

ANCAMIDE[®] 2832**Curing Agent****DESCRIPTION**

Ancamide[®] 2832 is a modified polyamide curing Agent developed to provide rapid through cure and long overcoatability with epoxy resins. It can be used in refinish, non-automotive OEM and in wet-on-wet type applications in the protective coatings market for fast return to service.

TYPICAL PROPERTIES

Property	Value	Unit	Method
Appearance	Dark Amber liquid		
Colour	7 max	Gardner	ASTM D 1544
Viscosity @ 25°C	500-2000	mPa.s	Brookfield RVTD, Spindle 4
Amine Value	325-450	mg KOH/g	Perchloric Acid Titration
Specific Gravity @ 21°C	1.02		
Equivalent Wt {active N-H}	156		
Recommended use Level	82	PHR	With bisphenol- A based epoxy resin (EEW=190)

ADVANTAGES

- Excellent intercoat adhesion
- Top coat “dive back” resistance
- Good blush resistance

APPLICATIONS

- Refinish
- Non-Automotive OEM
- Fast return to service protective coatings

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.

PACKAGING AND HANDLING

Refer to the Safety Data Sheet for Ancamide[®] 2832 curing Agent.

TYPICAL HANDLING PROPERTIES

Property	Value	Unit	Method
Gel Time @ 25°C	29	min	Techne GT-5 Gelation Timer, 150 g mix
Thin Film Set Time 25°C	1:30/1:45	h	ASTM D 5895 - BK Drying Recorder, Phase 2/3, 60% RH
Wet-on-Wet top coat time	15-30	min	
Shore D (25 °C) Day 1/7	68		
Persoz Pendulum Hardness 7 days @ 25°C	302	s	ASTM D 4366
Tg °C (7 day), second scan	47		
Carbamation Resistance	5	Scale 1-5, 5=best	ISO 2812 (wet patch method), after 24hrs @ 23°C

SUPPLEMENTARY DATA

Wet-on-wet epoxy coating refers to a method of applying an epoxy coating where additional coats are applied before the previous coats have cured. Epoxy systems can be used as primer or as an intermediate coat. The functional primer coat provides corrosion and barrier protection to the steel, and facilitates the intercoat adhesion of the subsequent intermediate coat. It is essential that the epoxy primer develop its functional properties like hardness, crosslink density, and glass Transition temperature (Tg), and that a sufficient recoat window for the intermediate layer is provided.

Ancamide[®] 2832 curing agent is a medium viscosity, modified polyamide solution supplied in butanol solvent. Ancamide[®] 2832 curing agent-based epoxy primers can be top coated with urethane, acrylic urethane and slower versions of polycarbamide top coats, resulting in outstanding surface appearance, within 15-30 minutes after primer is applied, thus enhancing the productivity and throughput in both factory and field applied epoxy systems. Ancamide[®] 2832 curing agent-based primers offer outstanding intercoat adhesion and long term corrosion resistance. The anticorrosive primer formulation based on Ancamide[®] 2832 is given in Table 1. The primer was applied to grit blasted hot rolled steel substrates panels. Using conventional spray equipment to provide two to three mils of dry film thickness, the panels were allowed to cure for seven days prior to testing in salt spray. Evaluation of scribe creep was rated accordance with ASTM D 1654. One set of duplicate panels was evaluated for blistering and rusting. After the visual evaluation was completed the scribe areas were scraped to expose the underlying metal substrate, allowing for accurate scribe creep measurements. Results for 1000 h exposure are shown in Table 2.

TABLE 1: STARTING POINT FORMULATION - ANTI-CORROSIVE PRIMER

Nb.	A-Component	Description	Weight (lbs.)	Volume (gallons)
1.	Epon 828	Liquid Epoxy Resin	239.2	24.79
2.	Nuosperse 657	Dispersant	5.51	0.73
3.	Bentone SD-2	Thixotrope	8.82	0.73
4.	Xylene	Solvent	159.83	22.08
5.	n-Butanol	Solvent	22.04	3.38
6.	Bayferrox 130 M	Pigment	88.2	2.19
7.	Heucophos ZCPP	Pigment	137.79	5.23
8.	Blanc fix micro	Filler	198.42	5.48
9.	Wollastocoat 10ES	Filler	132.27	5.54
10.	Mica White 325M	Filler	110.23	6.68
	Total A		1102.32	76.85
Nb.	B-Component	Description	Weight (lbs.)	Volume (gallons)
11.	Ancamide® 2832	Curing Agent	196.39	23.15

TABLE 2: 1000 H SALT FOG EXPOSURE OF COATED AND SCRIBED STEEL PANELS

Formulation	Degree of Rust	Scribe Creep	Field Blistering	Blister Size
Ancamide® 2832	None	10	10	10 (No blisters)

TYPICAL PROPERTIES

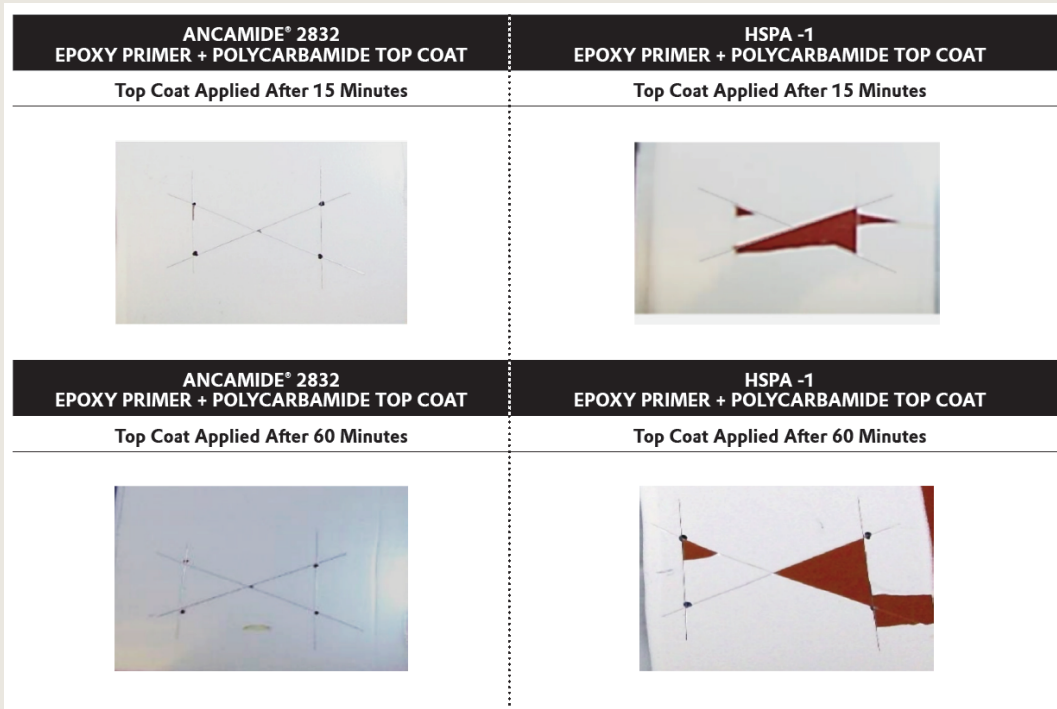
Property	Value	Unit
Non Volatile (Wt)	81.4	%
Non Volatile (Vol)	70	%
PVC	35.8	%
VOC	2.24	lb./gal

RAPID RECOAT STUDY USING POLYCARBAMIDES

The epoxy primers were evaluated for their ability to be rapidly overcoated with a fast cure isocyanate-based system. Polycarbamide topcoat based on HDI Trimer and a cycloaliphatic diethyl maleate ester curing agent was used. The rapid over coat properties of Ancamide® 2832 are compared with that of conventional polyamide HSPA-1 by applying 3 mils of an epoxy primer, as described in Table 1, on Bondrite B-952 panels and curing for 15 minutes and 60 minutes on separate panels. The formulated polycarbamide topcoat was applied after 15 and 60 minutes on primed Bondrite panels. The panels were cured for 24 hours and the crosshatch adhesion, as per ASTM 3359, was conducted. With the Ancamide® 2832, the epoxy primer is dry to touch after 15 minutes at 23°C. The surface appearance is smooth and wrinkle free. The intercoat adhesion results were excellent with rating of 5A being achieved. With the HSPA-1 curing agent, the primer was still wet to touch after 15 minutes and the applied topcoat showed base primer bleed through. With this system the polycarbamide topcoat exhibited very poor intercoat adhesion with a significant area delaminating following the application and removal of the adhesive tape during the crosshatch test. When the base primers were subjected to a 60 minute cure at 23 °C followed by application of polycarbamide topcoat, again excellent surface appearance and adhesion was observed for the Ancamide® 2832 curing agent. There was some improvement with the HSPA-1 polyamide with no primer bleed through, however the dry/wet adhesion of the polycarbamide coating was poor with a rating of 2A only.

TABLE 3: WET/DRY ADHESION PROPERTIES OF EPOXY PRIMERS WITH POLYCARBAMIDE TOPCOATS

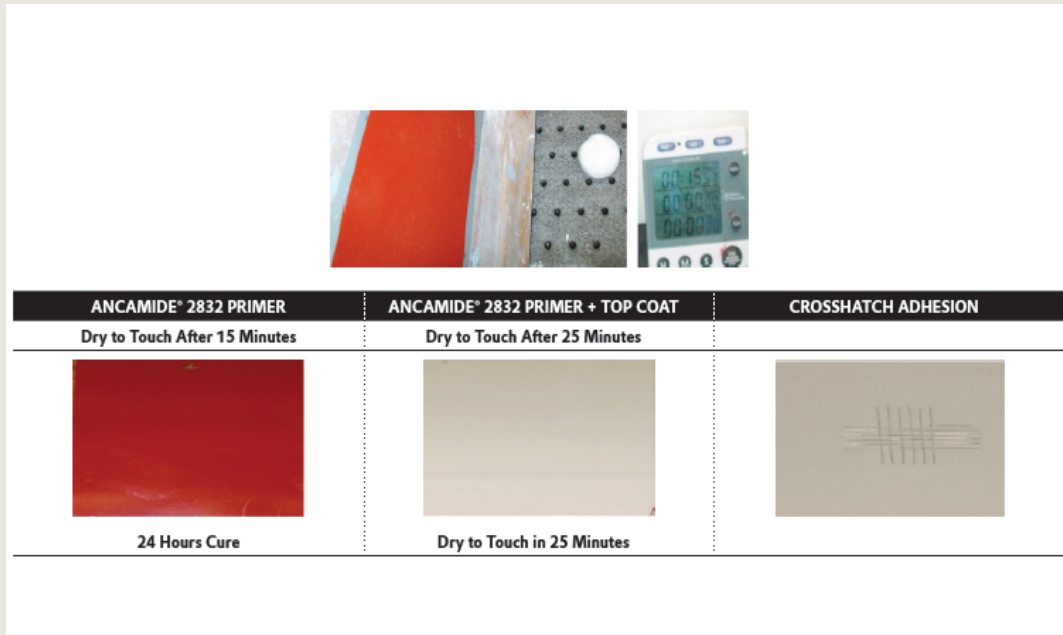
	APPLICATION TIME (TOP COAT)	ADHESION TYPE	ANCAMIDE® 2832	HSPA-1
Epoxy Primer		Dry	5A	5A
		Wet	5A	5A
Epoxy Primer + Polycarbamide top coat	15 min	Dry	5A	2A
		Wet	5A	1A
Epoxy Primer + Polycarbamide top coat	60 min	Dry	5A	2A
		Wet	5A	2A



ANCAMIDE® 2832 WET- ON-WET SPRAY APPLICATION

The epoxy primers were evaluated for their ability to be rapidly overcoated with a fast cure isocyanate-based system. Polycarbamide topcoat based on HDI Trimer and a cycloaliphatic diethyl maleate ester curing agent was used. Ancamide® 2832 epoxy primer was spray applied at 2-3 mils DFT on Bondrite B-952 panels. Dry cotton balls were dropped at regular interval and the panels were turned over to determine the time at which cotton ball no longer sticks to the primer surface without leaving any cotton fiber residue. The cotton balls dropped off the panels after 15 minutes. The primed panels were top coated with polycarbamide top coats after 15 minutes and 24 hours of cure. The panels were dry to touch in 25 minutes after the top coat application. Crosshatch adhesion tests were conducted on the cured panels after 24 hours.

FIGURE 1:



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