Product information

ANCAMINE® 2686

Curing Agent

DESCRIPTION

Ancamine 2686 curing agent is a modified cycloaliphatic polyamine intended for use as a room temperature curing agent for liquid epoxy resin. Based upon Evonik's cycloaliphatic amines, it offers exceptional cost-in-use economics and a broad balance of chemical resistance and surface appearance properties. Ancamine 2686 curing agent provides high mechanical build, rapid cure and is particularly suitable for lower temperature use.

TYPICAL PROPERTIES

Property	Value	Unit	Method
Appearance	Yellow liquid		
Colour (Gardner)	max. 12	Gardner	ASTM D 1544-80
Viscosity @ 25°C	100-400	mPa.s	Brookfield RVTD, Spindle 4
Amine Value	300-350	mg KOH/g	Perchloric Acid Titration
Specific Gravity @ 21°C	1.0		
Equivalent	95	Wt/{H}	
Recommended use Level	50	PHR	With Bisphenol A diglycidyl ether (EEW=190)

ADVANTAGES

- Good low temperature cure
- Excellent chemical and mechanical resistance

APPLICATIONS

- Non-colour sensitive applications
- Industrial flooring, screeds, primers, grouts
- Cost sensitive applications
- Chemical resistant tank linings
- High solids coatings
- Secondary containment

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.

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HANDLING PRECAUTIONS

Refer to the Safety Data Sheet for Ancamine 2686 curing agent.

TYPICAL HANDLING PROPERTIES*

Property	Value	Unit	Method
Gel Time (150g mix @ 25°C)	35	mins	Techne GT-3 Gelation Timer
Thin Film Set Time 25°C	4.0	h	BK Drying Recorder Phase III
Hardness Shore D at 25°C (24h)	78		DIN 53505
Hardness Shore D at 10°C (24h)	70		DIN 53505
Typical cure schedule	2- 7	days	
Compressive Strength	103	MPa	ISO 604
Compressive Modulus	2.0	GPa	ISO 604
Flexural Strength	93	MPa	ISO 178
Flexural Modulus	3.0	GPa	ISO 178
Heat Distortion Temperature	50	°C	ASTM D648
Carbamation Test	4		ISO 2812 (Wet Patch Method), scale 1-5 (5 is best)

*With Bisphenol A diglycidyl ether (EEW=190)

SUPPLEMENTARY DATA

Ancamine 2686 curing agent is a modified cycloaliphatic polyamine intended for use as a room temperature curing agent for liquid epoxy resin. Ancamine 2686 curing agent provides high mechanical build, rapid cure and is particularly suitable for lower temperature condition down to 10°C. The supplementary data outlines several product features of Ancamine 2686 curing agent in combination with standard and diluted epoxy resins.

Ancamine 2686 curing agent is a versatile hardener with excellent fit for purpose in a variety of non-colour sensitive industrial applications, in particular in the area of civil engineering. Starting point formulations using Ancamine 2686 curing agent are included at the end of the technical datasheet.

PRODUCT FEATURE BENEFITS IN CLEAR COATINGS AND CASTINGS

Handling and Cure Speed
Basic performance data of clear coats and castings based on Ancamine 2686 curing agent and diluted epoxy resins is summarized in Table 1. Considering, a minimal shore D50 requirement for early return to service, Ancamine 2686 curing agent based epoxy system meet this condition within 16 hours at room temperature. At 10°C, Ancamine 2686 curing agent builds good initial hardness of ca. Shore A50 and requires 48 hours. If necessary, Ancamine 2686 curing agent can be accelerated with Ancamine 2609 or Ancamine 2432 curing agent to facilitate faster hardness build.

TABLE 1: HANDLING AND CURE SPEED PROPERTIES OF ANCAMINE 2686 CURING AGENT IN COMBINATION WITH DILUTED DGEBA/ F EPOXY RESINS.

Epoxy resin			ANCAMINE 2686 CURING AGENT	
			DGEBA/ F/ Epodil 748 Reactive Diluent, EEW195, h 900 mPa.s	DGEBA/ F/ Hexanediol diglycidylether, EEW175, h 900 mPa.s
AHEW/[H]			95	95
PHR			50	54
Ambient Temperature (23°C)				
Gelation time, 150g mix		minutes	50-55	45
Carbamation Resistance	Day 1	1-5*	4	4
Gloss 20°/60°	Day 1		92/100	95/100
Persoz Pendulum	Day 1 / Day 7	S	75/250	80/260
Shore D Build	16h / 24h / Day 7	Shore D	55/65/77	50/60/77
Low Temperature (10°C)				
Carbamation Resistance	Day 1	1-5*	3	3
Gloss 20°/60°	Day 1		80/90	87/95
Persoz Pendulum	Day 2 / Day 7	S	25/150	20/135
Shore D Build	24h / 48h / Day 7	Shore D	—/55/77	—/60/74

*Carbamation resistance scale 1-5, 5=best

Mechanical properties

Mechanical strength properties of epoxy castings were determined using a dual column material testing machine (Instron, model 4206-006) equipped with 104 kN load cell. Tests were conducted according to ISO 604. For recording compressive strength data of cubes of 25x25x25 mm, the machine was equipped with compressive plates and a Dynamic 25/50 mm GL Extensometer and operated at 2.5 mm/min cross-head speed. Castings were prepared at 23°C and left to cure for 7 days prior to testing. Epoxy castings based on Ancamine 2686 curing agent and standard epoxy resin (EEW190) provide high compressive strength and modulus of respectively 103 and 2,000 MPa. High compressive strength is paramount for epoxy systems used in industrial flooring and structural bonding applications in order to protect the concrete structure and avoid structural damages.

Adhesion to concrete

A primer formulation according to Table 2 was applied onto concrete slabs (conditioned at 23°C and 60% RH for 7 days). Primer was left to cure for 7 days at room temperature prior to conducting pull off adhesion tests according to ISO 4624. Ancamine 2686 curing agent based primer demonstrated excellent adhesion strength of 6.4 (±0.4) MPa and cohesive failure within the concrete substrate.

TABLE 2: CLEAR COAT PRIMER FORMULATION BASED ON ANCAMINE 2686 CURING AGENT

Part A		**Parts by Weight**
Bisphenol-A Epoxy Resin	EEW182-192, η12 Pa.	100
Epodil 748 Reactive Diluent	EEW275-300	25
Part B		
Ancamine 2686 curing agent	AHEW95	53
Total Parts		**178**

Additives for improving surface appearance and leveling

Coatings and castings based on Ancamine 2686 curing agent mixed with Epodil 748 reactive diluent diluted bis-A/F epoxy resin showed improved performance when using additives for surface appearance and leveling. Examples of additives that demonstrated good use in combination with Ancamine 2686 are Surfynol DF-62 Defoamer, Byk A530, and Byk 346. In order to eliminate additive incompatibility issues, it is important to mix the additive with epoxy resin for 15 minutes, preferably using a blade mixer.

TRADEMARK REFERENCE

Evonik	Ancamine® 2686 Curing Agent Epodil® 748 Reactive Diluent Epodil® LV-5 Modifier Surfynol® DF-62 Defoamer
Byk Chemie	Byk® A530
Kronos International, Inc.	Kronos® 2160
Bayer	Bayferrox® 318M

START POINT FORMULATION 1: SOLVENT-FREE, GREY SELF LEVELING FLOOR

A-Component			Parts by Weight
1. Epoxy resin	Bisphenol-A/F epoxy resin, Epodil 748 diluted, EEW 195, η 900 mPa.s	Various	40.2
2. Defoamer additive	Byk A530	Byk Chemie	1.0
3. Titanium dioxide	Kronos 2160	Kronos	5.0
4. Iron oxide black	Bayferrox 318M	Bayer	0.1
5. Filler	Barium sulphate powder, 3-20 µ	Various	53.7
A-Component Manufacturing Procedure			
• Charge components 1-2 and mix at low shear until homogeneous			
• Charge components 3-5, mix until homogeneous at low shear; then grind pigments at high speed (10-20 m/s) to yield particle size less than 25 µm. Ensure temperature during grinding is kept < 50°C			
B-Component			
6. Amine curing agent	Ancamine 2686 curing agent	Evonik	20.0
C-Component			
7. Quartz sand 0.1-0.3 mm		Various	100.0
TOTAL			220.0
Application Procedure			
• After mixing part A, B and C, the formulation is ready to apply			

Example:
Self leveller floor formulation based on Ancamine 2686 curing agent.

START POINT FORMULATION 2: SOLVENT-FREE MORTAR/REPAIR COMPOUND

A-Component			Parts by Weight
1. Epoxy resin	Bisphenol-A epoxy resin, EEW 190, η 12 Pa.s	Various	80.0
2. Epoxy Reactive Diluent	Byk A530	Byk Chemie	20.0
3. Wetting additive and modifier	Kronos 2160	Kronos	8.0
A-Component Manufacturing Procedure			
• Charge components 1-3 and mix at low shear until homogeneous			
B-Component			
4. Amine curing agent	Ancamine 2686 curing agent	Evonik	50.0
C-Component			
5. Silica flour, 75µm		Various	80.0
6. Quartz Sand 0.1-0.3 mm		Local	400.0
7. Quartz Sand 0.3-0.5 mm		Local	400.0
TOTAL			1038.0

Application Procedure

• Mix parts A and B and mix until homogeneous

• Slowly add part C to the mixture while continue to mix; continue mixing to obtain a homogeneous mixture and the formulation is ready to apply.

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