

Protective Marine **Coatings**

MACROPOXY® 646 **FAST CURE EPOXY**

PART A PART B

B58-600 B58V600

SERIES HARDENER

Revised: October 19, 2016

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

· Chemical resistant

Low odor

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

Mill White, Black and a wide range of colors available through tinting Color:

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 <300 g/L; 2.50 lb/gal Unreduced: Reduced 10%: mixèd

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 (m²/L)	116 (2.8)	232 (5.7)

Theoretical coverage **sq ft/gal** (m²/L) @ 1 mil / 25 microns dft **1152** (28.2) *May be applied at 3.0-10.0 mils (75-250 microns) dft in a multicoat system. Refer to Recommended Systems and Performance

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
To cure:			
Service:	10 days	7 days	4 days
Immersion:	14 days	7 days	4 days
If maximum recoat	time is exceeded	d, abrade surface	before recoating.
Drving time is ten	nperature humidi	ity and film thickr	ess 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

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

Drving Schedule @ 5.0 mils wet (125 microns):

<u>Diying ot</u>	sticadic (a) 0.0 i	IIII3 WCL (IZO II	<u>110101137.</u>
	@ 35°F/1.7°C	@ 77°F/25°C	@ 100°F/38°C
		50% RH	
To touch:	3 hours	1 hour	1 hour
To handle:	48 hours	4 hours	2 hours
To recoat:			
minimum:	16 hours	4 hours	2 hours
maximum:	1 year	1 year	1 year

PRODUCT CHARACTERISTICS (CONT'D)

Shelf Life: 36 months, unopened

Store indoors at 40°F (4.5°C)

to 110°F (43°C)

Flash Point: 91°F (33°C), TCC, mixed Reducer, R7K15

Reducer/Clean Up:

In California: 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

*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	84 mg loss
Accelerated Weathering-QUV ¹	ASTM D4587, QUV-A, 12,000 hours	Passes
Adhesion	ASTM D4541	1,037 psi
Corrosion Weathering ¹	ASTM D5894, 36 cycles, 12,000 hours	Rating 10 per ASTM D714 for blistering; Rating 9 per ASTM D610 per rusting
Nuclear Decontamination	ASTM D4256/ANSI N 5.12	99% Water Wash; 95% Overall
Direct Impact Resistance ²	ASTM D2794 Modified	**120 in. lb.
Dry Heat Resistance	ASTM D2485	250°F (121°C)
Exterior Durability	1 year at 45° South	Excellent, chalks
Flexibility	ASTM D522, 180° bend, 3/4" mandrel	Passes
Fuel Contribution	NFPA 259	5764 btu/lb
Humidity Resistance	ASTM D4585, 6000 hours	No blistering, cracking, or rusting
Immersion	1 year fresh and salt water	Passes, no rusting, blistering, or loss of adhesion
Radiation Tolerance	ASTM D4082 / ANSI 5.12	Pass at 21 mils (525 microns)
Pencil Hardness	ASTM D3363	3H
Salt Fog Resistance ¹	ASTM B117, 6,500 hours	Rating 10 per ASTM D610 for rusting; Rating 9 per ASTM D1654 for corrosion
Slip Coefficient, Mill White*	AISC Specification for Struc- tural Joints Using ASTM A325 or ASTM A490 Bolts	Class A, 0.36
Surface Burning	ASTM E84/NFPA 255	Flame Spread Index 20; Smoke Development Index 35 (at 18 mils or 450 microns)
Water Vapor Permeance	ASTM D1653, Method B	1.16 US perms

Epoxy coatings may darken or discolor following application and curing: *Refer to Slip Certification document

** Performed on 1/16 inch blasted steel

Zinc Clad II Plus Primer

² Two coats of Macropoxy 646 Fast Cure Epoxy

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.



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PRODUCT INFORMATION

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RECOMMENDED USES

- Marine applications
- Fabrication shops Pulp and paper mills
- Power plants

- Offshore platforms
 Nuclear Power Plants
 Nuclear fabrication shops
- Chemical plants Tank exteriors Water treatment plants

Refineries

DOE Nuclear Fuel Facilities DOE Nuclear Weapons Facilities

Dry Film Thickness / ct. Mils (Microns)

- 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

 Acceptable for use in Canadian Food Processing facilities, categories: D1, D2, D3 (Confirm acceptance of specific part numbers/rexes with your SW
- Sales Representative)
 Conforms to AWWA D102 OCS #5
 Conforms to MPI # 108

Immersion and atmospheric:

- 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.
- Suitable for use in the Mining & Minerals Industry
- Acceptable for use over and/or under Loxon S1 and Loxon H1 Caulking

RECOMMENDED S	YSTEMS
---------------	--------

Steel:					
2 cts.	Macropoxy 646 Fast Cure Epoxy	5.0-10.0	(125-250)		
	e/Masonry, smooth:				
2 cts.	Macropoxy 646 Fast Cure Epoxy	5.0-10.0	(125-250)		
Concrete		40000	(050 500)		
1 ct.	Kem Cati-Coat HS Epoxy Filler/Sealer	10.0-20.0	(250-500)		
2 cts.	as needed to fill voids and provide a c Macropoxy 646 Fast Cure Epoxy	ontinuous s 5.0-10.0	ubstrate. (125-250)		
<u>Atmospl</u>	neric:				
Steel: (Shop ap used at 3 coat as p	plied system, new construction, AWWA 5 mils / 75 microns minimum dft when u art of a multi-coat system)	D102, can sed as an in	also be termediate		
1 ct. 1-2 cts.	Macropoxy 646 Fast Cure Epoxy of recommended topcoat	3.0-6.0	(75-150)		
Steel:	or recommended topcoat				
1 ct.	Recoatable Epoxy Primer	4.0-6.0	(100-150)		
2 cts.	Macropoxy 646 Fast Cure Epoxy	5.0-10.0	(125-250)		
Steel:	=		()		
1 ct.	Macropoxy 646 Fast Cure Epoxy	5.0-10.0	(125-250)		
1-2 cts.	Acrolon 218 Polyurethane	3.0-6.0	(75-150)		
or	Hi-Solids Polyurethane	3.0-5.0	(75-125)		
or or	SherThane 2K Urethane Hydrogloss	2.0-4.0 2.0-4.0	(50-100) (50-100)		
Steel:	Trydrogioss	2.0-4.0	(50-100)		
2 cts.	Macropoxy 646 Fast Cure Epoxy	5.0-10.0	(125-250)		
1-2 cts.	Tile-Clad HS Epoxy	2.5-4.0	(63-100)		
Steel:			(00 100)		
1 ct.	Zinc Clad II Plus	2.0-4.0	(50-100)		
1 ct.	Macropoxy 646 Fast Cure Epoxy	3.0-10.0	(755-250)		
1-2 cts.	Acrolon 218 Polyurethane	3.0-6.0	(75-150)		
Steel:	7: 01 1 111 110	0050	(75.405)		
1 ct.	Zinc Clad III HS Zinc Clad IV	3.0-5.0 3.0-5.0	(75-125) (75-125)		
1 ct.	Macropoxy 646 Fast Cure Epoxy	3.0-10.0	(75-125)		
1-2 cts.	Acrolon 218 Polyurethane	3.0-6.0	(75-150)		
Aluminu	,		(/		
2 cts.	Macropoxy 646 Fast Cure Epoxy	2.0-4.0	(50-100)		
Galvaniz	ing:		` ,		
2 cts.	Macropoxy 646 Fast Cure Epoxy	2.0-4.0	(50-100)		
	FIRETEX M89/02, M90, M90/02, and M93/02:				
1 ct.	Salvanized Substrates being primed fo	2.0-5.0			
	Macropoxy 646 Fast Cure Epoxy		(50-125)		
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

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Iron & Steel

SSPC-SP2/3 or SSPC-SP WJ-2/NACE WJ-2L SSPC-SP10/NACE 2, 2-3 mil (50-75 micron) profile or SSPC-SP WJ-3/NACE WJ-3L Atmospheric: Immersion:

Aluminum:

SSPC-SP1 SSPC-SP1; See Surface Preparations section on page 3 for application of FIRETEX intumescent Galvanizing:

coating systems

Concrete & Masonry SSPC-SP13/NACE 6, or ICRI No. 310.2R, CSP 1-3 Atmospheric:

SSPC-SP13/NACE 6-4.3.1 or 4.3.2, or Immersion:

ICRI No. 310.2R, CSP 2-4

Surface Preparation Standards

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

TINTING

Tint Part A with Maxitoners 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

35°F (1.7°C) minimum, 120°F (49°C) Temperature: 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

85% maximum Relative humidity:

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: 12.9 ± 0.2 lb/gal; 1.55 Kg/L mixed, may vary by color

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

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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:

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.

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 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. In preparing galvanized steel substrates for the application of FIRE-TEX intumescent coating systems, Surface Preparation Specification SSPC-SP 16 must be followed obtaining a surface profile of minimum 1.5 mils (38 microns). Optimum surface profile will not exceed 2.0 mils (50 microns).

1.5 filis (30 filicions). Optimizations of the control of the cont 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:

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 2-4.
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	SSPC	NACE
White Metal Near White Metal Commercial Blast Brush-Off Blast	5	Sa 3 Sa 2.5 Sa 2 Sa 1	SP 5 SP 10 SP 6 SP 7	1 2 3 4
Hand Tool Cleaning	Rusted Pitted & Rusted	C St 2 D St 2	SP 2 SP 2	-
Power Tool Cleaning	Rusted Pitted & Rusted	C St 3 D St 3	SP 3 SP 3	-

APPLICATION	CONDITIONS
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35°F (1.7°C) minimum, 120°F (49°C) Temperature:

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 U	lpReducer	R7K15
In California	Reducer	R7K111

Airless Spray

Pump	30:1
Pressure	.2800 - 3000 psi
Hose	1/4" ID
Tip	017"023"
Filter	60 mesh
Reduction	.As needed up to 10% by volume

Conventional Spray

Gun	Deviidiss MBC-510
Fluid Tip	E
Air Nozzle	704
Atomization Pressure	60-65 psi
Fluid Pressure	10-20 psi
Reduction	As needed up to 10

0% by volume

Requires oil and moisture separators

Brush

Brusn	Nylon/Polyester or Natural Bristle
Reduction	As needed up to 10% by volume

Niclea /Delice stee en Netice I Deletie

Roller

Cover	.3/8" woven with solvent resistant core
Reduction	.As needed up to 10% by volume

Plural Component Spray...Acceptable

Refer to April 2010 Technical Bulletin - "Application Guidelines for Macropoxy 646 Fast Cure Epoxy & Recoatable Epoxy Primer Utilizing Plural

Component Equipment"

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. plication. 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/qal	44=0 (00.0)		

1152 (28.2)

(m²/L) @ 1 mil / 25 microns dft *May be applied at 3.0-10.0 mils (75-250 microns) dft in a multi-coat system. Refer to Recommended Systems and Performance

Tips Sections.

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
To cure:			
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

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

Drving Schedule @ 5.0 mils wet (125 microns):

Diving Ochcadic (a. 0.0 iniii wet (120 inicions).			<u>11010113/1</u>
	@ 35°F/1.7°C	@ 77°F/25°C 50% RH	@ 100°F/38°C
To touch:	3 hours	1 hour	1 hour
To handle:	48 hours	4 hours	2 hours
To recoat:			
minimum:	16 hours	4 hours	2 hours
maximum:	1 year	1 year	1 year

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.

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.

Tinting is not recommended for immersion service.

Use only Mill White and Black for immersion service.

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).

Acceptable for Concrete Floors.

Can be used as a metalizing sealer. Consult Technical Bulletin - Sealers for Thermal Spray Metalizing, or your local Sherwin-Williams representative.

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

SAFETY PRECAUTIONS

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