



Protective & Marine Coatings

EPO-PHEN™ FF EPOXY PHENOLIC

Revised 01/2016 - Issue 6

PRODUCT INFORMATION

PRODUCT DESCRIPTION

EPO-PHEN FF COATING is a flake filled (MIO) amine cured epoxy phenolic novolac formulated for use under thermal insulation at elevated or cryogenic temperatures and for immersion service in water and hydrocarbons such as gasoline, fuel oil, and diesel fuel.

- Temperature resistant to 218°C (425°F), constant; 232°C (450°F) intermittent (dry service)
- Self priming
- Chemical resistant

The micaceous iron oxide (MIO) provides:

- High temperature resistance
- Film reinforcement
- One coat, high build application
- Improved edge protection

PRODUCT CHARACTERISTICS

Finish:	Semi-Gloss
Colour:	Limited Range
Volume Solids:	70% ± 2%, mixed
Weight Solids:	85% ± 2%, mixed
VOC (EPA Method 24):	<250 g/L
Mix Ratio:	4:1 by volume

Recommended Spreading Rate per coat (one coat system):

	Minimum		Maximum	
W.f.t. microns (mils)	250 (10.0)	325 (13.0)		
D.f.t. microns (mils)	175 (7.0)	225 (9.0*)		
~Coverage m²/L (sqft/gal)	3.9 (160)	3.0 (125)		

*Do not apply over 225 microns (9.0 mils) total dft for service above 149°C (300°F).

Drying Schedule @ 300 microns wet:

	@ 10°C (50°F)	@ 25°C (77°F)	@ 38°C (100°F)
	<i>50% RH</i>		
To touch:	6 hours	3 hours	1 hour
To handle:	18 hours	8 hours	2 hours
To recoat (itself):			
minimum:	48 hours	16 hours	6 hours
maximum:	30 days	30 days	30 days
To cure:	21 days	7 days	3 days
Heat Cure:	8 hrs @ ambient, then 16 hrs @ 60°C (140°F)		

*If maximum recoat time is exceeded, abrade surface before recoating.
Drying time is temperature, humidity, and film thickness dependent.*

Pot Life:	4 hours	2 hours	1 hour
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Thinned with Thinner No. 50

Induction:	None required		
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Shelf Life:	24 months, unopened Store indoors at 4.5°C (40°F) to 38°C (100°F)
Flash Point:	89°F (32°C) Seta Flash
Cleanser/Thinner:	No. 50

PERFORMANCE CHARACTERISTICS

Substrate*: Steel

Surface Preparation*:

Sa2½

ISO8501-1:2007 Average surface profile 50-75µm

System Tested*:

1 ct: Epo-Phen FF @ 175-225 microns dft (7.0-9.0 mils)

*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	129 mg loss
Adhesion	ASTM D4541	750 psi
Control of Corrosion under Thermal Insulation (Wet/Dry Thermal Cycling)	NACE RP0198 149°C (300°F), 300 microns dft (12 mils) 218°C (425°F), 225 microns dft (9 mils)	Passes, Complies with NACE RP-0198 System 5 Passes
Corrocell Immersion Resistance	NACE TM-01-74, 2 years, 99°C (210°F)	No blistering, rusting, cracking, or other detrimental effect
Flexibility	NACE RP-0394	3.29%
Immersion Elevated Temperature*		Passes 6 months at 96°C (204°F) in gearbox oil
Pencil Hardness	ASTM D3363	4H
Radiation Tolerance	ASTM D4082 / ANSI 5.12	Pass at 450 microns (18 mils)
Temperature Resistance (dry service)	ASTM D2485	218°C (425°F), constant; 232°C (450°F) intermittent, may discolour above 93°C (200°F)
Thermal Cycling	-160°C (-320°F) over carbon and stainless steel	Passes

*Report No. IM54.1382-09

RESISTANCE GUIDE - IMMERSION (Ambient Temperature)

- Alkalies Recommended (66°C/150°F)
- Crude oil Recommended (104°C/220°F)
- Diesel fuel Recommended (49°C/120°F)
- Lubricating oils Recommended (49°C/120°F)
- Fuel oils Recommended (49°C/120°F)
- Aromatic solvents Recommended (49°C/120°F)
- Hi-aromatic gasoline Recommended (49°C/120°F)
- Ethanol gasohol Recommended (54°C/130°F)
- MTBE, ETBE, TAME Recommended (49°C/120°F)
- Ether/fuel blends (reformed gas) Recommended (49°C/120°F)
- Water, distilled water, & demineralized water Recommended (99°C/210°F)
- Methanol, ethanol, or blends Recommended (38°C/100°F)

Consult your Sherwin-Williams representative for specific application, temperature, concentration, and exposure recommendations.

Epoxy coatings may darken or yellow after application and curing.



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PRODUCT INFORMATION

RECOMMENDED USES

- Steel and stainless steel tanks and piping under insulation
- Non-insulated structural steel and piping subjected to chemical or abrasion attack
- Use in areas subject to wet/dry cycling up to 149°C (300°F)
- Use in areas where temperature resistance up to 232°C (450°F) is required (dry service)
- Acceptable for use in immersion service at elevated temperatures for fresh water and distilled water 99°C (210°F)
- Suitable for storage of gasoline, fuel oil, diesel fuel, and other similar hydrocarbon cargos
- Not qualified for potable water immersion
- Water and wastewater facilities
- Wind tower gearbox lining

RECOMMENDED SYSTEMS

Dry Film Thickness / ct.
Microns (Mils)

Steel/Stainless Steel, high temperature resistance up to 232°C (450°F):

1 ct. Epo-Phen FF 175-225 (7.0-9.0)

Steel/Stainless Steel, high temperature resistance up to 149°C (300°F):

2 cts. Epo-Phen FF 125-200 (5.0-8.0)

Steel/Stainless Steel, high temperature resistance up to 232°C (450°F):

2 cts. Epo-Phen FF 88-112 (3.5-4.5)

Carbon Steel or Stainless Steel, immersion/tank lining:

2 cts. Epo-Phen FF 125-200 (5.0-8.0)

Concrete, immersion/tank lining:

1 ct. Kem Cati-Coat HS 250-500 (10.0-20.0)

2 cts. Epo-Phen FF 125-200 (5.0-8.0)

For non-immersion service, Epo-Phen may be topcoated with Acrolon 218 HS up to 93°C (200°F), or with Heat-Flex 450 up to 232°C (450° F).

The systems listed above are representative of the product's use, other systems may be appropriate.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Iron & Steel

Immersion;

Sa2½ ISO8501-1:2007

Atmospheric;

Average surface profile 50-75µm

Concrete;

Immersion:

SSPC-SP13/NACE 6 - 4.3.1 or 4.3.2 or ICRI No. 310.2, CSP 2-3

Surface Preparation Standards

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Sa 3	Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 2	Sa 2	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted C St 2	C St 2	SP 2	-
Pitted & Rusted	D St 2	D St 2	SP 2	-
Rusted	C St 3	C St 3	SP 3	-
Power Tool Cleaning	Pitted & Rusted D St 3	D St 3	SP 3	-

TINTING

Do not tint.

APPLICATION CONDITIONS

Temperature: 10°C (50°F) minimum, 49°C (120°F) maximum

(air, surface, and material)

At least 3°C above dew point

Relative humidity:

85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging: 20L, mixed (35.7kg)
Part A 16L, (31.4kg)
Part B 4L, (4.3kg)

Weight: 1.8 Kg/L; 14.8 ± 0.2 lb/gal, mixed

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.



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APPLICATION BULLETIN

Revised 01/2016 Issue 5

SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Steel/Stainless Steel, under insulation, immersion

Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Near White Metal Blast Cleaning per Sa2½. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (50 microns / 2 mils). Remove all weld spatter and round all sharp edges. Prime any bare steel the same day as it is cleaned.

On stainless steel, use Aluminum Oxide or other non-metallic abrasive grit. Do not use chlorinated solvents for cleaning stainless steel.

Steel, non-insulated, atmospheric

Minimum surface preparation is Hand Tool Clean per St2. Power Tool Cleaning to Bare Metal per SSPC-SP11 is also acceptable. Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. For better performance, use Commercial Blast Cleaning per Sa2, blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (50 microns / 2 mils). Remove all weld spatter and round all sharp edges. Prime any bare steel within 8 hours or before flash rusting occurs.

Concrete and Masonry

For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 2-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 24°C (75°F). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Primer required.

Follow the standard methods listed below when applicable:

ASTM D4258 Standard Practice for Cleaning Concrete.
ASTM D4259 Standard Practice for Abrading Concrete.
ASTM D4260 Standard Practice for Etching Concrete.
ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete.
SSPC-SP 13/Nace 6 Surface Preparation of Concrete.
ICRI No. 310.2 Concrete Surface Preparation.

Concrete, Immersion Service:

For surface preparation, refer to SSPC-SP13/NACE 6, Section 4.3.1 or 1.3.2 or ICRI No. 310.2, CSP 2-3.

Immersion Service:

In addition to the above surface preparation, abrasive blasting of the concrete surface is required.

Surface Preparation Standards

Condition of Surface	Surface Preparation Standards		SSPC	NACE
	ISO 8501-1	Swedish Std.		
White Metal	BS7079:A1 Sa 3	SIS055900 Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 2	Sa 2	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted C St 2	C St 2	SP 2	-
Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning	Rusted C St 3	C St 3	SP 3	-
Pitted & Rusted	D St 3	D St 3	SP 3	-

APPLICATION CONDITIONS

Temperature: 10°C (50°F) minimum, 49°C (120°F) maximum (air, surface, and material)
At least 3°C above dew point

Relative humidity: 85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

Cleanser/ThinnerNo. 50

Airless Spray

Pump.....45:1 minimum
Pressure.....3600 psi minimum
Hose.....3/8" - 1/2" ID
GunGraco XTR 7
Tip19 - 21 thou, (0.48 - 0.53mm)
Filter30 mesh
ThinningAs needed, up to 15% by volume

Conventional Spray

GunBinks 95
Fluid Tip66/65
Air Nozzle.....63PH-1
Atomization Pressure.....65 - 75 psi
Fluid Pressure.....15 - 20 psi
ThinningAs needed, up to 15% by volume

Brush, small areas only

Brush.....Natural Bristle
ThinningAs needed, up to 15% by volume

Roller, small areas only

Cover3/8" woven with solvent resistant core
ThinningAs needed, up to 15% by volume

If specific application equipment is not listed above, equivalent equipment may be substituted.



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APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly using low speed power agitation. Make certain no pigment remains on the bottom of the can. Then combine 4 parts by volume of Part A with 1 part by volume of Part B. Thoroughly agitate the mixture with power agitation. Re-stir before using.

If thinning solvent is used, add only after both components have been thoroughly mixed.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat (one coat system):

	Minimum	Maximum
Wet microns (mils)	250 (10.0)	325 (13.0)
Dry microns (mils)	175 (7.0)	225* (9.0*)
~Coverage m²/L (sqft/gal)	3.9 (160)	3.0 (125)

* Do not apply over (225 microns) 9.0 mils total dft for service above 149°C (300°F).

Drying Schedule @ 12.0 mils wet (300 microns):

	@ 10°C/50°F	@ 25°C/77°F	@ 38°C/100°F
		50% RH	
To touch:	6 hours	3 hours	1 hour
To handle:	18 hours	8 hours	2 hours
To recoat (itself):			
minimum:	48 hours	16 hours	6 hours
maximum:	30 days	30 days	30 days
To cure:	21 days	7 days	3 days
Heat Cure:	8 hrs @ ambient, then 16 hrs @ 60°C (140°F)		

If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity, and film thickness dependent.

Topcoat within 72 hours if using a silicone acrylic.

Pot Life: 4 hours 2 hours 1 hour

Thinned with Thinner No. 50

Induction: None required

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Cleanser/Thinner N° 50. Clean tools immediately after use with Cleanser/Thinner N° 50. Follow manufacturer's safety recommendations when using any solvent.

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PERFORMANCE TIPS

Stripe coat crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

For Immersion Service: (if required) Holiday test in accordance with ASTM D5162 for steel, or ASTM D4787 for concrete.

Excessive reduction of material can affect film build, appearance, and adhesion.

Do not mix previously catalyzed material with new.

Do not apply the material beyond recommended pot life.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Reducer #15.

Temperatures above 25°C (77°F) will shorten the pot life.

Do not apply over 225 microns (9.0 mils) total dft when used in service above 149°C (300°F).

Not recommended for potable water immersion.

Acceptable for insulation to be applied over the coating, after the coating has reached it's dry to touch time.

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

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