Epoxy Curing Agents and Modifiers

ANCAMIDE® 2769 Curing Agent

DESCRIPTION

Ancamide 2769 curing agent is an innovative technology designed for use with liquid epoxy resin. Showing polyamide like properties it is also 100% solids, contains no plasticizer and exhibits very low viscosity. This allows for formulation of solvent free or high solids coatings with ultra low volatile organic components.

BENEFITS

- Very low viscosity
- 100% solvent and plasticizer free
- Excellent compatibility with liquid epoxy resin
- No induction time
- Good through cure and appearance at 10°C
- Good corrosion resistance
- Adhesion to poorly prepared substrates

APPLICATIONS

- High solids and solvent free marine and maintenance coatings
- General protective coatings
- Tank and container coatings

STORAGE AND HANDLING

Refer to the Safety Data Sheet for Ancamide 2769 curing agent.

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.

TABLE 1: TYPICAL PROPERTIES

Appearance	Clear amber liquid
Color[1] (Gardner)	≤10
Viscosity[2] @ 25°C (mPa.s)	100-160
Amine Value[3] (mg KOH/g)	400-440
Specific Gravity @ 21°C	0.97
Equivalent Wt/{H}	150
Recommended Use Level[4] (PHR)	65-80

TABLE 2: TYPICAL HANDLING PROPERTIES[4]

Gel Time[5] @ 25°C (min)	120
Thin Film Set Time[6] @ 25°C (h)	9
Thin Film Set Time[6] @ 10°C (h)	24
Persoz Hardness[7] 1/7d @ 25°C (s)	205/300
Typical cure schedule	2-7 days

[1] ASTM D 1544
[2] Brookfield RVTD, spindle 4
[3] Perchloric Acid Titration
[4] With bisphenol-A based epoxy resin (EEW=190), 80 ph
[5] Techne GT-3 Gelation Timer, 150 g mix
[6] ASTM D 5895 - BK Drying Recorder, Phase 3
[7] ASTM D 4366

SUPPLEMENTARY DATA

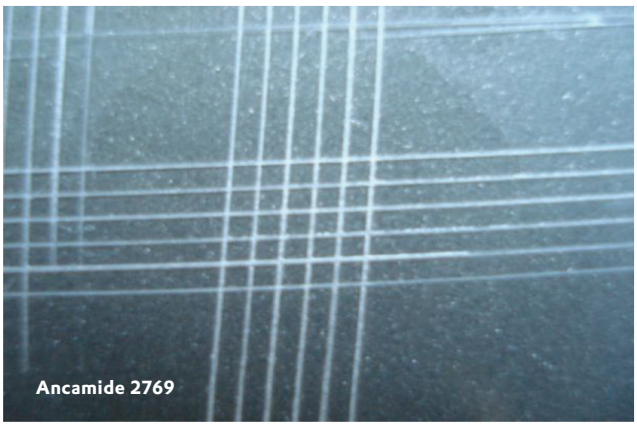
Ancamide 2769 provides enhanced adhesion to poorly prepared substrates. In this example, sandblasted steel SA2 ½ panels were prepared by immersing in water for 3-4 weeks until the rust build was significant. Then the panels were coated using standard LER (EEW=190) with Ancamide 2769 and tested for pull-off adhesion.

The adhesion was compared with a modified polyamide adduct and a modified polyamide for both wet concrete and metal. The results are shown below:

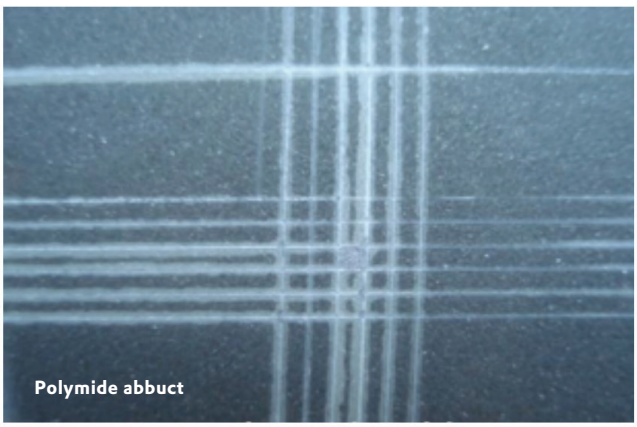
TABLE 3:

Curing Agent	Adhesion to Wet Concrete		Adhesion to Rusted Metal	
	Strength, PSI	Mode of failure	Strength, PSI	Mode of failure
Ancamide 2769	783	Concrete cohesive failure	899	Failure in the rust layer
Modified Polyamide Adduct	783	Concrete cohesive failure	928	Failure in the rust layer
Modified polyamide	493	100% delamination	—	—

Intercoat adhesion was also tested and shown to be superior to a polyamide adduct because the Ancamide 2769 does not contain plasticizer that can leach out during the drying process. The test was conducted according to ISO 2409, on panels with 2X100 micron DFT (~ 4 mils) thickness. The films were overcoated after 4 days of cure at ambient conditions.



Result: GT 0



Result: GT 3

ISO 2409: GT 0 = best, GT 5 = worst

The Ancamide 2769 sample continued to maintain adhesion through 12 days at which point the test was terminated.

STARTING POINT FORMULATION: ANTICORROSIVE PRIMER

The following is offered as a starting point formulation for an anticorrosive primer application.

TABLE 4:

A-Component			Weight (lb)
Standard Bis-A LER (EEW=190)	Epoxy Resin	Various	31.4
Epodil® 742 diluent	Reactive diluent	Evonik	3.6
ZetaSperse® 2100 agent	Dispersing agent	Evonik	1.0
BYK 57	Defoamer	BYK	1.0
Bayferrox 130M	Pigment	Bayer	5.0
Plastorit 000	Filler	Kremer	15.0
Sachtleben Micro	Filler	Sachtleben	26.0
Heucophos ZCP-plus	Anti-corrosive pigment	Heubach	6.7
10 ES Wollastocoat	Filler	NYCO Minerals	10.0
Bentone SD-2	Rheology modifier	Elementis	0.3
Xylene/Butanol (4:1)	Solvent	Various	6.8
Total A:			**106.8**
B-Component			
Ancamide 2769	Curing agent	Evonik	**28.2**

TABLE 5:

		Anticorrosive primer using Ancamide 2769
VOC	g/L	85
PVC	%	23
Mix viscosity	mPa.s (cPs)	1000
Mix solids	Vol. %	91
Mix ratio (weight)	A:B	3.8:1
Mix ratio (volume)	A:B	2:1
Potlife (min. to double viscosity)	23°C	90-120
TFST, 74°F (23°C)	Phase 2	9.0
150µm wft (6 mil)	Phase 3	13.0
TFST, 50F (10°C)	Phase 2	19.0
150µm wft (6 mil)	Phase 3	27.0
Persoz Hardness, 74°F (23°C)	24 h	87
	7d	164
	14d	179
Persoz Hardness, 50°F (10°C)	24 h	soft
	7d	76
	14d	108
Gloss, 74°F (23°C)	20°/60°	85/97
Salt Spray 2000 h	Field/Scribe	10/9*
Prohesion 2000 h	Field/Scribe	10/9*
Cleveland Humidity	12 months	No loss of adhesion, No blisters

* rating 10 = best (no blisters or corrosion)

Please note that early hot water resistance (60C) can be improved by adding a co-curing agent such as Ancamine 2739 to the B-side at a 70/30 to 50/50 mix of 2769/2739.

The properties and performance of this formulation can be seen in Table 5.

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

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