

# Ancamide® 2652 Curing Agent

## DESCRIPTION

Ancamide 2652 curing agent is a special polyamide adduct designed for use with liquid epoxy resins in two-part, ambient-cure coatings specifically developed to provide long overcoatability with epoxy and alternative resin technology.

## ADVANTAGES

- Long overcoatability
- Good corrosion resistance
- Fast dry and cure
- Moderate viscosity
- Good flexibility

## APPLICATIONS

- High-solids marine and maintenance coatings
- High-solids lining 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.

## STORAGE AND HANDLING

Refer to the Material Safety Data Sheet for Ancamide 2652 curing agent.

## TYPICAL CURE SCHEDULE

7 days at ambient temperature.

TABLE 1: TYPICAL PROPERTIES

|  |                     |
|--|---------------------|
| Appearance                                 | Clear, Amber Liquid |
| Color <sup>1</sup> (Gardner)               | 7+                  |
| Viscosity <sup>2</sup> @ 25°C (mPa.s)      | 1,740               |
| Specific Gravity <sup>3</sup> @ 25°C       | 0.98                |
| Amine Value <sup>4</sup> (mg KOH/g)        | 132                 |
| Flash Point <sup>5</sup> (closed cup) (°C) | 37                  |
| Theoretical Equivalent Wt/{H}              | 250                 |
| Recommended Use Level (phr, EEW=190)*      | 90                  |

TABLE 2: TYPICAL HANDLING PROPERTIES (1\*)

|                                 |    |
|---------------------------------|----|
| Use Level (phr)                 | 90 |
| Thin Film Set Time <sup>6</sup> |    |
| Tack Free @ 25°C (h)            | 5  |
| Hard Dry @ 25°C (h)             | 13 |
| Pencil Hardness @ 25°C          | F  |

\*Preferred loading of 90 phr (70% stoichiometry) for optimum overcoatability

TABLE 3: TYPICAL PERFORMANCE

|                                 |    |
|---------------------------------|----|
| Use Level (phr)                 | 90 |
| Thin Film Set Time <sup>6</sup> |    |
| Tack Free @ 25°C (h)            | 5  |
| Hard Dry @ 25°C (h)             | 13 |
| Pencil Hardness @ 25°C          | F  |

1\* Ancamide 2652 curing agent formulated with DGEBA (EEW=190) liquid epoxy resin.  
2\* DGEBA (EEW=190) based Paint: DGEBA/Cardura E-10/Talc/TiO<sub>2</sub>/Xylene/n-Butanol =39.2/9.8/36.7/4.1/5.1/5.1

## FOOTNOTES

<sup>1</sup>ASTM D 1544-80

<sup>2</sup>ASTM D-445-83, Brookfield, RVTD, Spindle 4

<sup>3</sup>ASTM D 1475-85

<sup>4</sup>Perchloric Acid Titration

<sup>5</sup>Seta Flash Closed Cup

<sup>6</sup>BK Drying Recorder

<sup>7</sup>ASTM B 117

<sup>8</sup>Testing Method:

- 1) Apply coating on sand blasted steel (200 $\mu$ -wet)
- 2) Place in Weathering (1 day-84 days)
- 3) Overcoat with coating after exposure (200 $\mu$ -wet)
- 4) Age system at 25 °C, 7 days
- 5) Immersion test in water at 25 °C, 7 days
- 6) Assess damage area

Rating: 0%→10, 20%→8, 40%→6, 60%→4, 80%→2, 100%→0

## SUPPLEMENTARY DATA

**OVERCOATABILITY:** Ancamide 2652 is specifically formulated for long overcoatability. Per the data on the previous page, for both epoxy on epoxy and polyurethane on epoxy, the overcoat window is longer than 3 months.

The below test gives an example of epoxy on epoxy overcoatability with a standard crosshatch adhesion test and compares to a standard polyamide.



**Ancamide 2652**  
12 weeks exposure  
Recoatibility = 10



**Standard Polyamide**  
12 weeks exposure  
Recoatibility = 1

Recoatibility scale 10 = best, 0 = worst.

**CATHODIC DISBONDMENT:** The increased use of cathodic protection in pipelines, ships, and other structures places additional demands on coating systems.

Cathodic disbondment is a phenomenon during which a coating used in a cathodic protection service loses adhesion with the substrate metal. Cathodic disbondment can be affected by the coating formulation (including the curing agent), the extent of cure and coating thickness.

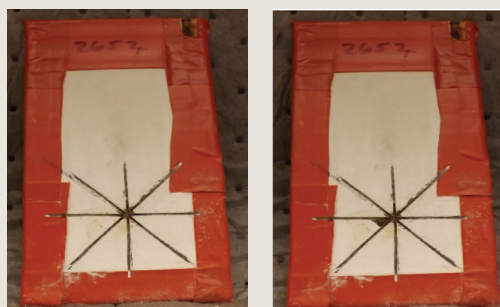
Cathodic protection prevents corrosion by converting the asset from an anode to a cathode using a connected sacrificial material to act as the anode. An electrical current may also be necessary.

Evonik used industry standard ASTM G 42 to challenge Ancamide 2652 in a primer formulation for cathodic disbondment. Designed to simulate pipeline coatings under elevated temperature, ASTM G42 calls for a standard coating formulation at 30-35 mil thickness to be immersed in an electrolyte solution for 28 days at 60°C. During the test, the reference and applied voltages were recorded along with the impressed current. After immersion, the panels were then washed, visually inspected, and attempts were made to remove the coating. The extent of disbondment was measured.

The results were as follows, indicating suitability of formulations using Ancamide 2652 for cathodic protection service.

| PROPERTIES         | ANCAMIDE 2652                   |
|--------------------|---------------------------------|
| Delamination       | None                            |
| Blistering         | None                            |
| Observed corrosion | None                            |
| Recommendation     | Recommended for CD applications |

## ANCAMIDE 2652 BEFORE AND AFTER RADIAL DISBONDMENT TEST



**APPENDIX 1:** The formulation parameters were as follows:

- Standard LER (EEW 190; DER 331 or Epon 828)
- PVC=18-23%

| Part A           | Weight (kg) | Volume (gal) |
|------------------|-------------|--------------|
| Epon 828         | 327.30      | 33.74        |
| Nuospense 657    | 5.24        | 0.68         |
| Xylene           | 70.04       | 9.68         |
| MIBK             | 32.73       | 4.89         |
| Aromatic 100     | 72.01       | 9.88         |
| TiO <sub>2</sub> | 130.92      | 3.93         |
| Talcron MP 10-52 | 399.31      | 17.10        |
| Part B           | Weight (kg) | Volume (gal) |
| Ancamide 2652    | 294         | 3850         |

**TEST PARAMETERS:** Test parameters included both formulation parameters and cathodic disbonding test parameters.

The cathodic disbonding test parameters:

- 28 days of immersion at a constant 60°C
- Coating thickness of 30-35 mil
- Panel construction: hot rolled sand blasted steel
- Reference voltage: 1.5V
- 3% electrolyte solution comprised of 1 wt % each of: NaCl, Na<sub>2</sub>SO<sub>4</sub>, Na<sub>2</sub>CO<sub>3</sub>
- Reference electrode: Ag/Cl
- Holiday diameter: 1/4 inch

Epoxy Curing Agents and Modifiers

# Ancamide<sup>®</sup> 2652 Curing Agent

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