MACROPOXY® 646
FAST CURE EPOXY

PART A  B58-600
PART B  B5SV600
SERIES  HARDENER

PRODUCT INFORMATION

4.53

PRODUCT DESCRIPTION

MACROPOXY 646 FAST CURE EPOXY is a high solids, high build, fast drying, polyamide epoxy designed to protect steel and concrete in industrial exposures. Ideal for maintenance painting and fabrication shop applications. The high solids content ensures adequate protection of sharp edges, corners, and welds. This product can be applied directly to marginally prepared steel surfaces.

- Low VOC
- Low odor
- Chemical resistant
- Abrasion resistant
- Outstanding application properties
- Meets Class A requirements for Slip Coefficient, 0.36 @ 6 mils / 150 microns dft (Mill White only)

PRODUCT CHARACTERISTICS

Finish: Semi-Gloss
Color: Mill White. Black and a wide range of colors available through tinting
Volume Solids: 72% ± 2%, mixed, Mill White
Weight Solids: 85% ± 2%, mixed, Mill White
VOC (EPA Method 24): Unreduced: <250 g/L; 2.08 lb/gal
Mixed Reduced 10%: <300 g/L; 2.50 lb/gal
Mix Ratio: 1:1 by volume

Recommended Spreading Rate per coat:

<table>
<thead>
<tr>
<th>Wet mils (microns)</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0 (175)</td>
<td>13.5 (338)</td>
<td></td>
</tr>
<tr>
<td>5.0* (125)</td>
<td>10.0* (250)</td>
<td></td>
</tr>
</tbody>
</table>

Theoretical coverage sq ft/gal:

<table>
<thead>
<tr>
<th>Wet mils (microns)</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>116</td>
<td>232</td>
<td></td>
</tr>
</tbody>
</table>

*May be applied at 3.0-10.0 mils dft as an intermediate coat. Refer to Recommended Systems (page 2). See Performance Tips section also.

Drying Schedule @ 7.0 mils wet (175 microns):

- @ 35°F/1.7°C  7.0 (175)  13.5 (338)
- @ 77°F/25°C  5.0* (125) 10.0* (250)

To touch: 4-5 hours
To handle: 2 hours
To recoat:
- minimum: 48 hours
- maximum: 1 year
To cure:
- Service: 10 days
- Immersion: 14 days

If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity, and film thickness dependent. Paint temperature must be at least 40°F (4.5°C) minimum.

Pot Life: 10 hours
Sweat-in-time: 30 minutes

When used as an intermediate coat as part of a multi-coat system:

Drying Schedule @ 5.0 mils wet (125 microns):

- @ 35°F/1.7°C  5.0* (125) 10.0* (250)

To touch: 3 hours
To handle: 48 hours
To recoat:
- minimum: 16 hours
- maximum: 1 year

PRODUCT CHARACTERISTICS (Cont’d)

Shelf Life: 36 months, unopened
Store indoors at 40°F (4.5°C) to 100°F (38°C).
Flash Point: 91°F (33°C), FCCC, mixed

Reduser/Clean Up:
- In California: Reducer, R7K15
- Reducer R7K111 or Oxsol 100

PERFORMANCE CHARACTERISTICS

Substrate*: Steel
Surface Preparation*: SSPC-SP10/NACE 2
System Tested*: 1 ct. Macropoxy 646 Fast Cure @ 6.0 mils (150 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 D4600, CS17 wheel, 1000 cycles, 1 kg load</td>
<td>84 mg loss</td>
</tr>
<tr>
<td>Accelerated Weathering-QUV</td>
<td>ASTM D4587, QUV-A, 12,000 hours</td>
<td>Passes</td>
</tr>
<tr>
<td>Adhesion</td>
<td>ASTM D4541</td>
<td>1,037 psi</td>
</tr>
<tr>
<td>Corrosion Weathering*</td>
<td>ASTM D5894, 36 cycles, 12,000 hours</td>
<td>Rating 10 per ASTM D714 for blistering; Rating 9 per ASTM D610 for rusting</td>
</tr>
<tr>
<td>Nuclear Decontamination</td>
<td>ASTM D2586/ANSI N 5.12</td>
<td>99% Water Wash; 95% Overall</td>
</tr>
<tr>
<td>Direct Impact Resistance</td>
<td>ASTM D2794</td>
<td>30 in. lb.</td>
</tr>
<tr>
<td>Dry Heat Resistance</td>
<td>ASTM D2485</td>
<td>250°F (121°C)</td>
</tr>
<tr>
<td>Exterior Durability</td>
<td>1 year at 45° South</td>
<td>Excellent, chalks</td>
</tr>
<tr>
<td>Flexibility</td>
<td>ASTM D522, 180° bend, 3/4&quot; mandrel</td>
<td>Passes</td>
</tr>
<tr>
<td>Fuel Contribution</td>
<td>NFPA 259</td>
<td>5764 btu/lb</td>
</tr>
<tr>
<td>Humidity Resistance</td>
<td>ASTM D4585, 6000 hours</td>
<td>No blistering, cracking, or rusting</td>
</tr>
<tr>
<td>Immersion</td>
<td>1 year fresh and salt water</td>
<td>Passes, no rusting, blistering, or loss of adhesion</td>
</tr>
<tr>
<td>Radiation Tolerance</td>
<td>ASTM D4082 / ANSI 5.12</td>
<td>Pass at 21 mils (525 microns)</td>
</tr>
<tr>
<td>Pencil Hardness</td>
<td>ASTM D3363</td>
<td>3H</td>
</tr>
<tr>
<td>Salt Fog Resistance*</td>
<td>ASTM B117, 6,500 hours</td>
<td>Rating 10 per ASTM D610 for rusting; Rating 9 per ASTM D1654 for corrosion</td>
</tr>
<tr>
<td>Slip Coefficient, Mill White*</td>
<td>AISC Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts</td>
<td>Class A, 0.36</td>
</tr>
<tr>
<td>Surface Burning</td>
<td>ASTM E84/NFPA 255</td>
<td>Flame Spread Index 20; Smoke Development Index 35 (at 18 mils or 450 microns)</td>
</tr>
<tr>
<td>Water Vapor Permeance</td>
<td>ASTM D1653, Method B</td>
<td>1.16 US perms</td>
</tr>
</tbody>
</table>

Epoxy coatings may darken or discolor following application and curing. *May be applied at 3.0-10.0 mils dft as an intermediate coat. Refer to Recommended Systems (page 2). See Performance Tips section also.

DISCLAIMER

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continued on back
MACROPOXY® 646
FAST CURE EPOXY

PART A
B58-600
PART B
B58V600

PRODUCT INFORMATION

4.53

RECOMMENDED USES

- Marine applications
- Fabrication shops
- Pulp and paper mills
- Power plants
- Offshore platforms
- Nuclear Power Plants
- Nuclear fabrication shops
- DOE Nuclear Weapons Facilities
- Mill White and Black are acceptable for immersion use for salt water and fresh water, not acceptable for potable water
- Suitable for use in USDA inspected facilities
- Conforms to AWWA D102 OCS #5
- Conforms to MPI # 108
- 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 qualifications are NRC license specific to the facility.

RECOMMENDED SYSTEMS

<table>
<thead>
<tr>
<th>Dry Film Thickness / ct.</th>
<th>Part A</th>
<th>Part B</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel:</td>
<td>2 cts.</td>
<td>2 cts.</td>
<td></td>
</tr>
<tr>
<td>Macropoxy 646</td>
<td>5.0-10.0 (125-250)</td>
<td>5.0-10.0 (125-250)</td>
<td></td>
</tr>
<tr>
<td>Concrete/Masonry, smooth:</td>
<td>2 cts.</td>
<td>2 cts.</td>
<td></td>
</tr>
<tr>
<td>Macropoxy 646</td>
<td>5.0-10.0 (125-250)</td>
<td>5.0-10.0 (125-250)</td>
<td></td>
</tr>
<tr>
<td>Concrete Block:</td>
<td>1 ct.</td>
<td>1 ct.</td>
<td></td>
</tr>
<tr>
<td>Kem Cati-Coat HS Epoxy</td>
<td>10.0-20.0 (250-500)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filler/Sealer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>as needed to fill voids and provide a continuous substrate.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macropoxy 646</td>
<td>5.0-10.0 (125-250)</td>
<td>5.0-10.0 (125-250)</td>
<td></td>
</tr>
</tbody>
</table>

ATMOSPHERIC:

Steel:
- (Shop applied system, new construction, AWWA D102, can also be used at 3 mils minimum dft when used as an intermediate coat as part of a multi-coat system)

1 ct. Macropoxy 646 Fast Cure Epoxy 3.0-6.0 (75-150)

1-2 cts. of recommended topcoat

Steel:
- Recoatable Epoxy Primer 4.0-6.0 (100-150)

2 cts. Macropoxy 646 5.0-10.0 (125-250)

Steel:
- Macropoxy 646 4.0-6.0 (100-150)

1-2 cts. Acrolon 218 Polyurethane 3.0-6.0 (75-150)
- Hi-Solids Polyurethane 3.0-5.0 (75-125)
- SherThane 2K Urethane 2.0-4.0 (50-100)
- Hydrogloss 2.0-4.0 (50-100)

Steel:
- Macropoxy 646 5.0-10.0 (125-250)

1-2 cts. Tile-Clad HS Epoxy 2.5-4.0 (60-100)

Steel:
- Zinc Clad II Plus 3.0-6.0 (75-150)
- Macropoxy 646 3.0-10.0 (75-250)

Steel:
- Zinc Clad III HS 3.0-5.0 (75-125)
- Zinc Clad IV 3.0-5.0 (75-125)

1-2 cts. Acrolon 218 Polyurethane 3.0-6.0 (75-150)

Aluminum:
- Macropoxy 646 5.0-10.0 (125-250)

Galvanizing:
- Macropoxy 646 5.0-10.0 (125-250)

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

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
  - Atmospheric: SSPC-SP1/SWP-SP1
  - Immersion: SSPC-SP10/NACE 2, 2-3 mil (50-75 micron) profile
- Aluminum: SSPC-SP6
- Galvanizing: SSPC-SP1
- Concrete & Masonry
  - Atmospheric: SSPC-SP2/3
  - Immersion: SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 1-3

Surface Preparation Standards

<table>
<thead>
<tr>
<th>Condition of Surface</th>
<th>Steel</th>
<th>Aluminum</th>
<th>Concrete &amp; Masonry</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 5901-1</td>
<td>Sa 3</td>
<td>Sa 3</td>
<td>Sa 3</td>
</tr>
<tr>
<td>Swedish Std.</td>
<td>Sa 3</td>
<td>Sa 2.5</td>
<td>Sa 2.5</td>
</tr>
<tr>
<td>SSPC NACE</td>
<td>Sa 3</td>
<td>Sa 2.5</td>
<td>Sa 2.5</td>
</tr>
<tr>
<td>Sa 1</td>
<td>Sp 1</td>
<td>Sp 2</td>
<td>Sp 2</td>
</tr>
<tr>
<td>Sa 1</td>
<td>Sp 1</td>
<td>Sp 2</td>
<td>Sp 2</td>
</tr>
<tr>
<td>Sa 1</td>
<td>Sp 1</td>
<td>Sp 2</td>
<td>Sp 2</td>
</tr>
<tr>
<td>Sa 1</td>
<td>Sp 1</td>
<td>Sp 2</td>
<td>Sp 2</td>
</tr>
</tbody>
</table>

TINTING

Tint Part A with Maxitones at 150% strength. Five minutes minimum mixing on a mechanical shaker is required for complete mixing of color.

Tinting is not recommended for immersion service.

APPLICATION CONDITIONS

Temperature:
- 35°F (1.7°C) minimum, 120°F (49°C) maximum (air and surface)
- 40°F (4.5°C) minimum, 120°F (49°C) maximum (materials)
- At least 5°F (2.8°C) above dew point

Relative humidity:
- 85% maximum

Refer to product Application Bulletin for detailed surface preparation information.

PACKAGING:

<table>
<thead>
<tr>
<th>Part A</th>
<th>1 gallon</th>
<th>3.78L</th>
<th>5 gallon</th>
<th>18.9L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part B</td>
<td>1 gallon</td>
<td>3.78L</td>
<td>5 gallon</td>
<td>18.9L</td>
</tr>
</tbody>
</table>

Relative humidity: 85% maximum

APPLICATION CONDITIONS

Temperature:
- 35°F (1.7°C) minimum, 120°F (49°C) maximum (air and surface)
- 40°F (4.5°C) minimum, 120°F (49°C) maximum (materials)
- At least 5°F (2.8°C) above dew point

Relative humidity: 85% maximum

ORDERING INFORMATION

Refer to the MSDS sheet before use.

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SAFETY PRECAUTIONS

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 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.

**Iron & Steel, Atmospheric Service:**
Minimum surface preparation is Hand Tool Clean per SSPC-SP2. 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). Prime any bare steel within 8 hours or before flash rusting occurs.

**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. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils / 50-75 microns). Remove all weld spatter and round all sharp edges by grinding. Prime any bare steel the same day as it is cleaned.

**Aluminum**
Remove all oil, grease, dirt, oxide and other foreign material by Solvent Cleaning per SSPC-SP1.

**Galvanized Steel**
Allow to weather a minimum of six months prior to coating. Solvent Cleaning per SSPC-SP1 (recommended solvent is VM&P Naphtha). When weathering is not possible, or the surface has been treated with chromates or silicates, first Solvent Clean per SSPC-SP1 and apply a test patch. Allow paint to dry at least one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP7 is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2, prime the area the same day as cleaned.

**Concrete and Masonry**
For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 1-3. Surfaces should be thoroughly clean and dry. Concrete 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.

**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 1-3.

**Follow the standard methods listed below when applicable:**
- ASTM D4256 Standard Practice for Cleaning Concrete.
- ASTM D4256 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.

**Previously Painted Surfaces**
If in sound condition, clean the surface of all foreign material. Smooth, hard or glossy coatings and surfaces should be dulled by abrading the surface. Apply a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, or if this product attacks the previous finish, removal of the previous coating may be necessary. If paint is peeling or badly weathered, clean surface to sound substrate and treat as a new surface as above.

### Application Conditions

<table>
<thead>
<tr>
<th>Temperature:</th>
<th>Relative humidity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>35°F (1.7°C) minimum, 120°F (49°C) maximum (air and surface)</td>
<td>85% maximum</td>
</tr>
<tr>
<td>40°F (4.5°C) minimum, 120°F (49°C) maximum (material)</td>
<td></td>
</tr>
<tr>
<td>At least 5°F (2.8°C) above dew point</td>
<td></td>
</tr>
</tbody>
</table>

### Application Equipment

- **Airless Spray**
  - Pump: 30:1
  - Fluid Pressure: 60-65 psi
  - Air Nozzle: 704
- **Conventional Spray**
  - Pump: 30:1
  - Fluid Pressure: 10-20 psi
- **Brush**
  - Cover: 3/8" woven with solvent resistant core
  - Reduction: Not recommended
- **Plural Component Spray**
  - Refer to April 2010 Technical Bulletin - "Application Guidelines for Macropoxy 646 & Recoatable Epoxy Primer Utilizing Plural Component Equipment"
  - If specific application equipment is not listed above, equivalent equipment may be substituted.
**APPLICATION PROCEDURES**

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly with low speed power agitation. Make certain no pigment remains on the bottom of the can. Then combine one part by volume of Part A with one part by volume of Part B. Thoroughly agitate the mixture with power agitation. Allow the material to sweat-in as indicated prior to application. 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:

<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>7.0 (175)</td>
<td>13.5 (338)</td>
</tr>
<tr>
<td>Dry mils (microns)</td>
<td>5.0* (125)</td>
<td>10.0* (250)</td>
</tr>
<tr>
<td>Coverage sq ft/gal (m²/L)</td>
<td>116 (2.8)</td>
<td>232 (5.7)</td>
</tr>
<tr>
<td>Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft</td>
<td>1152 (28.2)</td>
<td></td>
</tr>
</tbody>
</table>

*May be applied at 3.0-10.0 mils dft as an intermediate coat. Refer to Recommended Systems (page 2). See Performance Tips section also.

**NOTE:** Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

**Drying Schedule @ 7.0 mils wet (175 microns):**

| To touch: | 4-5 hours | 2 hours | 1.5 hours |
| To handle: | 48 hours | 8 hours | 4.5 hours |
| To recoat: | 48 hours | 8 hours | 4.5 hours |
| maximum: | 1 year | 1 year | 1 year |
| To cure: | 10 days | 7 days | 4 days |
| Service: | 14 days | 7 days | 4 days |

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