Product information

ANCAMINE® 2880

Curing Agent

DESCRIPTION

Ancamine 2880 curing agent is a low-viscosity modified cycloaliphatic amine designed for use with liquid epoxy resin for ambient and relatively low temperature cure. It yields formulations with fast cure, low color, outstanding carbamation resistance and excellent yellowing resistance while maintaining typical performance properties of conventional cycloaliphatic polyamines.

TYPICAL PROPERTIES

Property	Value	Unit	Method
Color	1	Gardner	ASTM D1544
Viscosity @ 25°C	200-300	cPs	ASTM D-2196, Brookfield, DV-II, Spindle S27
Specific Gravity @ 25°C	1.02		ASTM D1475
Amine Value	320-350	mg KOH/g	Perchloric Acid Titration
Equivalent Wt/[H]	95		
Use Level	50	phr	Bisphenol A diglycidyl ether resin BADGE (EEW=190)

ADVANTAGES

- Outstanding resistance to carbamation and water spotting
- Low color and excellent UV resistance
- Fast cure speed and rapid hardness development at ambient and low temperature
- Low viscosity
- Very good chemical and mechanical resistance
- Excellent surface appearance
- EHS friendly

APPLICATIONS

- Industrial and decorative flooring
- High solids and solvent free coatings

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SHELF LIFE

At least 24 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 2880 curing agent.

TYPICAL HANDLING PROPERTIES*

Property	Resin A	Resin B	Unit	Method
Mixed Viscosity @ 25°C	2000	750	cPs	ASTM D2196, Brookfield, DV-II, Spindle S27
Gel Time (150g mix @ 25°C)	37	40	min	Techne GT-3 Gelation Timer
Thin Film Set Time @ 25°C	4.5	6.5	h	ASTM D5895, BK Drying Recorder
Thin Film Set Time @ 10°C	8	14	h	ASTM D5895, BK Drying Recorder
Persoz Pendulum Hardness 1d/7d @ 23°C	274/335	150/280	s	ASTM D4366
Persoz Pendulum Hardness 1d/7d @ 10°C	80/252	31/230	s	ASTM D4366
Shore D Hardness 1d/7d @ 23°C	80/80	80/80		ASTM D2240
Shore D Hardness 1d/7d @ 10°C	75/80	65/80		ASTM D2240

*Resin A: 100% DGEBA resin (EEW=190)
*Resin B: 90% DGEBA resin (EEW=190) and 10% Epodil 748 diluent

SUPPLEMENTAL DATA

This supplementary data outlines several performance attributes of Ancamine 2880 in combination with standard bis-phenol A resin and hydrogenated epoxy resin.

Carbamation Resistance

Figure 1 shows excellent coating appearance and outstanding carbamation resistance of Ancamine 2880-epoxy film after 1 day cure, even at 10 °C compared to the benchmark products.

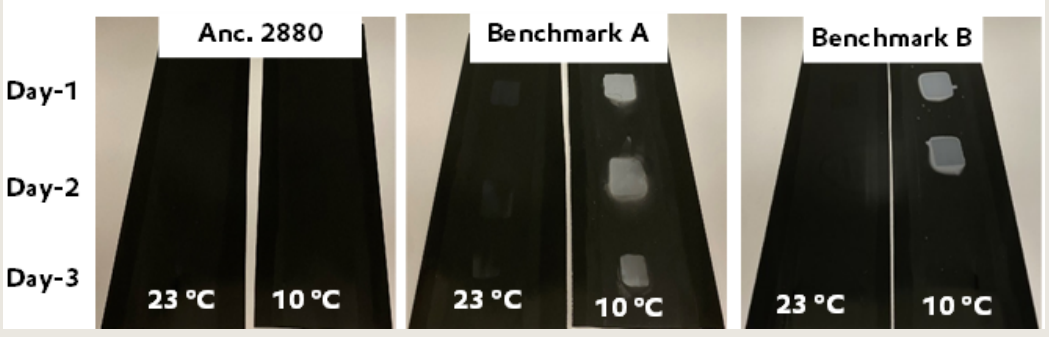

Figure 1: Excellent coating appearance with 90% bisphenol A epoxy (EEW = 190) and 10% Epodil® 748 resin blend.

Mechanical Properties

Table 1 shows that standard bis-phenol A epoxy cured with Ancamine 2880 maintains high mechanical characteristics by providing high load bearing capability and stiffness, suitable for flooring application.

Table 1: High mechanical properties

Property	Ancamine 2880	Benchmark A	Benchmark B	Method
Compressive strength (MPa)	81	76	80	ASTM D695
Compressive Modulus (kpsi)	284	225	260	ASTM D695
Tensile Strength (psi)	9670	9488	9008	ASTM D638
Tensile Modulus (kpsi)	405	406	396	ASTM D638
Flexural Strength (MPa)	94	88	87	ASTM D790
Flexural Modulus (kpsi)	454	438	439	ASTM D790

Abrasion Resistance (ASTM D4060)

Table 2: Abrasion resistance with different epoxy systems

Weight loss after 500 cycles/2 KG wheel (mg)			
Curing Agent	**Resin 1***	**Resin 2****	**Resin 3*****
Ancamine 2880	27	42	30
Benchmark A	28	42	37
Benchmark B	33	42	32

*Resin 1: Bisphenol A epoxy (EEW = 190)
**Resin 2: 90% Bisphenol A epoxy - 10% Epodil 748
***Resin 3: 50% Bisphenol A epoxy - 50% Novolac epoxy

Ancamine 2880 mixed with different epoxy resins, coated at 6 mil WFT on steel substrates and cured for 7 days at ambient conditions. The average weight loss given in Table 2, illustrates excellent abrasion resistance in all the resin systems. This makes Ancamine 2880 an ideal candidate for a flooring to withstand wear and tear in high traffic areas.

Intercoat Adhesion: Fast Return to Service

Table 3: Intercoat adhesion with epoxy and polyurea

Intercoat adhesion on concrete (ASTM D7234): Anc. 2880 Topcoat over Epoxy Primer	**On dry concrete**	
	At 4 h, 23 °C, 50% RH	951 psi
	At 8 h, 10 °C, 60% RH	829 psi
	On damp concrete	
	At 4 h, 23 °C, 50% RH	837 psi
	At 8 h, 10 °C, 60% RH	888 psi
Intercoat adhesion on steel panel (ASTM D3359)	**Anc. 2880 Topcoat over Epoxy Primer**	
	At 4 h, 23 °C, 50% RH	5A
	Polyurea Topcoat over Anc. 2880 primer	
	At 6 h, 23 °C, 50% RH	5A

On dry and damp concrete substrate: A fast cure epoxy primer was coated at 6 mil WFT on dry and damp concrete and cured at ambient and 10 °C environment. The 10 mil Ancamine 2880/epoxy topcoat was applied after 4 hours at ambient condition and after 8 hours at 10 °C.
On steel substrate: The first set of the two-coat system is the same as on concrete substrate. In the second set of experiment, the Ancamine 2880 was used as primer and coated at 6 mil WFT on steel substrate, and after 6 hours a commercially available aliphatic polyurea topcoat was applied at 10 mil WFT. Both systems were cured at controlled ambient condition for 7 days.
As shown in Table 3, Ancamine 2880 with fast cure speed and outstanding intercoat adhesion offers a solution for fast return to service where multiple layers can be applied within 24 hours.

UV Resistance (ASTM D4587)

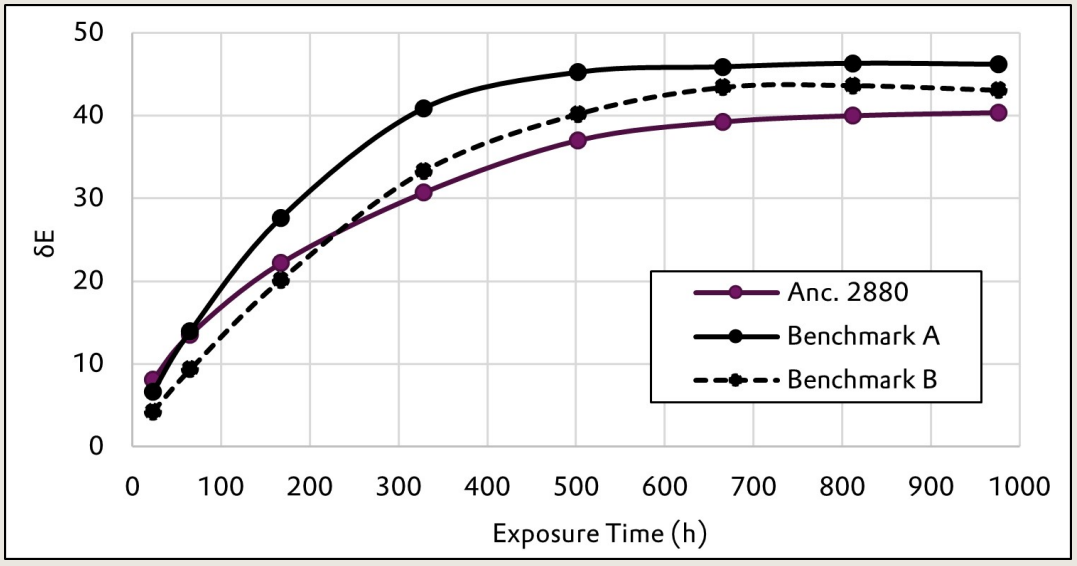

Figure 2: UV resistance of clear coating with standard bisphenol A epoxy

6 mil clear coating of Ancamine 2880-epoxy was applied on white standard panels, and allowed to cure for 7 days at ambient conditions. The cured epoxy panels were exposed to UV irradiation in the accelerated weathering QUV machine for 1000h, without condensation. As shown in Figure 2, films cured with Ancamine 2880 can achieve improved color stability over industrial benchmark products.

Performance With Hydrogenated Epoxy Resins

A commercialized hydrogenated bisphenol A epoxies (HER) was selected for performance evaluation with the curing agent Ancamine 2880. The handling and performance properties are summarized in Table 4. Ancamine 2880 in combination with HER resin provides moderate cure speed with long working time, and offers walkable floor on day 1.

Table 4: Performance properties Ancamine 2880 with hydrogenated bisphenol A epoxy resin, HER

Property	Value	Unit
PHR	43	
Gel Time (150g mix @ 23°C, 50% RH)	80	min
Thin Film Set Time, Phase -3 (6 mil @ 23°C, 50% RH)	14	h
Thin Film Set Time, Phase -3 (6 mil @ 23°C, 60% RH)	28	h
Shore D Hardness @ 23°C, 50% RH (Day 1)	70	

UV resistance study of the coatings, prepared by mixing Ancamine 2880 with standard bisphenol A epoxy (DGEBA) and the HER, hydrogenated epoxy resin was conducted. It can be seen from Figure 3 that the Ancamine 2880 in combination with HER hydrogenated resin exhibited greater than two times better UV resistance as can be concluded from color retention and yellowness index values after 1000 hours of exposure.

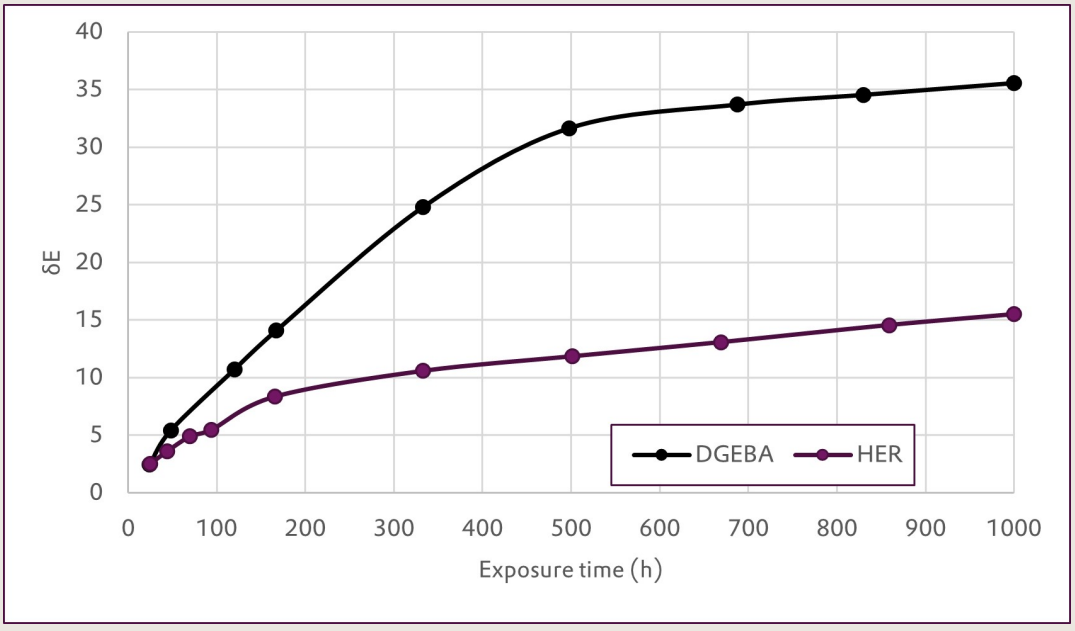

Figure 3: UV resistance of clear coating with hydrogenated bisphenol A epoxy

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