPICAL PROPERTIES

Property	Value	Unit
Appearance	Clear Liquid	
Colour	<2	Gardner
Viscosity @ 77°F	450	cP
Amine Value	272	mg KOH/g
Specific Gravity @ 77°F	1.03	
Density @ 77°F	8.6	lb/gal
Flash Point (closed cup)	205	°F
Equivalent Wt/{H}	115	
Recommended use Level	60	phr, EEW=190

ADVANTAGES

- Very low color and good color stability
- Good chemical resistance (see attached)
- High gloss
- Good resistance to amine blush
- Low viscosity

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APPLICATIONS

- High-solids coatings
- Self-leveling and pebble finish flooring
- Chemically resistant tank linings, mortars, and grouts
- Decorative tile grouts

STORAGE AND HANDLING

Refer to the Safety Data Sheet for Ancamine 1618 curing agent.

SHELF LIFE

At least 24 months from the date of manufacture in the original sealed container at ambient temperature. Store away from heat and excessive humidity in tightly closed containers

TYPICAL CURE SCHEDULE

2 – 7 days at ambient temperature

TYPICAL HANDLING PROPERTIES

Property	A*	B*	Unit
Use Level	60	58	phr
Mixed Viscosity @ 77°F	2,400	1,370	Cp
Gel Time (150g mix @ 77°F)	50	74	Min
Thin Film Set Time @ 77°F	7.0	7.3	h
Thin Film Set Time @ 50°F	-	19	h
Peak Exotherm (100g mix @ 77°F)	196	-	°F
Peak Exotherm Time	60	-	Min

* Ancamine 1618 curing agent formulated with standard Bisphenol-A based (DGEBA, EEW=190) epoxy resin.
* Ancamine 1618 curing agent with 90% DGEBA resin (EEW=190) and 10% Epodil® 748 reactive diluent.

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TYPICAL PERFORMANCE (7 DAY CURE @ 77ºF)

Property	A*	B*	Unit
Glass Transition Temperature	123	111	°F
Compressive Strength @ Yield	-	9,500	psi
Compressive Modulus	,	312	thousand psi
Tensile Strength	7,140	6,100	psi
Tensile Modulus	322	204	psi
Tensile Elongation	-	7.0	%
Flexural Strength	13,380	10,100	psi
Flexural Modulus	344	378	psi
Hardness	81	82	Shore D
Abrasion Resistance Weight Loss @ 1,000 cycles with wheel no. 10	-	0,056	gm
Mar Resistance	-	1,05	kg
Heat Deflection Temperature	115	-	°F
Bond Strength (mild steel to mild steel)	820	-	psi

SUPPLEMENTAL DATA

CHEMICAL RESISTANCE: Chemical immersion studies following ASTM D543 were performed using Ancamine 1618 formulations cured for 7 days at 77°F. Ancamine 1618 curing agent was mixed in the recommended use levels with the following resins:
100% Bisphenol-A based liquid resin (EEW=190)
100% Bisphenol-F based liquid resin (EEW=172)
60 % Bisphenol-F (EEW=172) / 40% multifunctional epoxy novolac (EEW=176) resin blend
10% Cresyl glycidyl ether (CGE - Epodil 742) dilutedBisphenol-A resin (EEW=188)
Three samples were tested for each reagent. Table 1 shows the percent weight gain or loss after 3 days and 28 days for each of these formulations immersed invarious chemicals at 77°F

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TABLE 1: CHEMICAL RESISTANCE FOR ANCAMINE 1618 FORMULATIONS % WEIGHT CHANGE AS A FUNCTION OF TIME

Reagent	with Bis-A Based Resin (EEW=190)		with Bis-F Based Resin (EEW=172)		with 60% Bis-F / 40% Novolac Blend		with 10% CGE Diluted Bis-A Resin	
	3 days	28 days	3 days	28 days	3 days	28 days	3 days	28 days
Deionized Water	0.49	1.50	0.58	1.74	0.59	1.68	0.53	1.53
Methanol	7.93	-2.41	13.01	Dest.	11.88	1.26	12.90	2.52
Ethanol	3.98	10.28	3.61	9.58	2.98	8.58	4.26	10.01
Toluene	0.40	2.86	0.05	0.78	4.99	0.68	0.46	5.64
Xylene	0.04	0.19	0.11	0.09	-0.03	0.05	0.04	0.58
Butyl Cellosolve	1.65	5.31	1.03	3.62	0.75	2.80	1.97	7.74
MEK	Dest.	Dest.	16.63	Dest.	18.25	13.20	Dest.	Dest.
10% Lactic Acid	1.81	5.42	1.51	4.80	1.75	5.09	0.92	3.04
10% Acetic Acid	2.92	8.23	2.29	6.95	2.83	7.68	1.95	5.95
70% Sulfuric Acid	0.08	0.14	0.11	0.45	0.22	0.35	0.02	0.10
98% Sulfuric Acid	Dest.	Dest.	0.77	-9.32	0.36	-6.10	Dest.	Dest.
50% Sodium Hydroxide	-0.01	-0.04	-0.01	-0.01	-0.04	-0.05	-0.03	-0.09
10% Sodium Hypochlorite	0.51	1.36	0.54	1048	0.51	1.31	0.51	1.33
1,1,1 Trichloriethane	0.02	-0.02	0.02	0.29	0.05	0.34	0.05	0.32

Dest. = Samples destroyed

Spillage resistance studies were conducted on Ancamine 1618 curing agent formulated with a 90% bis-A resin (EEW=190) and 10% Epodil 748 diluent (C12-C14 alkyl glycidyl ether) blend. Samples were cured for 7 days at 77°F; three samples were tested for each reagent. The immersion/recovery schedule for the testing is shown in Table 2. Percentage weight change and Shore D hardness were measured after each of the immersion periods. The samples were then allowed to recover before reimmersion for the next time period. Hardness retention is relevant in flooring applications where it indicates the ability of the floor to support traffic after exposure to chemical spills. Results of this study are presented in Table 3.

TABLE 2: SPILLAGE RESISTANCE TEST METHOD SCHEDULE

Castings of 1/8" thickness are immersed for specified time period. Sample is then removed, weighed, and hardness tested immediately. Sample is then allowed to recover for specified time before re-immersion.

3 h imm → test → 24 h recover → 24 h imm → test → 24 h recover → 3 day imm → test → 3 day recover → 7 day imm → test → 7 day recover → 28 day imm → test → 7 day recover → 90 day imm → test

TABLE 3: SPILLAGE RESISTANCE FOR ANCAMINE 1618 WITH 90% DGEBA / 10% EPODIL 748 % WEIGHT CHANGE AND SHORE D HARDNESS AS A FUNCTION OF TIME

Reagent	Initial Hard.	After 3 hr		After 24 hr		After 3 days		After 7 days		After 28 days		After 90 days	
		% wt.	Hard	% wt.	Hard	% wt.	Hard	% wt.	Hard	% wt.	Hard	% wt.	Hard
10% Acetic Acid	82	0.32	80	1.07	74	2.12	72	3.31	73	5.44	69	7.82	58
10% Lactic Acid	82	0.17	81	0.59	80	1.25	80	1.94	78	3.07	76	4.07	67
Toluene	82	0.01	79	0.82	72	3.83	68	9.18	62	17.75	53	19.15	48
Xylene	82	0	79	0.02	76	0.32	74	1.20	68	6.90	66	13.05	56
Trichloroethane	82	0.32	77	0.64	76	2.72	72	5.92	65	18.49	64	35.93	58
Methanol	82	3.08	65	8.06	35	6.89	26	DESTROYED					
Ethanol	82	0.91	75	2.64	71	5.06	67	7.93	60	5.77	54	2.60	69
Butyl Cellosolve	82	0.19	78	1.10	74	3.20	65	5.40	61	10.79	56	26.9	46
MEK	82	6.19	60	DESTROYED									
Skydrol	82	0.06	77	0.10	77	0.30	77	0.71	77	1.36	78	2.55	67
70% Sulfuric Acid	82	0.13	81	0.06	80	0.05	81	0.06	79	-0.01	81	-0.10	80
98% Sulfuric Acid	82	-14.45	75	DESTROYED									
Deionized Water	82	0.16	82	0.35	82	0.57	81	0.94	82	1.54	80	1.47	79
50% Sodium Hydroxide	82	0.07	80	-0.05	82	-0.08	81	-0.10	81	-0.19	80	-0.28	66
Bleach	82	0.28	80	0.48	80	0.73	81	1.01	81	1.24	79	1.37	68

Note: Samples cured for 7 days at 77°F before testing

These studies show that Ancamine 1618 curing agent provides very good chemical resistance to a variety of solvents, acids, and bases, which makes it useful in formulating flooring, linings, and grouts. Chemical resistance of 1618-based formulations can be optimized for specific chemicals using different resin blends. For information on the chemical resistance of many other Evonik curing agents, please refer to publication number 125-9326 (Rev 1996): "Chemical Resistance for Ambient Cure Epoxy Formulations."

CURE SPEED: The thin film set time of Ancamine 1618 curing agent with standard bisphenol-A resin (DGEBA, EEW=190) in a 6 mil film is 5.5 h at 77°F. Using a 90% bisphenol-A resin / 10% Epodil 748 diluent blend, the thin film set time is 7.3 h at 77°F and 19 h at 50°F. To speed thin film set time and hardness development, Ancamine 1618 can be accelerated with modified aliphatic amine curing agents such as 10% Ancamine 2089M, 10% Ancamine 2432, or 10% Ancamine 2481.

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