

## Product information

# ANCAMINE<sup>®</sup> 2878

## Curing Agent

### DESCRIPTION

Ancamine 2878 curing agent is an aliphatic amine curing agent particularly suited to low temperature conditions. The main applications for Ancamine 2878 curing agent are solvent free coatings, high filled mortars, grouts and patch repair. Ancamine 2878 curing agent can also be used as a co-curing agent to accelerate other curing agent technologies. The product is nonyl phenol free and provides rapid and excellent property development when cured at both ambient and at low temperature conditions (5°C).

### TYPICAL PROPERTIES

Property	Value	Unit	Method
Appearance	Pale amber liquid		
Colour	≤ 5	Gardner	ASTM D 1544
Viscosity @ 25°C	1000-2000	mPa.s	Brookfield RVTD, spindle 4
Amine Value	235-275	mg KOH/g	Perchloric Acid Titration
Specific Gravity @ 21°C	1.09		
Equivalent	130	Wt/{H}	
Recommended use Level	65-70	PHR	With bisphenol-A based epoxy resin (EEW=190)

### ADVANTAGES

- High reactivity with cures down to 0 °C
- Excellent mechanical property development
- Good blush resistance
- Nonyl phenol & Bisphenol A free

### APPLICATIONS

- Marine and Protective coatings
- High build coating applications
- Civil engineering mortars, patch repair

## 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

Due to the nature of Ancamine 2878 a hazy appearance may occur during storage, which does not impact the performance. Low temperature storage can promote this effect. Ancamine 2878 appearance will become clear after heating for 4 hours at 60°C.

Also refer to the Safety Data Sheet for Ancamine 2878 curing agent.

## TYPICAL CURE SCHEDULE

2-7 days at ambient temperature

## TYPICAL HANDLING PROPERTIES

Property	Value	Unit	Method
Gel Time @ 25°C	12	min	Techne GT-5 Gelation Timer, 150 g mix
Peak Exotherm	159/16	°C/Min	
Thin Film Set Time @ 23°C	1.5/2.0	h	ASTM D 5895 - BK Drying Recorder, Phase 2/3, 60% RH
Thin Film Set Time @ 5°C	6.0/7.5	h	ASTM D 5895 - BK Drying Recorder, Phase 2/3, 60% RH
Shore D hardenss 7d @ 5°C /23°C	84D/86D		ASTM D 2240
Carbamation Resistance 5°C /23°C	4/5	(Scale 1-5, 5=best)	ISO 2812 (wet patch method), after 24h @ applied temperature
Specular Gloss [60°] 5°C /23°C	122/135		

## SUPPLEMENTARY DATA

### Handling and Performance Properties

Ancamine 2878 is a fast reactive, low viscosity curing agent designed for Marine and Protective Coatings along with Civil Engineering applications. The alkyl phenol free product provides a combination of rapid property development at ambient and low temperature cure with ease of handling. It offers excellent carbamation and corrosion resistance when cured under adverse conditions. Ancamine 2878 curing agent contains benzyl alcohol but allows for the formulation of high solid, VOC compliant Marine and Protective coatings, which can be used in a range of 2K epoxy anticorrosive primers and mid coats. For best performance Ancamine 2878 is designed to be used in combination with standard liquid epoxy resins.

### Cure Speed & Pot life

When used with a standard BADGE liquid epoxy resin (EEW= 190) clear coats exhibit very fast dry speed and property development. Figure 1 shows the thin film set time (TFST) as measured with a BK drying time recorder (ASTM D5895) based on loadings of 68 PHR.

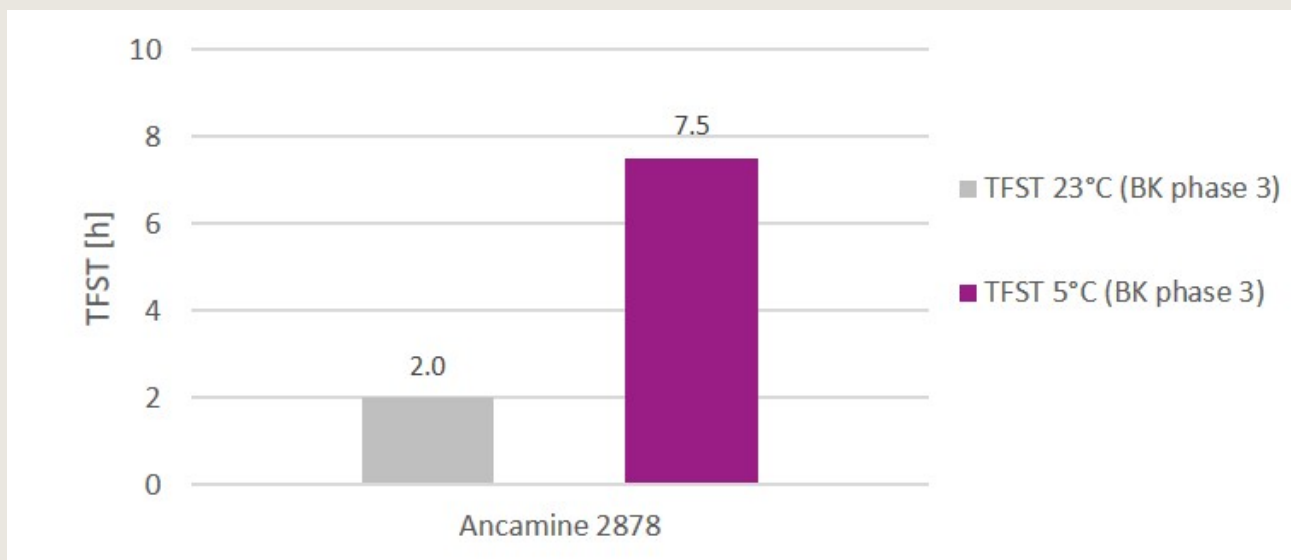


Figure 1 TFST of Ancamine 2878 in Clear Coat at 23°C and 5°C (ASTM D5895)

Ancamine 2878 also exhibits a good workable pot life with a gel time of 12 minutes at 25°C, tested with a Techne GT-5 Gelation timer in a 150g mixture. The clear coat also provides a Persoz hardness of 270 seconds after 7 days cure at 23°C.

### High Carbamation Resistance

Coatings based on Ancamine 2878 curing agent provide excellent Carbamation resistance at ambient and low temperature conditions down to 5°C. For testing the clear coat formulation is left to cure for 24 hours at 23°C and 5°C after which it is exposed to water for 24 hours (ISO2812 wet patch-method). The results in Table 1 shows negligible Carbamation, rated as 4 for 5°C and 5 for 23°C on a 1-5 relative scale (5= excellent, no visible marks).

TABLE 1 CARBAMATION RESISTANCE BASED ON ISO 2812 (WET PATCH METHOD)

Carbamation Resistance	5°C	23°C
Ancamine 2878	4	5

**Corrosion Resistance (Prohesion, Cleveland Humidity)**

Ancamine 2878 was evaluated for an anti-corrosive primer formulation (AP-2878) and a white enamel top coat (WE-2878).

When Ancamine 2878 is pigmented to a low VOC (<250g/L) anti-corrosive primer, thin film set time (ASTM D5895) with a BK drying time recorder of coatings is 2 hours (Phase 3) at ambient temperature. With a thin film set time achievable within approximately 9 hours (Phase 3) for primers applied and cured at 5 °C.

TABLE 2 THIN FILM SET TIME (ASTM D5895) OF ANTI-CORROSIVE PRIMER ANCAMINE 2878 (AP-2878)

Formulation	TFST 23°C (PH2/PH3) [h]	TFST 5° (PH2/PH3) [h]
AP-2878	1.5/2	6/9

AP-2878 was evaluated under prohesion spray test conditions and applied to grit blasted, hot rolled steel, using conventional spray equipment, in double coats to give a high dry film thickness. Prohesion (ASTM B-117) panels were scribed and evaluated for field blisters using the ASTM D714 and the scribe creepage was rated in accordance with ASTM D-1654.

TABLE 3 PROHESION EXPOSURE - ANCAMINE 2878 ANTI CORROSIVE PRIMER

Formulation	Scribe Creed	Scribe Creed	Blister Size
AP-2878	10	10	10

Prohesion ASTM B-117, cabinet temperature 35°C  
 Film Thickness 230-280 µm  
 Rating: 10=best (no blisters), 0= worst  
 Data after 2000 h exposure

Following 2000 hours prohesion exposure, the AP-2878 formulation shown excellent resistance on the scribed surface with an excellent rating of 10 on a 10-0 relative scale. No failures at the scribe and no blisters at the surface of the panel are visible.



## AP-2878 2000 [h] PROHESION



When formulated in a white enamel top coat, Ancamine 2878 exhibits a thin film set time (ASTM D5895) with a BK drying time recorder of coating is 2.5 hours (Phase 3) at ambient temperature. With a thin film set time achievable within approximately 9 hours (Phase 3) for top coats applied and cured at 5#C. Pot life of greater than 30 minutes can be achieved, while maintaining VOCs of less than 250 g/L.

TABLE 4 THIN FILM SET TIME (ASTM D5895) AND POT-LIFE OF WE-2878

Formulation	TFST 23°C (PH2/PH3) [h]	TFST 5° (PH2/PH3) [h]	Pot-life [min]
WE-2878	2/2.5	7/9	36

WE-2878 was evaluated under cleveland humidity test conditions (35°C, 100% relative humidity) and applied to grit blasted, hot rolled steel, using conventional spray equipment, in double coats to give a high dry film thickness. WE-2878 panels were exposed to constant humidity (ISO 6270) and assessed for blistering using ASTM D714.

TABLE 5 CLEVELAND HUMIDITY EXPOSURE- ANCAMINE 2878 ON WHITE ENAMEL PAINT (WE-2878)

Formulation		Field Blisters	Blister Size
WE-2878	1000 hours	10	10
WE-2878	3000 hours	9	9

Continuous 100% humidity exposure, cabinet temperature 35°C

Film Thickness 120-140 µm

Rating: 10=best (no blisters), 0= worst

The white enamel top coat formulation (WE-2878) gave excellent humidity resistance with no signs of field blistering at 1000 hours and a slight blister formation after 3000h.

#### WE-2878 3000 [h] CLEVELAND HUMIDITY



## White Enamel- Formulation (WE-2878) Based on Ancamine 2878

Nb.	A-Component	Parts [g]	Parts [%]	Type
1.	Epikote 828	90	26.9	Epoxy Resin
2.	Epodil 748	10	3.0	Diluent
3.	Tego Dispers 678	3	0.9	Additive
4.	Tego Dispers 630	2	0.6	Additive
5.	Tego Flow 300	1	0.3	Additive
6.	Kronos 2160	60	18	Pigment
7.	Luzenac 10MO	45	13.5	Pigment/Filler
8.	Xylene	18	5.4	Solvent
9.	MIBK	18	5.4	Solvent
	<b>Total A</b>	<b>247</b>	<b>74</b>	
Nb.	B-Component	Parts [g]	Parts [%]	Type
1.	Ancamine 2878	70	21.0	Curing Agent
2.	n-Butanol	17	5.0	Solvent
	<b>Total B</b>	<b>87</b>	<b>26</b>	
	<b>Total A and B</b>	<b>334</b>	<b>100</b>	

### Preparing Steps:

**A-Component:** Charge components 1 and 2 and stir homogeneous. Add the components 3-5 and stir shortly. Charge 6 and 7 separately and mix well. Add pigments step by step to mixture by beside adding parts of solvents mix (8,9) and then mix under high shear for 15-30 minutes.

**B-Component:** Charge component 1 and 2 and stir homogeneously.

**A+B:** Mix 2,8 parts of Component A to 1 part of Component B (by weight). After mixing Part A and B apply the coating.

### Typical Properties

Property	Value	Unit
Vol. Solids (A+B)	72.4	%
Wt. Solids (A+B)	83.1	%
PVC	17	%
VOC	221	g/l
Mix ratio by Volume (A:B)	2:1	
Mix ratio by Weight (A:B)	2.8:1	
Density (A/B/A+B)	1.46/1.00/1.31	g/ml
Stoich	104	%

### Typical Handling Properties

Property	Value	Unit
Pot-life	36	min
TFST (BK, Phase II/Phase III, 25°C)	1.5/2.5	h
TFST (BK, Phase II/Phase III, 5°C)	7/9	h
Gloss 20°/60° 7d 25°C	102/103	GU
Gloss 20°/60° 7d 5°C	90/102	GU
Cylindrical Mandrel 7d 23°C	15	%
Conical Mandrel 7d 23°C	>32	%



## Anticorrosive Primer- Formulation (AP-2878) Based on Ancamine 2878

Nb.	A-Component	Parts [g]	Parts [%]	Type
1.	Epikote 828	90	22.5	Epoxy Resin
2.	Epodil 748	10	2.5	Diluent
3.	Bentone SD2	3	0.8	Additive
4.	Anti-terra U	2	0.5	Additive
5.	Heucophos ZCP-Plus	20	5.0	Pigment/Filler
6.	Bayferrox 130M	20	5.0	Pigment
7.	Luzenac 10MO	45	11.3	Pigment/Filler
8.	Blanc Fixe Micro	70	17.5	Pigment/Filler
9.	Wollastocoat 10ES	30	7.5	Pigment/Filler
10.	Xylene	30	7.5	Solvent
11.	n-Butanol	10	2.4	Solvent
	<b>Total A</b>	<b>330</b>	<b>82.5</b>	
Nb.	B-Component	Parts [g]	Parts [%]	Type
1.	Ancamine 2878	70	17.5	Curing Agent
	<b>Total B</b>	<b>70</b>	<b>17.5</b>	
	<b>Total A and B</b>	<b>334</b>	<b>100</b>	

### Preparing Steps:

**A-Component:** Charge components 1 and 2 and stir homogeneous. Add the components 3,4 and stir shortly. Charge 5-9 separately and mix well. Add pigments step by step to mixture by beside adding parts of solvents mix (10,11) and then mix under high shear for 15-30 minutes.

**A+B:** Mix 4,7 parts of Component A to 1 part of Component B (by weight). After mixing Part A and B apply the coating.

## Typical Properties

Property	Value	Unit
Vol. Solids (A+B)	81	%
Wt. Solids (A+B)	90	%
PVC	25	%
VOC	160	g/l
Mix ratio by Volume (A:B)	3:1	
Mix ratio by Weight (A:B)	4.7:1	
Density (A/B/A+B)	1.72/1.09/1.56	g/ml
Stoich	104	%

## Typical Handling Properties

Property	Value	Unit
TFST (BK, Phase II/Phase III, 25°C)	1.5/2	h
TFST (BK, Phase II/Phase III, 5°C)	7.5/10	h

Ancamine® is a registered trademark of Evonik Industries AG or one of its subsidiaries.

### Disclaimer

This information and all further technical advice are based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.

### EVONIK OPERATIONS GMBH

Business Line Crosslinkers  
Paul-Baumann-Str. 1  
45764 Marl  
Germany

[www.evonik.com/crosslinkers](http://www.evonik.com/crosslinkers)

**Product Information:** [APCSE@evonik.com](mailto:APCSE@evonik.com)

**Sample Request:** [APCSE@evonik.com](mailto:APCSE@evonik.com)

### EVONIK CORPORATION

Business Line Crosslinkers  
7001 Hamilton Boulevard  
Trexlerstown, PA 18087  
USA

[CrosslinkersProinfo@evonik.com](mailto:CrosslinkersProinfo@evonik.com)

[Crosslinkers-Samples@evonik.com](mailto:Crosslinkers-Samples@evonik.com)

### EVONIK SPECIALTY CHEMICALS (SHANGHAI) CO., LTD.

Business Line Crosslinkers  
55, Chundong Road  
Xinzhuang Industry Park  
Shanghai, 201108  
China

[CL-Asiainfo@evonik.com](mailto:CL-Asiainfo@evonik.com)

[CL-Asiainfo@evonik.com](mailto:CL-Asiainfo@evonik.com)

