



Cathodic protection is employed for the protection of steel pipelines, storage tanks, boat hulls, oil platforms, and other major assets. Finding the right curing agent to optimize coatings systems in this type of service can be a challenge for formulators. Through testing, Evonik identified a range of curing agents that perform exceptionally well in cathodic protection applications.

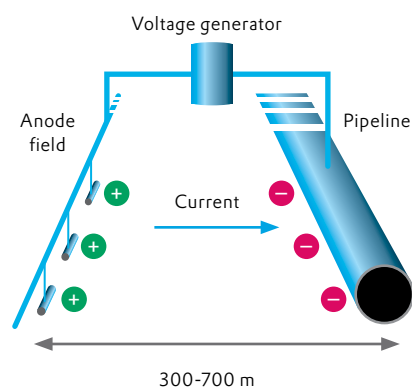
#### PRODUCT RECOMMENDATIONS

Evonik is pleased to recommend the epoxy curing agents for use in coatings designed to be used where cathodic protection service is employed. These products were evaluated for their performance using ASTM G42, "Standard Test Method for Cathodic Disbonding of Pipeline Coatings Subjected to Elevated Temperature." At the end of the test, the panels were checked for visual signs of blistering and corrosion and force was applied to attempt delamination.

**FIGURE 1: CATHODIC PROTECTION SYSTEM OF THE PIPELINE**

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.

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.



	ANCAMIDE 2353	ANCAMIDE 2634	ANCAMIDE 2652	SUNMIDE CX 1151	ANCAMINE 2432
<b>Typical Benefits</b>	Very good solvent and chemical resistance. Cures down to 40°F. No induction time needed.	Good low temperature cure. High corrosion and hot water resistance.	Specially designed to provide a long overcoat window. Provides excellent corrosion resistance.	Fast cure at low temperatures.	Outstanding chemical resistance. Fast cure with good working time.
<b>Test Results</b>	Delamination	None	None	<1.0 mm	1.5 mm
	Blistering	None	None	None	None
	Observed corrosion	None	None	None	None

## TEST METHODS

Evonik used industry standard ASTM G 42 to challenge our curing agents 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.

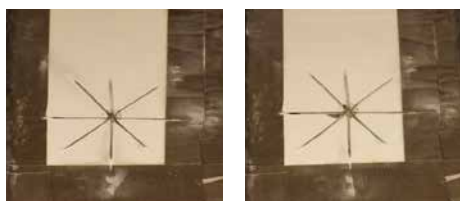
## TEST PARAMETERS

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: ¼ inch

## ANCAMIDE 2353 RADIAL DISBONDMENT RESULTS



before

after

### 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

### Disclaimer

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Formulation parameters: Use of standard liquid epoxy resin (LER) with EEW of 190. Pigment volume concentration (PVC) was set between 18 and 23%. Please see the formulation/Part A for details.

PART A	WEIGHT (kg)	VOLUME (gal)
Epon 828	327.30	33.74
Nuosperse 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 2353	196	23.28
<b>OR</b>		
Ancamide 2634	152	80.91
<b>OR</b>		
Ancamide 2652	294	38.50
<b>OR</b>		
Sunmide CX-1151	425	50
<b>OR</b>		
Ancamide 2432	425	50

