

Des Plaines River WRF Bolted Bulk Storage Silos

Addendum No.2

Scope of Work:

We are looking for a contractor to prepare and coat three steel bolted bulk storage tanks 25 feet in diameter and 52 feet tall.

The result is to provide a water-resistant, airtight seal within each silo that will prevent moisture penetration and maintain a nitrogen enriched environment. With the application of a flexible elastomeric coating.

Note: Under normal operation each silo is maintained with a nitrogen enriched environment to prevent fire or explosions.

Safety

The contractor shall provide air monitoring, anti-fall devices and harness to each worker entering the silos. The bottom of the silo has converging walls with a hopper angle of 60 degrees.

Preliminary Work:

The contractor shall:

- 1) Remove the blast panels and store them out of harm's way.
- 2) Remove the gas sensors. and protect the threaded bosses from damage.
- 3) Secure all openings to prevent water and blast debris from entering and existing the silos.
- 4) Verify all fasteners (nuts & bolts) are securely tightened to 35-foot pounds. Tighten all loose nuts and bolts. Nuts and bolts are not to exceed 50-foot pounds.
- 5) Verify there are no gaps between seams. which would allow light to be visible, identify any sources where water has penetrated the silos.
- 6) The manufacturer has not provided any information on bolt pattern or torque requirements. We shall determine a bolt tightening pattern in the field if loose bolts are discovered.

Surface Preparation

- 1) Brush blast all interior surfaces of the tank to achieve a blast profile of SSPC SP-7 Brush off Blast without causing damage and not blowing through the structure. The objective is to ensure the profile created is suitable for the prime coat to adhere to.
- 2) The contractor shall remove and dispose of the spent blast media, in accordance with State and Local regulations.
- 3) Once the clean-up has been completed, the contractor shall verify that no joints have opened, and all seams are uniformly secure.

Coatings and application

- 1) The contractor shall apply one prime coat to cover @ 3 – 5 Mils DTF with S&W Macropoxy 646 to all surfaces.
- 2) After priming, the contractor will caulk all panel joints where the gap between the seams exist which will be difficult to bridge when applying the finish coating.
- 3) The contractor shall apply in multiple passes to achieve 100 mils DFT along all joints and seams and 60 mils DFT along the center of each panel.

Final Completion

Upon completion of this project, the contractor shall work with operations staff to ensure each silo functions as designed under operation and is free of leaks (water and air).

Approved Coatings:

Caulk: Paintable sealant such as Sikaflex 1A polyurethane

Prime Coat: Sherwin Williams Macropoxy 646

Finish Coat: RR&C: High Performance Elastomeric Membrane

All coatings shall be handled and applied in accordance with the manufacture's application guidelines.

Once the coating has cured. The contractor shall reinstall the gas monitoring probes and blast panels.



Protective & Marine Coatings

PRODUCT DATA SHEET



MACROPOXY® 646

FAST CURE EPOXY

Revised: May 13, 2019

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.

INTENDED USES

- Recommended for marine applications, refineries, offshore platforms, fabrication shops, chemical plants, tank exteriors, power plants, water treatment plants, and mining and minerals industry
- Mill White and Black are acceptable for immersion use for salt water and fresh water, not acceptable for potable water

PRODUCT DATA

Finish:	Semi-Gloss		Average Drying Times @ 7.0 mils (175 microns) wet:		
Colors:	Mill White, Black and a wide range of colors available through tinting		35°F (1.7°C)	77°F (25°C)	100°F (38°C)
			50% RH	50% RH	50% RH
Volume Solids:	72% ± 2%, mixed, Mill White		Touch:	4-5 hours	2 hours
VOC (mixed):	Unreduced: <250 g/L; 2.08 lb/gal Reduced 10%: <300 g/L; 2.50 lb/gal		Handle:	48 hours	8 hours
Mix Ratio:	1:1 by volume		Recoat:		4.5 hours
Typical Thickness:			minimum:	48 hours	8 hours
			maximum:	1 year	1 year
			Cure to service:		
			atmospheric:	10 days	7 days
			immersion:	14 days	7 days
					4 days
					4 days
			Average Drying Times as intermediate @ 5.0 mils (125 microns) wet:		
			Touch:	3 hours	1 hour
			Handle:	48 hours	4 hours
			Recoat:		2 hours
			minimum:	16 hours	4 hours
			maximum:	1 year	1 year
			<i>If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity, and film thickness dependent. Paint temperature must be 40°F (4.5°C) minimum.</i>		
			Pot Life:	10 hours	4 hours
			Sweat-in-time:	30 minutes	30 minutes
					15 minutes

Finish:	Semi-Gloss	
Colors:	Mill White, Black and a wide range of colors available through tinting	
Volume Solids:	72% ± 2%, mixed, Mill White	
VOC (mixed):	Unreduced: <250 g/L; 2.08 lb/gal Reduced 10%: <300 g/L; 2.50 lb/gal	
Mix Ratio:	1:1 by volume	
Typical Thickness:		
	<u>Recommended Spreading Rate per coat:</u>	
	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)	115 (2.9)	230 (5.8)
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 as an intermediate in a multicoat system.		
<i>NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.</i>		
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/Clean Up:	Reducer #15 or Reducer #58 (California) Reducer #111 or Oxsol 100	
Weight:	12.9 ± 0.2 lb/gal ; 1.55 Kg/L, mixed, may vary by color	

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.

Minimum recommended surface preparation:

Iron & Steel: Atmospheric: SSPC-SP2/3/ ISO8501-1:2007 St 2 or SSPC-SP WJ-3 / NACE WJ-3L
Immersion: SSPC-SP10 / NACE 2/ ISO8501-1:2007 Sa 2.5, 2-3 mil (50-75 micron) profile or SSPC-SP WJ-2/NACE WJ-2L

Aluminum & 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



Protective & Marine Coatings

PRODUCT DATA SHEET



MACROPOXY® 646

FAST CURE EPOXY

APPLICATION			APPLICATION CONDITIONS	
Airless Spray* Pump.....30:1 Pressure.....2800-3000 psi (193-206 bar) Hose.....1/4" ID (6.3 mm) Tip......017"-.023" (0.43-0.58 mm) Filter.....60 mesh Reduction.....As needed up to 10% by volume			Temperature: Air: 35°F (1.7°C) minimum, 120°F (49°C) maximum Surface*: 35°F (1.7°C) minimum, 250°F (120°C) maximum Material: 40°F (4.5°C) minimum At least 5°F (2.8°C) above dew point Relative humidity: 85% maximum	
Conventional Spray* Gun.....DeVilbiss MBC-510 Fluid Tip.....E Air Nozzle.....704 Atomization Pressure.....60-65 psi (4.1-4.5 bar) Fluid Pressure.....10-20 psi (0.7-1.4 bar)			*When spraying a surface above 120°F (49°C), reduce material 10% with Reducer #100, R7K100. Spray apply only. Product will produce an orange peel appearance when applied at elevated temperatures.	
Brush* Brush.....Nylon/Polyester or Natural Bristle			APPROVALS	
Roller* Cover.....3/8" woven with solvent resistant core			<ul style="list-style-type: none">Suitable for use in USDA inspected facilitiesAcceptable 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 #5Conforms to MPI # 108This product meets specific design requirements for non-safety related nuclear plant applications in Level II, III and Balance of Plant, and DOE nuclear facilities*Meets Class A requirements for Slip Coefficient, 0.36 @ 6 mils / 150 microns dft (Mill White only)	
Plural Component Spray ..Acceptable *Reduction.....As needed up to 10% by volume If specific application equipment is not listed above, equivalent equipment may be substituted.			* Nuclear qualifications are NRC license specific to the facility	
RECOMMENDED SYSTEMS			ADDITIONAL NOTES	
Dry Film Thickness / ct.				
	Mils	(Microns)		
Steel, Immersion & Atmospheric			Tint Part A with Maxitoner at 150% strength. Five minutes minimum mixing on a mechanical shaker is required for complete mixing of color.	
2 Cts. Macropoxy 646	5.0-10.0	(125-250)	Tinting is not recommended for immersion service.	
Steel, Organic Zinc Primer, Atmospheric			Quik-Kick Epoxy Accelerator is acceptable for use. See data page for details.	
1 Ct. Zinc Clad IV (85)	3.0-5.0	(75-125)	Acceptable for concrete floors.	
1 Ct. Macropoxy 646	5.0-10.0	(125-250)	When spraying a surface above 120°F (49°C), reduce material 10% with Reducer #100. Spray apply only. Product will produce an orange peel appearance when applied at elevated temperatures.	
Steel, Inorganic Zinc Primer, Atmospheric			Topcoating: It is recommended to apply a thinned-down, low wet film thickness mist coat over zinc rich primers to help avoid outgassing. Allow it to tack up and seal the surface. Then apply a full wet film thickness coat as directed.	
1 Ct. Zinc Clad II (85)	2.0-4.0	(50-100)	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.	
1 Ct. Macropoxy 646	5.0-10.0	(125-250)		
Steel, Organic Zinc/Epoxy/Urethane Topcoat				
1 Ct. Zinc Clad IV (85)	3.0-5.0	(75-125)		
1 Ct. Macropoxy 646	3.0-10.0	(75-250)		
1 Ct. Acrolon 7300	2.0-4.0	(50-100)		
Steel, Inorganic Zinc/Epoxy/Urethane Topcoat				
1 Ct. Zinc Clad II (85)	2.0-4.0	(50-100)		
1 Ct. Macropoxy 646	3.0-10.0	(75-250)		
1 Ct. Acrolon 7300	2.0-4.0	(50-100)		
Steel, Organic Zinc/Epoxy/Polysiloxane Topcoat, Atmospheric				
1 Ct. Zinc Clad IV (85)	3.0-5.0	(75-125)		
1 Ct. Macropoxy 646	3.0-10.0	(75-250)		
1-2 Cts. Sher-Loxane 800	2.0-4.0	(50-100)		
Concrete/Masonry, Smooth, Immersion & Atmospheric				
2 Cts. Macropoxy 646	5.0-10.0	(125-250)		
The systems listed above are representative of the product's use, other systems may be appropriate.			HEALTH AND SAFETY	
WARRANTY			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.	
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.			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 Sheet.	

High Performance Elastomeric Membrane

SELECTION & SPECIFICATION DATA

Generic Type	Asphalt Modified Polyurethane
Description	Liquid applied monolithic lining system with exceptional chemical and abrasion resistant elastomeric properties. As a cold applied chemistry, it is well suited as an alternate where hot applied membrane systems are not practical. Typical applications include primary and secondary containment, wastewater containment, spillway fountains, decorative ponds and various other waterproofing and corrosion protection situations. Due to its elastomeric properties, it may help to prevent the transmission of substrate cracks through the lining.
Features	<ul style="list-style-type: none"> • Low VOC • Crack Bridging • UV Resistant • >400% Elongation • Good Adhesion to asphalt
Color	Black
Finish	Gloss
Primer	Self-priming on most concrete, and metal surfaces. Epoxy primer may be used to reduce the risk of outgas blisters on concrete.
Topcoats	Aggregate broadcast or coatings
Dry Film Thickness	40 -125 mils per coat *depending on slope
Solids Content	By Volume 87% +/- 5%
Theoretical Coverage Rate	40-50 sqft/gl at 30 mils
VOC Value(s)	<150 g/L
Dry Temp. Resistance	225°F - Excursions to 250° F
Limitations	Will lose gloss, discolor, and chalk in sunlight exposure.

SUBSTRATES & SURFACE PREPARATION

General	All surfaces must be clean and free from debris and loose scale material or anything that may interfere with adhesion or act as a bond breaker with the desired substrate. Concrete or CMU Concrete must be cured minimum 7 days at 75°F(24°C) and 50% relative humidity or equivalent. Prepare surfaces to expose aggregate. Voids in concrete may require surfacing.
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Steel	Immersion: SSPC-SP10 Non-immersion: SSPC-SP6 1.5-3.0 mils (38-75 microns) SSPC-SP2 or SP3 are suitable cleaning methods for mild environments.
Previously Painted Surfaces	Consult with your Sherwin-Williams representative.

MIXING & THINNING

Mixing	<p>The viscosities of the two components are such that the contents of Part B container can be readily poured into the Part A and mixed at product temperatures above 60° F. An electric or air driven mixer (generating a vigorous vortex) is recommended. A metal, spiral head mix design having a minimum 4" head diameter is suggested and is available from Grainger and other suppliers http://www.grainger.com/Grainger/Drum-Mixer-2FDJ3?Pid=search the phone number is 1-800-472-4643. Part number F2DJ3. DO NOT MIX PARTIAL KITS.</p> <p>Mix Part A for a 1 minute premix to reduce viscosity and ensure homogeneity. With vortex created, add Part B hardener slowly. Move the mix blade around in the pail to ensure full dispersion of the Part B hardener for 3 minutes. Upon completion, place mix head in empty pail and spin off excess material hanging on mix blade.</p> <p>Do not allow moisture contamination into the mix</p> <p>Caution: Material that reaches its full cure cannot be recovered so guard against material set up on tools and pump equipment including hoses, guns, pumps etc. Flush and clean all equipment after use with mineral spirits.</p>
Thinning Ratio	DO NOT THIN 31:1 Ratio (A to B) by Weight
Pot Life	30 minutes @ 32°C (90°F) 40 minutes @ 24°C (75°F) 50 minutes @ 16°C (60°F) Not recommended below 60°F

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Spray Application (General)	The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.
Conventional Spray	Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, .070" I.D. fluid tip and appropriate air cap.

High Performance Elastomeric Membrane

Airless Spray Single Leg or Hot Pot

Pump Size - 45:1 or greater
Hose Length/Diameter - 200 ft x 1/2"
Whip Length/Diameter - 15 ft x 1/4"
Work Life, 4 gallons at 32°C (90°F):

Brush

Use a medium/thick bristle brush.

Roller

Use a short-nap synthetic roller cover with phenolic core.

1/4" Notched Squeegee

Horizontal application can be achieved by using a 1/4" serrated (saw tooth) neoprene squeegee and allow for self leveling to occur. 125 mils typically results from this technique.

CLEANUP & SAFETY

Cleanup

Use mineral spirits for suitable cleanup. In case of spillage, absorb and dispose of in accordance with local applicable regulations. Refer to SDS for more information.

Safety

Read and follow all caution statements on this product data sheet and on the SDS for this product. Wear protective clothing, gloves and eye protection.

Ventilation

Thorough air circulation must be used during and after application until the product is cured.

Recoat Window

Recoat window is typically 1-4 hrs. Cured material over 4 hrs may need to be prepared as stated in the repair and maintenance section below.

PACKAGING, HANDLING & STORAGE

Shelf Life

Part A: 12 months at 75°F (24°C)
Part B: 12 months at 75°F (24°C)
*When kept at recommended storage conditions and in original unopened containers.

Storage Temperature & Humidity

40° - 110°F (4° - 43°C)
0-100% Relative Humidity

Storage

Store Indoors. This product is not affected by excursions below these published storage temperatures, down to 10°F, for a duration of no more than 14-days. Always inspect the product prior to use to make sure it is smooth and homogeneous and properly mixed.

PERFORMANCE DATA

Test Method	System	Results
ASTM D 4060	CS17 wheels, 1 kg load 1000 cycle	2.4 mg loss after 1000 cycles / 2 mil loss after 1000 cycles
ASTM D 2240 Shore A @ 25°C	7 day shore A	45
ASTM D 624 Tear Strength Die C	7 day tear strength	40 lbs/in
ASTM D 412 Tensile Strength	60 mil or 100 mil	>300 psi

REPAIR

	Liquid Membrane elastomeric compound is a tough abrasion-resistant product, and no maintenance should be needed. If mechanical damage should occur, it can be easily repaired by maintenance personnel. Edges of the old compound should be roughed up with a wire bristle brush to expose a fresh surface. That surface should then be wiped with an aromatic or mineral spirit solvent and allowed to dry. Subsequent material can be applied over the prepared area.
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