EXPRESSCOTE® HCR FF CHEMICAL RESISTANT LINING WITH OPTI-CHECK OAP TECHNOLOGY

PRODUCT DESCRIPTION

EXPRESSCOTE HCR FF is a glass flake filled epoxy novolac lining engineered to protect concrete and steel tank interiors from chemicals and solvents at ambient and elevated temperatures. It provides rapid return to service, high film build, and edge retentive protection compared to conventional epoxies.

- Fast return to service
- One coat protection
- Edge Retention > 70%
- 5 hours dry to walk on @ 77°F (25°C)
- 24 hours return to service @ 77°F (25°C)
- Designed for plural-component application equipment.
- 100 % Solids - Low VOC
- Designed for plural-component application equipment.
- 24 hours return to service @ 77°F (25°C)
- Edge Retention > 70%
- Fast return to service and edge retentive protection compared to conventional epoxies.

PRODUCT CHARACTERISTICS

Finish: Semi-Gloss
Color: Off White
Volume Solids: 100%, mix
Weight Solids: 100%, mixed
Mix ratio: 2:1 (2 components)
VOC (EPA method 24): 0 g/L, mixed

Recommended Spreading Rate per coat:

<table>
<thead>
<tr>
<th>Wet mls (microns)</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage sq ft/gal (m²/L)</td>
<td>20.0 (500)</td>
<td>30.0 (750)</td>
</tr>
<tr>
<td>Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft</td>
<td>53.0 (1.3)</td>
<td>80.0 (2.0)</td>
</tr>
</tbody>
</table>

Recommended Uses (Cont’d)

- Meets performance requirements of MIL-PRF-23236
- Chemical Holding Tanks (CHT)
- Concrete, Primary and Secondary Containment
- Power plant FGD duct and tanks
- Acceptable for use with 100% ethanol cargo
- Acceptable for use with cathodic protection systems
- Wind tower gearbox lining and transformer lining up to 284°F (140°C)
- 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 (1
- Nuclear Power Plants
- DOE Nuclear Fuel Facilities
- Nuclear fabrication shops
- DOE Nuclear Weapons Facilities

Nuclear qualifications are NRC license specific to the facility.

PERFORMANCE CHARACTERISTICS

Substrate*: Steel
Surface Preparation*: SSPC-SP10/NACE 2
System Tested*: 1 layer ExpressCote HCR FF @ 40 mils (1000 microns) dft

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Test Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abrasion Resistance</td>
<td>ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load</td>
<td>89 mg loss</td>
</tr>
<tr>
<td>Adhesion</td>
<td>ASTM D4541, Patti Tester</td>
<td>2830 psi</td>
</tr>
<tr>
<td>Cathodic Disbondment</td>
<td>MIL-PRF-23236</td>
<td>Passes, avg disbondment area of 0% obtained</td>
</tr>
<tr>
<td>Direct Impact Resistance</td>
<td>ASTM D2794</td>
<td>10 in-lbs.</td>
</tr>
<tr>
<td>Dry Heat Resistance</td>
<td>ASTM D2485, Method A, Quench Test</td>
<td>No cracking or delamination @ 500°F (260°C)</td>
</tr>
<tr>
<td>Flexibility</td>
<td>ASTM D522, 180° bend, 1&quot; mandrel</td>
<td>greater than 1&quot;</td>
</tr>
<tr>
<td>Fresh Water Immersion Resistance</td>
<td>ASTM D870, 2 years ambient</td>
<td>Rating 10 per ASTM D610 for Rusting; Rating 10 per ASTM D714 for Blistering</td>
</tr>
<tr>
<td>Glass Transition Temperature</td>
<td>115°F (46°C)</td>
<td></td>
</tr>
<tr>
<td>Heat Resistance for FGD Systems</td>
<td>ASTM D5499, Test Method A, 350°F (177°C), 40 mils (1000 microns) DFT</td>
<td>Passes, No cracking, chipping, or flaking 2,000 psi Patti adhesion</td>
</tr>
<tr>
<td>Immersion Elevated Temperature*</td>
<td></td>
<td>Passes 6 months at 204°F (96°C) in gearbox oil; Transformer lining up to 254°F (123°C)</td>
</tr>
<tr>
<td>Radiation Tolerance</td>
<td>ASTM D4082 / ANSI 5.12</td>
<td>Pass at 50 mils (1250 microns)</td>
</tr>
<tr>
<td>Salt Water Immersion Resistance</td>
<td>ASTM D870, 2 years ambient</td>
<td>Rating 10 per ASTM D610 for Rusting; Rating 10 per ASTM D714 for Blistering</td>
</tr>
<tr>
<td>Sulfuric Acid Resistance for FGD Systems</td>
<td>ASTM D6137, 20% Sulfuric Acid, 350°F (177°C), 40 mils (1000 microns) DFT</td>
<td>Passes, No cracking, chipping, or flaking 4 mil discoloration, good adhesion</td>
</tr>
</tbody>
</table>

*Report No. IM54.1382-09

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PRODUCT INFORMATION

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 for immersion:
- Iron & Steel: SSPC-SP10, 2-3 mil (50-75 micron) profile
- Concrete: SSPC-SP13/NACE 6, or ICRI No. 310.2R, CSP 3-5

Concrete & Masonry:
- Atmospheric: SSPC-SP13/NACE 6, or ICRI No. 310.2R, CSP3-5
- Immersion: SSPC-SP13/NACE 6-4.3.1 or 4.3.2, or ICRI No. 310.2R, CSP 3-5

Surface Preparation Standards

<table>
<thead>
<tr>
<th>Condition of Surface</th>
<th>ISO 8501-1</th>
<th>BS7079:A1</th>
<th>SIS055900</th>
<th>SSPC</th>
<th>NACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Metal</td>
<td>Sa 3</td>
<td>Sa 3</td>
<td>Sa 3</td>
<td>Sa 3</td>
<td>Sa 3</td>
</tr>
<tr>
<td>Near White Metal</td>
<td>Sa 2,5</td>
<td>Sa 2,5</td>
<td>Sa 10</td>
<td>Sa 10</td>
<td>Sa 10</td>
</tr>
<tr>
<td>Commercial Blast</td>
<td>Sa 2</td>
<td>Sa 2</td>
<td>Sa 6</td>
<td>Sa 10</td>
<td>Sa 10</td>
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<tr>
<td>Brush-Off Blast</td>
<td>Sa 1</td>
<td>Sa 1</td>
<td>Sa 7</td>
<td>Sa 10</td>
<td>Sa 10</td>
</tr>
<tr>
<td>Hand Tool Cleaning</td>
<td>C 5</td>
<td>C 5</td>
<td>C 5</td>
<td>C 5</td>
<td>C 5</td>
</tr>
<tr>
<td>Rusted</td>
<td>Pitted &amp; Rusted</td>
<td>C 5</td>
<td>C 5</td>
<td>C 5</td>
<td>C 5</td>
</tr>
<tr>
<td>Power Tool Cleaning</td>
<td>C 3</td>
<td>C 3</td>
<td>C 3</td>
<td>C 3</td>
<td>C 3</td>
</tr>
<tr>
<td>Rusted</td>
<td>Pitted &amp; Rusted</td>
<td>C 3</td>
<td>C 3</td>
<td>C 3</td>
<td>C 3</td>
</tr>
</tbody>
</table>

TINTING

B62V250 Part B 5 gallon Component may be tinted with up to 3 oz of Maxitoner Phthalo Green, Phthalo Blue or Black colorant.

Colors: Light Green, Light Blue, and Gray.

APPLICATION CONDITIONS

Temperature:
- Surface: 50°F (10°C) minimum, 120°F (49°C) maximum
- Air: 50°F (10°C) minimum, 120°F (49°C) maximum
- Material: 100°F (38°C) minimum, 130°F (54°C) maximum

At least 5°F (2.8°C) above dew point.
Non-condensing humidity:.................85% maximum

Refer to product Application Bulletin for detailed application information.

Material should be stored and kept at or above 50°F (10°C).

ORDERING INFORMATION

Packaging:
- Part A: 15 gallons (56.7L) mixed
- Part B: 5 gal (18.9L) in a 5 gal (18.9L) container

Weight:
- 12.78 ± 0.2 lb/gal ; 1.53 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.
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.

**Iron & Steel (immersion service)**
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. For better performance a White Metal Blast Cleaning per SSPC-SP5/NACE 1 can be used. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils / 50-75 microns). Coat any bare steel the same day as it is cleaned or before flash rusting occurs. Remove all weld spatter.

**Concrete and Masonry**
For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2R, CSP 3-5. 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 3-5.

**Surface Preparation Standards**

<table>
<thead>
<tr>
<th>Condition of Surface</th>
<th>ISO 8501-1</th>
<th>BS7579:A1</th>
<th>Swedish Std</th>
<th>SSPC</th>
<th>NACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Metal</td>
<td>Sa 3</td>
<td>Sa 3</td>
<td>Sa 3</td>
<td>5</td>
<td>Sa 3</td>
</tr>
<tr>
<td>Near White Metal</td>
<td>Sa 2.5</td>
<td>Sa 2.5</td>
<td>Sa 2.5</td>
<td>10</td>
<td>Sa 2.5</td>
</tr>
<tr>
<td>Commercial Blast</td>
<td>Sa 2</td>
<td>Sa 2</td>
<td>Sa 2</td>
<td>3</td>
<td>Sa 2</td>
</tr>
<tr>
<td>Brush-Off Blast</td>
<td>Sa 1</td>
<td>Sa 1</td>
<td>Sa 1</td>
<td>4</td>
<td>Sa 1</td>
</tr>
<tr>
<td>Hand Tool Cleaning</td>
<td>Rusted</td>
<td>C St 2</td>
<td>C St 2</td>
<td>2</td>
<td>C St 2</td>
</tr>
<tr>
<td>Power Tool Cleaning</td>
<td>Pitted &amp; Rusted</td>
<td>D St 1</td>
<td>D St 1</td>
<td>3</td>
<td>D St 1</td>
</tr>
</tbody>
</table>

**Application Conditions**

Temperature: Surface: 50°F (10°C) minimum, 120°F (49°C) maximum
Air: 50°F (10°C) minimum, 120°F (49°C) maximum
Material: 100°F (38°C) minimum, 130°F (54°C) maximum
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.

Reduction..........................not recommended
Clean up..........................MEK (R6K10)

**Plural Component Equipment**
- Pump.........................Graco Xtreme Mix or equivalent
- Pressure......................5000 Psi
- Hose..........................3/8" ID minimum
- Gun.........................Graco Silver Series or XTR Series
- Tip..........................023-033
- Material temperature at
  Gun tip.........................120°F (49°C) to 130°F (54°C)
- Static Mixing Tubes.......Place one 1/2 " ID 5 " long static mixing tube between the remote mix manifold and 25' long 3/8" ID integrated hose. Place a second 1/2 " ID 5 " long static mixing tube between the 3/8 " ID integrated hose and 15' long 1/4" ID whip hose that is connected to the gun.

The material should be 120°F-130°F (49°C-54°C) (vary as needed) at the mixing block for optimal atomization based on tip size and pump pressure. **Do not heat above 140°F (60°C).** Material temperature for Part A and B components should be the same during application.

*Contact S-W Tech Service for proper location of the mixers.

**Brush**
For stripe coating or repair only:
Brush..........................Nylon/Polyester Natural Bristle

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.

ExpressCote HCR FF comes in premeasured containers which when mixed provides 15 gallons (56.7L) of ready-to-apply material.

Mixing Instructions: Mix contents of each component thoroughly with low speed power agitation at slow speeds. Make sure no pigment remains on the bottom or the side of the can. Then fill plural component hoppers with part A and B respectively.

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

<table>
<thead>
<tr>
<th>Recommended Spreading Rate per coat:</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet mils (microns)</td>
<td>20.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Dry mils (microns)</td>
<td>20.0</td>
<td>30.0*</td>
</tr>
<tr>
<td>~Coverage sq ft/gal (m²/L)</td>
<td>53.0</td>
<td>80.0</td>
</tr>
<tr>
<td>Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft</td>
<td>1600</td>
<td>39.2</td>
</tr>
</tbody>
</table>

*See Recommended Systems.

Drying Schedule @ 20.0 mils wet (500 microns):

- To touch: 3 hours
- To handle: 12 hours
- Foot traffic: 12 hours
- To recoat: minimum 12 hours
- maximum 7 days
- Cure to service: 7 days

Drying time is temperature, humidity, and film thickness dependent.

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

PERFORMANCE TIPS

Stripe coat all 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 coat 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, over thinning, climate conditions, and excessive film build.

No reduction of material is recommended, as this can affect film build, appearance and performance.

Brush application is for stripe coating and small areas only.

Under certain application conditions a "blush" layer may form on the surface of the coating. If a blush forms this must be removed by cleaning with a water detergent solution prior to the application of a second coat/repair.

Do not mix previously catalyzed material with new.

Do not apply the material beyond recommended pot life.

Prior to immersion service, evaluate coating using the Opti-Check feature with appropriate holiday detection equipment such as SureFire or Innova inspection lamps.

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

Guidance on techniques and required equipment to inspect a coating system incorporating Opti-Check OAP Technology can be found in SSPC-TU 11.

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

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