ElectroFin® heat transfer coatings

MODINE®

TECHNICAL DATA SHEET

GENERAL DESCRIPTION
– SUBJECT TO CHANGES OR DEVIATIONS

EFIN℠ Pro Shield™ 7: ElectroFin® E-coat + Insitu® Topcoat

PRODUCT DESCRIPTION

EFIN℠ Pro Shield™ 7: ElectroFin® E-coat + Insitu® Topcoat is two layers of coating protection. ElectroFin® E-coat, a water-based, flexible cationic epoxy polymer E-coat, and a water based/water reducible synthetic flexible polymer Insitu® Topcoat. This coating combination provides both UV and corrosion protection to RTPF (Round Tube Plate Fin) and Microchannel Heat Exchangers.

SPECIFICATIONS

RTPF or Microchannel Heat exchangers (MCHE) first have a flexible cationic ElectroFin® E-coat uniformly applied to all metallic surfaces with no material bridging between fins. The process shall ensure complete HX encapsulation of all conductive surfaces with uniform dry film thickness from 0.5-1.2 mils (12-30 µm). ElectroFin® E-coat meets 5B rating for cross-hatch adhesion per ASTM B3359. Corrosion durability was confirmed through testing to no less than 15,000 hours salt spray resistance per ASTM B117 using scribed aluminum test coupons. After curing, the Heat Exchangers shall receive Insitu® Topcoat, a spray-applied Water Based/ Water Reducible Synthetic Flexible Polymer Topcoat to prevent UV degradation of the ElectroFin® E-coat film. The Insitu® Topcoat shall have a 60 degree gloss (>75) and a dry film thickness of 0.5- 4.0 mils (13-101µm). Color options are available for the Insitu® Topcoat.

EFIN℠ PRO SHIELD™ 7: ELECTROFIN® E-COAT + INSITU® TOPCOAT MEETS THESE TEST STANDARDS

- ASTM B117 / DIN 53167 Salt Spray:
  - *ElectroFin® E-coat: 15,000+ hours*
  - *Insitu® Topcoat: 2,000+ hours (heat exchangers)*
    15,000+ hours (aluminum test coupons)
- ASTM G85 Annex A3 SWAAT Modified Salt Spray:
  - *ElectroFin® E-coat: 3,000 hours*
  - *Insitu® Topcoat: Not Applicable*
- ASTM D4587 UV Resistance:
  - *ElectroFin® E-coat: Not Applicable*
  - *Insitu® Topcoat 500 hours minimum*

EFIN℠ PRO-SHIELD™ 7: ELECTROFIN® E-COAT TECHNICAL PROPERTIES

PROPERTY	TEST METHOD	PERFORMANCE
Salt Spray	DIN 53167/ASTM B117	15,000 hours
Water Immersion	ASTM D870	1000 hours minimum
Pencil Hardness	ASTM D3363	2H minimum
Cross Hatch Adhesion	ASTM D3359	5B
Humidity	ASTM D2247	1000 hours minimum
UV Resistance	ASTM D4587	1000 hours minimum
SWAAT Corrosion	ASTM G85-A3	3000 hours
Dry Film Thickness	ASTM D7091	0.5-1.2 mils / 12-30 µm
Direct Impact	ASTM D2794	160 in/lb
Heat Transfer Reduction	—	Less than 1%
Bridging	—	No bridging including enhanced & micro-channel fin designs
Coating of Enhanced Fins	—	Up to 30 fins per inch
pH Range	—	3-12
Temperature Limits	—	-40ºF to 325ºF / -40ºC to 163ºC (dry load)
Gloss – 60 Degree	ASTM D523	55-75

EFIN℠ PRO-SHIELD™ 7: ELECTROFIN® E-COAT VS. OTHER HX COATINGS

	ELECTROFIN® E-COAT	DIP PHENOLICS	ELASTOMERICS	OTHER E-COATS
Application Method	Complete Immersion Cathodic Deposition	Manual Dip or Flow	Manual Dip or Flow	Anodic or Cathodic Deposition
Flexibility	Excellent	Poor – Good	Excellent	Good
Coating Uniformity	Computer controlled Consistent (0.5-1.2 mils)	Manual Inconsistent (2-6 mils)	Manual Inconsistent (2-6 mils)	Inconsistent (0.4-1.5 mils)
Coating Penetration	Computer controlled Consistent	Uncontrolled/Potentially Inconsistent	Uncontrolled/Potentially Inconsistent	Inconsistent to Bare Metal
Bridging	None – up to 30 fpi & 16 rows	Limited to 16 fpi with some bridging	Limited to 14 fpi with some bridging	Limited to 14 fpi with some bridging
Thermal Loss	< 1%	2% – 6%	2% – 6%	1% – 4%

EFIN℠ PRO-SHIELD™ 7: INSITU® TOPCOAT TECHNICAL PROPERTIES

PROPERTY	TEST METHOD	PERFORMANCE
Salt Spray	DIN 53167/ASTM B117	See Note 1: Below
Water Immersion	ASTM D870	>500 hours minimum
Pencil Hardness	ASTM D3363	HB
Cross Hatch Adhesion	ASTM D3359	5B
Humidity	ASTM D2247	500 hours minimum
UV Resistance	ASTM D4587	500 hours minimum
Mandrel Bend (Flexibility)	ASTM D522M	Pass

NOTE 1:

EFIN℠ Pro Shield™ Insitu® Topcoat has been ASTM B117 Salt Spray tested to 2,000+ hours on Heat Exchangers and 15,000+ hours on aluminum test coupons.

APPLICATIONS SUITED FOR EFIN℠ PRO SHIELD™ 7: ELECTROFIN® E-COAT + INSITU® TOPCOAT

- RTPF and Microchannel Heat Exchangers in coastal and industrial applications that require moderate corrosion and UV protection.