



Protective & Marine Coatings

MACROPOXY® 646 FF FLAKE FILLED EPOXY

PART A
PART B

B58A604
B58V600

GRAY
HARDENER

Revised: February 4, 2022

PRODUCT INFORMATION

4.59

PRODUCT DESCRIPTION

MACROPOXY 646 FF is a high solids, high build, fast drying, micaceous iron oxide filled polyamide epoxy mastic designed to protect steel and concrete in industrial exposures. Ideal for maintenance painting and fabrication shop applications. This flake filled coating ensures adequate protection of sharp edges, corners, and welds. This product can be applied directly to marginally prepared steel surfaces.

- Chemical resistant
- Low odor
- Abrasion resistant
- Outstanding application properties
- Excellent edge protection

PRODUCT CHARACTERISTICS

Finish:	Semi-Gloss
Color:	Gray
Volume Solids:	72% ± 2%, mixed (Mill White)
Weight Solids:	85% ± 2%, mixed (Mill White)
VOC (EPA Method 24):	<250 g/L; 2.08 lb/gal, mixed
Mix Ratio:	1:1 by volume

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	7.0 (175)	13.5 (338)
Dry mils (microns)	5.0* (125)	10.0* (250)
~Coverage sq ft/gal (m ² /L)	116 (2.8)	232 (5.7)
Theoretical coverage sq ft/gal (m ² /L) @ 1 mil / 25 microns dft	1152 (28.2)	

*See Performance Tips section

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):

	@ 35°F/1.7°C	@ 77°F/25°C 50% RH	@ 100°F/38°C
To touch:	4-5 hours	2 hours	1.5 hours
To handle:	48 hours	8 hours	4.5 hours
To recoat:			
minimum:	48 hours	8 hours	4.5 hours
maximum:	1 year	1 year	1 year
Cure for			
service:	10 days	7 days	4 days
immersion:	14 days	7 days	4 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	4 hours	2 hours
Sweat-in-time:	30 minutes	30 minutes	15 minutes

Shelf Life: 36 months, unopened
Store indoors at 40°F (4.5°C) to 100°F (38°C).

Flash Point: 94°F (34°C), TCC, mixed

Reducer/Clean Up¹: VOC Restricted Areas (<250 g/L): use Reducer R7K111 or Oxsol 100

¹Other areas (<340 g/L): use Reducer R7K111, Oxsol 100, or Reducer R7K15 up to 5%. Choose a reducer that is compliant in your area. Confirm compliance with state and local air quality rules before use.

RECOMMENDED USES

- Marine applications
 - Fabrication shops
 - Pulp and paper mills
 - Power plants
 - Offshore platforms
 - Refineries
 - Chemical plants
 - Tank exteriors
 - Water treatment plants
- When enhanced edge protection is required
 - Suitable for use in USDA inspected facilities
 - Conforms to AWWA D102 OCS #5
 - Recommended primer for FIRETEX hydrocarbon coatings
 - FIRETEX M89/02 primer for cryogenic applications

PERFORMANCE CHARACTERISTICS

Substrate*: Steel

Surface Preparation*: SSPC-SP10/NACE 2

System Tested*:

1 ct. Macropoxy 646 FF @ 6.0 mils (150 microns) dft

*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	137 mg loss
Adhesion	ASTM D4541	1,037 psi
Corrosion Weathering ¹	ASTM D5894, 36 cycles, 12,000 hrs	Rating 10 per ASTM D714 for blistering; Rating 10 per ASTM D610 for rusting
Direct Impact Resistance	ASTM D2794	32 in. lb.
Dry Heat Resistance	ASTM D2485	250°F (121°C)
Flexibility	ASTM D522, 180° bend, 1/4" mandrel	Passes
Humidity Resistance	ASTM D4585, 6750 hrs	No blistering, cracking or rusting
Immersion	1 year fresh and salt water	Passes, no rusting, blistering or loss of adhesion
Pencil Hardness	ASTM D3363	3H
Salt Fog Resistance ¹	ASTM B117, 6700 hrs	Rating 10 per ASTM D714 for blistering; Rating 10 per ASTM D610 for rusting
Water Vapor Permeance	ASTM D1653, Method B	1.04

Epoxy coatings may darken or discolor following application and curing.

Footnotes:

¹ Zinc Clad II Plus Primer



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RECOMMENDED SYSTEMS

Dry Film Thickness / ct.
Mils (Microns)

Immersion and atmospheric:

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

Concrete/Masonry, smooth:
2 cts. Macropoxy 646 FF 5.0-10.0 (125-250)

Concrete Block:
1 ct. Kem Cati-Coat HS Epoxy Filler/Sealer 10.0-20.0 (250-500)
as needed to fill voids and provide a continuous substrate.
2 cts. Macropoxy 646 FF 5.0-10.0 (125-250)

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 FF 3.0-6.0 (75-150)
1-2 cts. of recommended topcoat

Steel:
1 ct. Recoatable Epoxy Primer 4.0-6.0 (100-150)
2 cts. Macropoxy 646 FF 5.0-10.0 (125-250)

Steel:
1 ct. Macropoxy 646 FF 4.0-6.0 (100-150)
1-2 cts. Acrolon 218 Polyurethane 3.0-6.0 (75-150)
or Hi-Solids Polyurethane 3.0-5.0 (75-125)
or SherThane 2K Urethane 2.0-4.0 (50-100)
or Hydrogloss 2.0-4.0 (50-100)

Steel:
2 cts. Macropoxy 646 FF 5.0-10.0 (125-250)
1-2 cts. Tile-Clad HS Epoxy 2.5-4.0 (63-100)

Steel:
1 ct. Zinc Clad II Plus 3.0-6.0 (75-150)
1 ct. Macropoxy 646 FF 5.0-10.0 (125-250)
1-2 cts. Acrolon 218 Polyurethane 3.0-6.0 (75-150)

Steel:
1 ct. Zinc Clad III HS 3.0-5.0 (75-125)
or Zinc Clad IV 3.0-5.0 (75-125)
1 ct. Macropoxy 646 FF 5.0-10.0 (125-250)
1-2 cts. Acrolon 218 Polyurethane 3.0-6.0 (75-150)

Aluminum:
2 cts. Macropoxy 646 FF 2.0-4.0 (50-100)

Galvanizing:
2 cts. Macropoxy 646 FF 2.0-4.0 (50-100)

FIRETEX M89/02 Cryogenic Applications, M90 and M93 Series:
1 ct. Macropoxy 646 FF 2.0-5.0 (50-125)
1 ct. FIRETEX M89/02 and/or intumescent coating

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
Atmospheric: SSPC-SP2/3
Immersion: SSPC-SP10/NACE 2, 2-3 mil (50-75 micron) profile
Aluminum: SSPC-SP1
Galvanizing: SSPC-SP1
Concrete & Masonry
Atmospheric: SSPC-SP13/NACE 6, or ICRI No. 310.2R, CSP 1-3
Immersion: SSPC-SP13/NACE 6-4.3.1 or 4.3.2, or ICRI No. 310.2R, CSP 1-3

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	-
Pitted & Rusted	D St 3	D St 3	SP 3	-

TINTING

Do not tint.

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 (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:
Part A: 1 gallon (3.78L) and 5 gallon (18.9L) containers
Part B: 1 gallon (3.78L) and 5 gallon (18.9L) containers

Weight: 13.16 ± 0.2 lb/gal ; 1.60 Kg/L
mixed, may vary by color

SAFETY PRECAUTIONS

Refer to the SDS 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

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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. 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 Clean 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. 310.2R, CSP 1-3. 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.

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 1-3.

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.

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.

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	CSa 2	CSa 2	SP 2	-
Rusted	CSa 2	CSa 2	SP 2	-
Pitted & Rusted	CSa 2	CSa 2	SP 2	-
Rusted	CSa 3	CSa 3	SP 3	-
Power Tool Cleaning	D St 3	D St 3	SP 3	-
Pitted & Rusted	D St 3	D St 3	SP 3	-

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 (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 Up¹ VOC Restricted Areas (<250 g/L):
use Reducer R7K111 or Oxsol 100

¹Other areas (<340 g/L): use Reducer R7K111, Oxsol 100, or Reducer R7K15 up to 5%. Choose a reducer that is compliant in your area. Confirm compliance with state and local air quality rules before use.

Airless Spray

Pump.....30:1
Pressure.....2800 - 3000 psi
Hose.....1/4" ID
Tip0.017" - .023"
Filter60 mesh
Reduction.....As needed up to 5% by volume

Conventional Spray

GunDeVilbiss MBC-510
Fluid TipE
Air Nozzle.....704
Atomization Pressure.....60-65 psi
Fluid Pressure.....10-20 psi
Reduction.....As needed up to 5% by volume
Requires oil and moisture separators

Brush

Brush.....Nylon/Polyester or Natural Bristle
Reduction.....As needed up to 5% by volume

Roller

Cover3/8" woven with solvent resistant core
Reduction.....As needed up to 5% 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 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:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	7.0 (175)	13.5 (338)
Dry mils (microns)	5.0* (125)	10.0* (250)
~Coverage sq ft/gal (m²/L)	116 (2.8)	232 (5.7)
Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft	1152 (28.2)	

*See Performance Tips section

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):

	@ 35°F/1.7°C	@ 77°F/25°C	@ 100°F/38°C
		50% RH	
To touch:	4-5 hours	2 hours	1.5 hours
To handle:	48 hours	8 hours	4.5 hours
To recoat:			
minimum:	48 hours	8 hours	4.5 hours
maximum:	1 year	1 year	1 year
Cure for			
service:	10 days	7 days	4 days
immersion:	14 days	7 days	4 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	4 hours	2 hours
Sweat-in-time:	30 minutes	30 minutes	15 minutes

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. In California use Reducer R7K111. Follow manufacturer's safety recommendations when using any solvent.

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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 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.

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. In California use Reducer R7K111.

Insufficient ventilation, incomplete mixing, miscatalyzation, and external heaters may cause premature yellowing.

Excessive film build, poor ventilation, and cool temperatures may cause solvent entrapment and premature coating failure.

Quik-Kick Epoxy Accelerator is acceptable for use. See data page 4.99 for details.

When coating over aluminum and galvanizing, recommended dft is 2-4 mils (50-100 microns).

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

SAFETY PRECAUTIONS

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