



# Protective & Marine Coatings

# EPO-PHEN™ FF TANK LINING AND HI-TEMP COATING

PART A  
PART B

B62A55  
B62V55

GRAY  
HARDENER

Revised September 26, 2014

## PRODUCT INFORMATION

7.13

### 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 425°F (218°C), constant; 450°F (232°C) 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

<b>Finish:</b>	Semi-Gloss
<b>Color:</b>	Gray
<b>Volume Solids:</b>	70% ± 2%, mixed
<b>Weight Solids:</b>	85% ± 2%, mixed
<b>VOC (EPA Method 24):</b>	Unreduced: <250 g/L; 2.08 lb/gal
<b>Mix Ratio:</b>	4:1 by volume

#### Recommended Spreading Rate per coat (one coat system):

	Minimum	Maximum
<b>Wet mils (microns)</b>	<b>10.0</b> (250)	<b>13.0</b> (325)
<b>Dry mils (microns)</b>	<b>7.0</b> (175)	<b>9.0*</b> (225)*
<b>~Coverage sq ft/gal (m<sup>2</sup>/L)</b>	<b>125</b> (3.0)	<b>160</b> (3.9)

Theoretical coverage **sq ft/gal (m<sup>2</sup>/L) @ 1 mil / 25 microns dft** **1120** (27.4)  
Do not apply over 9.0 mils (225 microns) total dft for service above 300°F (149°C).

\*See recommended systems.

#### Drying Schedule @ 12.0 mils wet (300 microns):

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

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.

<b>Pot Life:</b>	4 hours	2 hours	1 hour
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reduced 10% with Reducer R7K15

<b>Sweat-in-Time:</b>	None required		
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<b>Shelf Life:</b>	24 months, unopened Store indoors at 40°F (4.5°C) to 100°F (38°C)
<b>Flash Point:</b>	89°F (32°C) Seta Flash
<b>Reducer/Clean Up:</b>	Reducer R7K15 or California R7K111 (exempt solvent)

### PERFORMANCE CHARACTERISTICS

**Substrate\*:** Steel

Complies with NACE SP0198 CUI System CS-4

**Surface Preparation\*:** SSPC-SP10/NACE 2

**System Tested\*:**

1 ct: Epo-Phen FF @ 7.0-9.0 mils (175-225 microns) dft  
\*unless otherwise noted below

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

\*Report No. IM54.1382-09

#### RESISTANCE GUIDE - IMMERSION (Ambient Temperature)

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

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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&  
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**PRODUCT INFORMATION**

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**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 300°F (149°C)
- Use in areas where temperature resistance up to 450°F (232°C) is required (dry service)
- Acceptable for use in immersion service at elevated temperatures for fresh water and distilled water 210°F (99°C)
- Suitable for storage of gasoline, fuel oil, diesel fuel, and other similar hydrocarbon cargos
- Approved as finish coating for FIRETEX M90/02 Intumescent coating
- Not qualified for potable water immersion
- Water and wastewater facilities
- Wind tower gearbox lining
- This product meets specific design requirements for non-safety related nuclear plant applications in Level II, III and Balance of Plant, and DOE nuclear facilities\*
- Nuclear Power Plants            • DOE Nuclear Fuel Facilities
- Nuclear fabrication shops     • DOE Nuclear Weapons Facilities

\* Nuclear qualifications are NRC license specific to the facility

**RECOMMENDED SYSTEMS**

**Dry Film Thickness / ct.**  
**Mils                    (Microns)**

**Steel/Stainless Steel, high temperature resistance up to 450°F (232°C):**  
1 ct. Epo-Phen FF                    7.0-9.0 (175-225)

**Steel/Stainless Steel, high temperature resistance up to 300°F (149°C):**  
2 cts. Epo-Phen FF                    5.0-8.0 (125-200)

**Steel/Stainless Steel, high temperature resistance up to 450°F (232°C):**  
2 cts. Epo-Phen FF                    3.5-4.5 (88-112)

**Carbon Steel or Stainless Steel, immersion/tank lining:**  
2 cts. Epo-Phen FF                    5.0-8.0 (125-200)

**Concrete, immersion/tank lining:**  
1 ct. Kem Cati-Coat HS                    10.0-20.0 (250-500)  
2 cts. Epo-Phen FF                    5.0-8.0 (125-200)

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

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:	SSPC-SP10/NACE 2, 2-3 mil (50-75 micron) profile
Atmospheric:	SSPC-SP2 or SSPC-SP11
Concrete	
Immersion:	SSPC-SP13/NACE 6 - 4.3.1 or 4.3.2 or ICRI No. 310.2R, 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	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	D St 3	D St 3	SP 3	-

**TINTING**

Do not tint.

**APPLICATION CONDITIONS**

Temperature: 50°F (10°C) minimum, 120°F (49°C) maximum (air, surface, and material)  
At least 5°F (2.8°C) above dew point  
Relative humidity: 85% maximum

Refer to product Application Bulletin for detailed application information.

**ORDERING INFORMATION**

Packaging: 5 gallons (18.9L), mixed  
Part A 4 gallons (15.1L)  
Part B 1 gallon (3.78L)

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

7.13

### 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 SSPC-SP10/NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils / 50 microns). 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 grit. Do not use chlorinated solvents for cleaning stainless steel.

#### Steel, non-insulated, atmospheric

Minimum surface preparation is Hand Tool Clean per SSPC-SP2. 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 SSPC-SP6/NACE 3, blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils / 50 microns). 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. 310.2R, CSP 2-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). 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. Fill bug holes, air pockets and other voids with Steel-Seam FT910. 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. 310.2R 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. 310.2R, 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	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	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	-

### APPLICATION CONDITIONS

Temperature: 50°F (10°C) minimum, 120°F (49°C) maximum (air, surface, and material)  
At least 5°F (2.8°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.

Reducer/Clean Up ..... Reducer R7K15 or California R7K111 (exempt solvent)

#### Airless Spray

Pump.....45:1 minimum  
Pressure.....3600 psi minimum  
Hose.....3/8" - 1/2" ID  
Gun ..... Graco XTR 7  
Tip ..... .019" - .021", XHD RAC (Graco)  
Filter.....30 mesh  
Reduction.....As needed, up to 15% by volume

#### Conventional Spray

Gun ..... Binks 95  
Fluid Tip ..... 66/65  
Air Nozzle.....63PH-1  
Atomization Pressure.....65 - 75 psi  
Fluid Pressure..... 15 - 20 psi  
Reduction.....As needed, up to 15% by volume

#### Brush, small areas only

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

#### Roller, small areas only

Cover ..... 3/8" woven with solvent resistant core  
Reduction.....As needed, up to 15% by volume

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



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## APPLICATION BULLETIN

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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 reducer solvent is used, add only after both components have been thoroughly mixed, after sweat-in.

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

#### Recommended Spreading Rate per coat (one coat system):

	Minimum	Maximum
<b>Wet mils</b> (microns)	<b>10.0</b> (250)	<b>13.0</b> (325)
<b>Dry mils</b> (microns)	<b>7.0</b> (175)	<b>9.0*</b> (225)*
<b>~Coverage sq ft/gal</b> (m <sup>2</sup> /L)	<b>125</b> (3.0)	<b>160</b> (3.9)
Theoretical coverage <b>sq ft/gal</b> (m <sup>2</sup> /L) @ 1 mil / 25 microns dft	<b>1120</b> (27.4)	

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

\*See recommended systems.

#### Drying Schedule @ 12.0 mils wet (300 microns):

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

**Heat Cure:** 8 hrs @ ambient, then 16 hrs @ 140°F (60°C)

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  
reduced 10% with Reducer R7K15

**Sweat-in-Time:**                    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 Reducer R7K15. Clean tools immediately after use with Reducer R7K15. 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 R7K15.

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

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

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

Refer to the MSDS sheet before use.

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### WARRANTY

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