



Bridge Preservation Through Coatings

Presented by: Tony Serdenes, AMPP Protective Coatings Specialist
To: BPP Local Agency Outreach Working Group
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Engineering | Design | Planning | Construction Management

Bridge Preservation Through Coatings



Topics of Discussion

- Evaluation
- Design (Specification)
- Inspection
- Maintenance
- AMPP Committees

Premature Failures - The Why!

NCHRP 2016 Study identified factors contributing to premature failure of steel bridge coating systems. These factors include:

- » Inadequate surface preparation or coating application
- » Residual surface contamination
- » Incorrect coating thickness
- » Improper environmental conditions for application
- » Incorrect mixing or agitation
- » Inadequate / incorrect coatings / materials
- » Extreme exposure conditions
- » Inadequate inspections
- » Inadequate qualified contractors
- » Inadequate specifications

NCHRP Project 20 68A, Scan 15-03, Successful Preservation Practices For Steel Bridge Coatings

Bridge Preservation Through Coatings - Current DOT Practices

- Full removal and replacement and/or Zone Painting are typically specified.
- Containment for abrasive blasting is required to meet AMPP (SSPC) Guide 6 Level 2A.
- Abrasives required are typically recyclable steel abrasives
- Some states still use nonrecyclable abrasives.
- Surface preparation requirements are usually an SSPC SP 10 Near White Blast. Profiles (roughening of the steel) vary by state.
- Most states (About 36) require contractors to be AMPP (SSPC) QP 1 and QP 2 Certified Contractors.



Bridge Preservation Through Coatings - Current DOT Practices

- Coating systems used are typically Organic zinc/Epoxy/Urethane
- A few states use inorganic zinc as the field primer. Typically, this primer is only used on new steel in the shop.
- Some states have gone to a two-coat system, organic zinc with a topcoat, and metalizing.
- Stripe coating of the primer/intermediate coats.
- Weathering steel is typically approached in the same manner.
- QA - AMPP Certified coatings inspectors, CIP Level 1, 2, 3



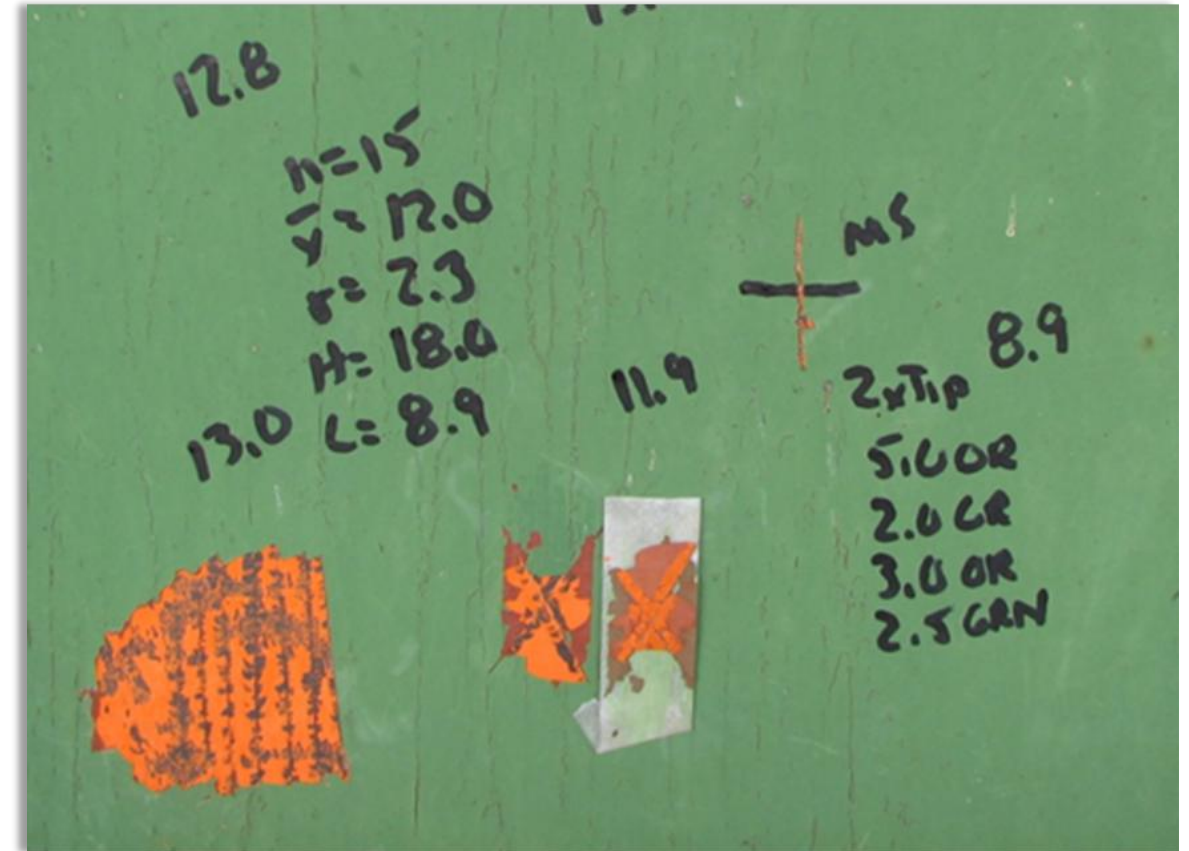
Bridge Preservation Through Coatings - Evaluation



- Assessment of inventory for single or multiple structures
 - Identify areas that could cause issues for proper surface preparation and application (i.e., tight spaces, back-to-back angles, utilities, vegetation, etc.)
 - Access to the structure.
 - Potential layout yard for the contractor for equipment and storage.
 - Will structural repairs be required before cleaning and painting.
 - Containment level required.
 - Railroads, etc.

Bridge Preservation Through Coatings - Evaluation

- **Testing Protocol during Field evaluation**
 - Corrosion – Isolated or scattered
 - Adhesion – Failure between coats or substrate
 - Chalking
 - Brittleness of coating
 - Film thickness (Destructive & Non-Destructive)
 - Coating's identification (Alkyd, Epoxy, Vinyl, etc.) for potential overcoat projects
 - Heavy Metals (Lead, Cadmium, Chromium)
 - Surrounding environment
 - *Matching the right system to the environment - humidity, etc. (OZ/E/U, Moisture cured systems)*



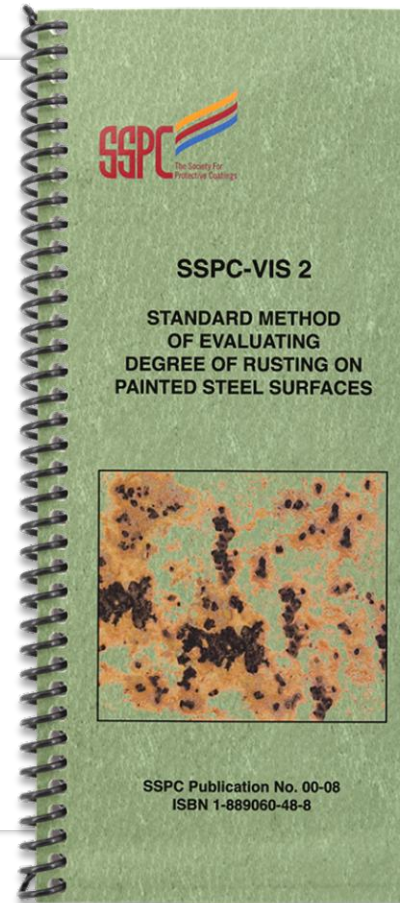
Bridge Preservation Through Coatings - Evaluation

- **Corrosion** (Field) – SSPC VIS 2 “Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces” to evaluate the degree of corrosion throughout the structure.
- **Adhesion** (Field) – ASTM D3359 – 17 “Standard Test Methods for Rating Adhesion by Tape Test” to check adhesion between the existing system and the substrate and between coats.
- **Chalking** (Field) – ASTM D4214 – 07(2015) “Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films” to evaluate the chalking of the finish coat as needed.
- **Brittleness** of coating (Field) – checked at the same time as adhesion testing is done. A lab test is available, but this can be documented in the field.
- **Film Thickness** (Field)
 - Total system – ASTM D7091/SSPC PA 2 (non-destructive test)
 - Individual layers – ASTM D4138 (destructive test)
- **Generic Coatings Identification** – (alkyd, epoxy, vinyl, etc.) (Lab) FTIR test
- **Heavy Metals Analysis** – (lead, cadmium, chromium) (Lab) ICP-OES test

Bridge Preservation Through Coatings - Evaluation

- Corrosion Evaluation
- Visual inspection:
 - Surface rust
 - Flaking/Scaling
 - Section loose

Can determine whether zone painting or total removal and recoat is required.



Bridge Preservation Through Coatings - Design

- **Development of Needs**
 - Based on assessment develop a list of structures that need work within 0 - 3 years, 3 – 5 years, 5 years and beyond
 - Develop a budget to address those various needs
 - Specification Development for specific bridges (Signature structures) or groups of bridges



Bridge Preservation Through Coatings - Design

- **Recommendations**
 - Total removal and replacement
 - Overcoat
 - Zone Painting (Defined areas, Beam ends and bearing, facias)
 - Do Nothing



Bridge Preservation Through Coatings - Design



- **Considerations**

- Budgets – Optimizing your most important needs vs budget established
- Life expectancy of bridges considered for painting. Will they be replaced within 10 years or so. Will the bridge have major rehabilitation needs, etc.
- Vehicular traffic disruptions – Full access to structure or limited access due to lane closure restraints (This will significantly affect the cost)
- Development of an engineers estimate

Bridge Preservation Through Coatings - Design

- **Specification Development**
 - Surface preparation
 - Coatings application
 - *Stripe Coating (Primer & Intermediate coats)*
 - Environmental requirements
 - Special provision/Plan Notes – Document unique situations, hard-to-reach/inaccessible/limited access areas, utilities, and Railroads – How will the contract address these areas?
 - Defined Quality Control/Quality Assurance
 - Warranties – 1yr., 2yr., etc.



Bridge Preservation Through Coatings - Design

- **Stripe Coating (Primer & Intermediate coats)**
 - Why this is so important.



Bridge Preservation Through Coatings - Design

Stripe Coating (Primer & Intermediate coats)

- SSPC-PA Guide 11

3.2 A “stripe coat” is a layer of coating applied to specific areas such as edges, welds, outside corners, bolt heads and threads, nuts, and crevices, to provide additional barrier protection. The stripe coat may be applied either before or after a layer of coating (often called a “full coat”) is applied over the entire surface being coated. The practice of applying a stripe coat is frequently referred to as “striping.” The coating manufacturer should be consulted on whether application of a stripe coat is recommended, as well as the thickness of the stripe coat. The project specification should provide detailed instructions on the surfaces to be stripe coated.

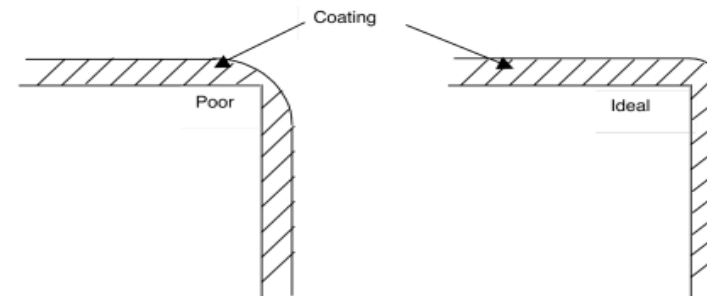


Figure 1. Schematic showing how coating thickness is reduced at a sharp corner.

Bridge Preservation Through Coatings - Design



Bridge Preservation Through Coatings - Design

Sample language from a DOT who has included Limited Access in their specifications

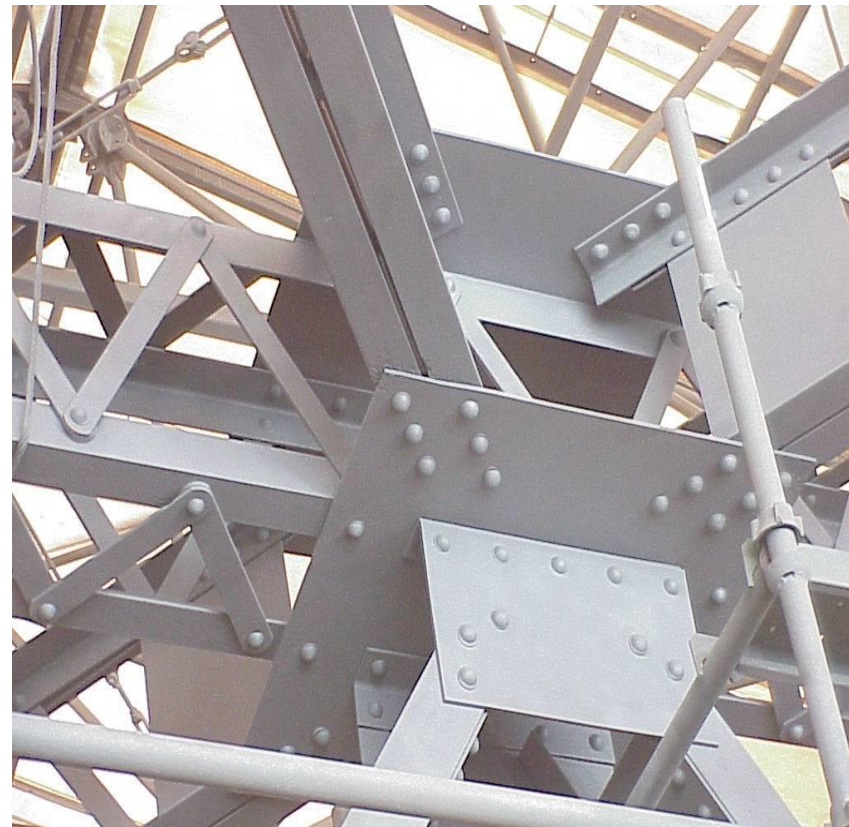
Limited Access Areas – Submit proposed methods of coating application together with the coating manufacturer’s recommendations, for achieving complete coverage in limited access areas (e.g., modified brushes, paint mitts, daubers, etc. as appropriate for the coating system).

Limited Access is defined as a location where the physical characteristics or configuration of the structure restricts the use of a surface preparation or paint application tool at that location.

A location is not considered Limited Access if additional time will allow for the proper cleaning or painting of the area, or if commercially available tools are available to clean or paint the area (e.g., angle nozzles, or short nozzles in place of traditional long nozzles for blast cleaning).

Bridge Preservation Through Coatings - Design

Examples of Hard To Reach/Inaccessible Areas



Bridge Preservation Through Coatings - Design



Submittals Requirements

- *Containment Plans – Stamped by a P.E.*
- *Environmental Plans – Monitoring of site*
- *Worker Protection Plans – Monitoring of personnel*
- *Waste Disposal/recycled materials plans*
- *Material Submittals – Paint, solvents, abrasive, etc.*

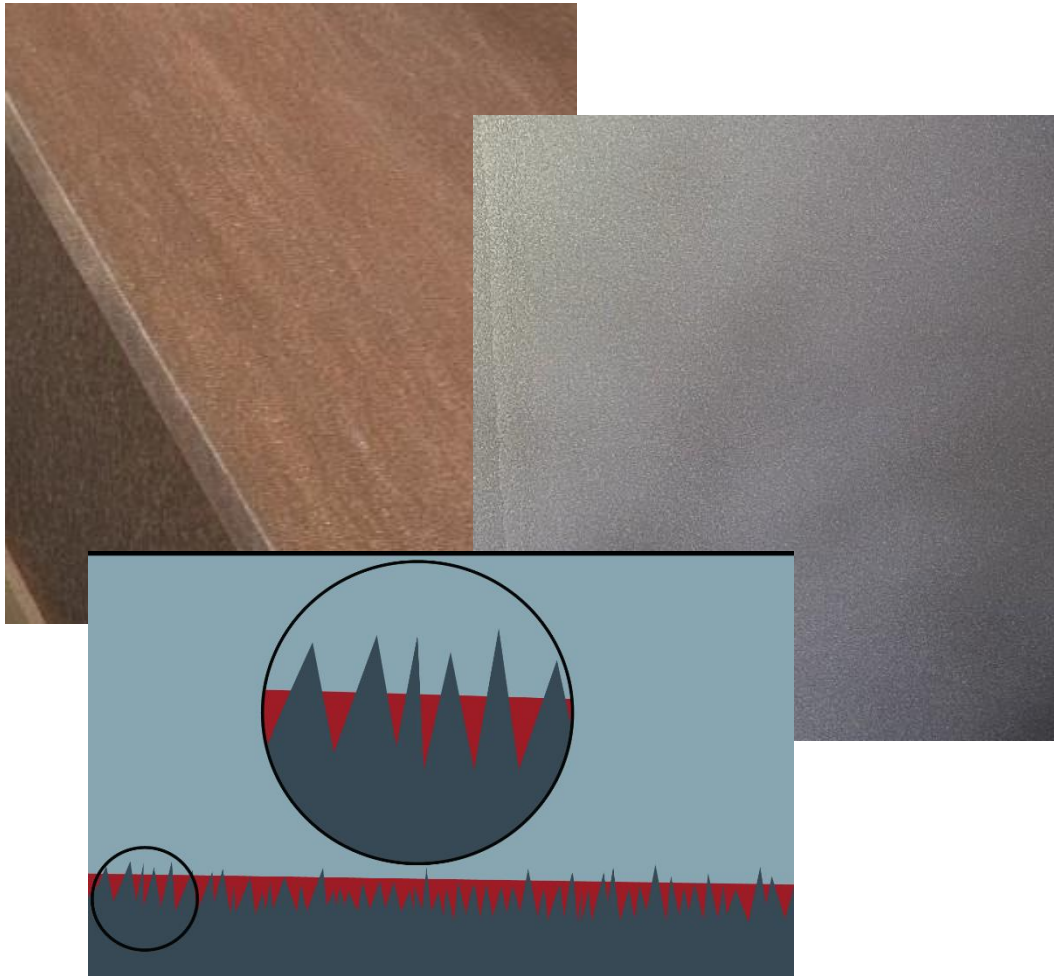
Bridge Preservation Through Coatings - Design

Specification Development

- Contractor prequalification
 - ✓ QP 1
 - ✓ QP 2
- Mandatory Pre-Bid Meeting/Site Visit



Bridge Preservation Through Coatings (Weathering Steel) - Design



What To Consider

Abrasive Blasting Concerns

- Deep profiles
- High peak exposure

Applying the Primer Coat

- Proper thickness applied
- Potential need for two coats

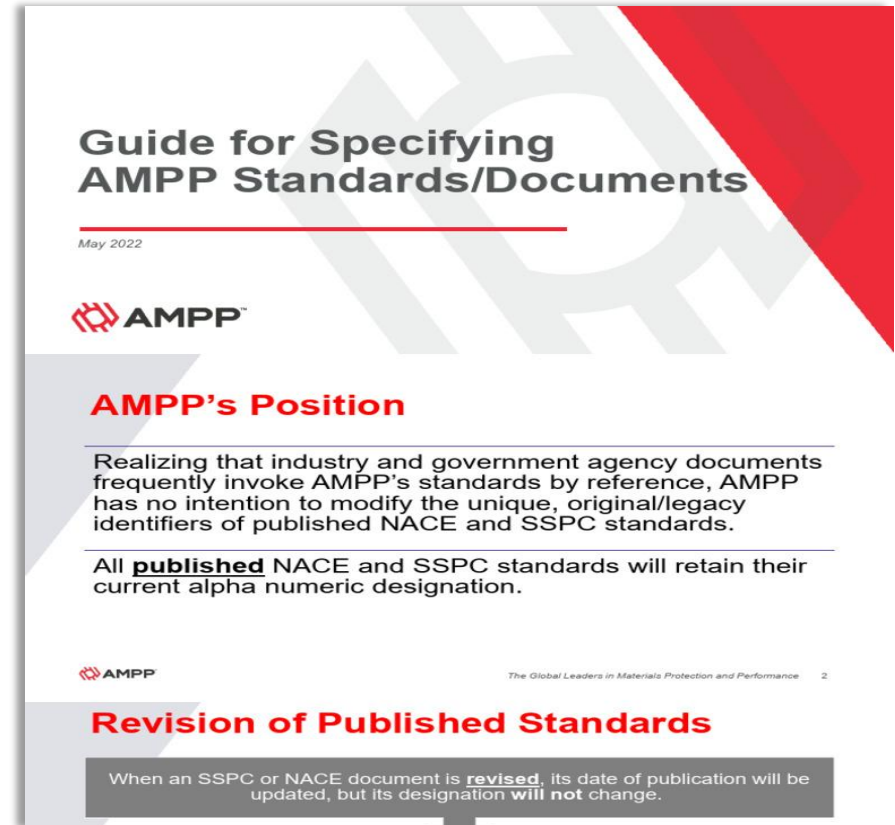
Dry Film Thickness Gauge

- Calibration to read above the blast profile

Bridge Preservation Through Coatings - Design

AMPP Standards

- SSPC Guide 6 – Containment Requirements
- SSPC Guide 7 – Waste Handling Requirements
- SSPC PA 2 – Dry Film Thickness Readings
- SSPC Guide 12 – Lighting Requirements
- SSPC SP 1 – Solvent Cleaning
- SSPC SP 10 – Near White Blast



Bridge Preservation Through Coatings - Design

AMPP Standards

- SSPC-PA Guide 11 – Stripe Coating
- SSPC QP 1 – Qualified Contractors
- SSPC QP 2 – Qualified Contractors for Hazardous Materials
- SSPC QP 3 – Qualified Paint Shops



Bridge Preservation Through Coatings - Inspection

- **Witness, Verify, and Document per Project Specifications**
 - Containment System
 - Surface Preparation
 - Ambient Conditions
 - Coating Application
 - Materials used (abrasive, thinners, paints, etc.)
 - Measurements taken (Surface profiles, dry film thicknesses, etc.)
 - Environmental & Personal Monitoring
 - Collection, Storage, Testing, and Disposal of Waste (Hazardous)
 - Daily activities



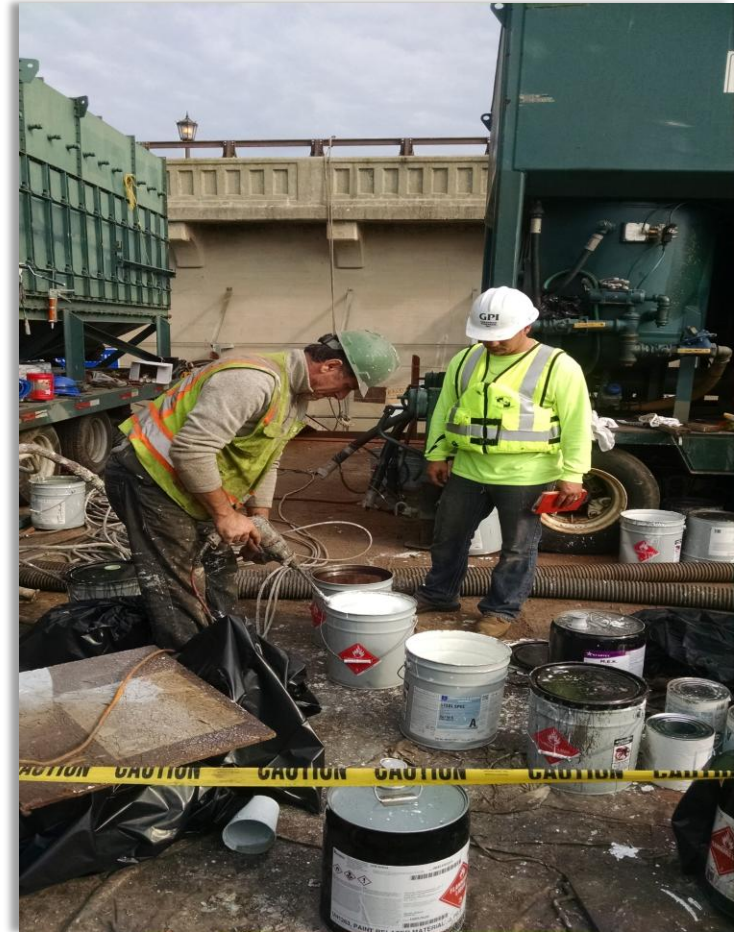
Bridge Preservation Through Coatings - Inspection

- Defined hold points
 - Containment
 - Ambient Conditions
 - ✓ *Surface & Air Temperatures, Humidity, Dew point*
 - Surface Preparation
 - ✓ *Surface cleanliness*
 - ✓ *Surface profiles*
 - Coating application
 - ✓ *Dry film thickness of each applied coating*
 - ✓ *Surface cleanliness between coats*
 - Waste Storage and Disposal
- Authority for the QA inspector



Bridge Preservation Through Coatings - Inspection

- **Documentation To Include**
 - Material Storage sites (Per the manufactures/Owners' requirements)
 - Proper mixing of materials
 - Proper Induction/Sweat-In time
 - Proper Abrasives and cleanliness of abrasive
 - Ambient conditions
 - Contractor work force
 - Location of work



Bridge Preservation Through Coatings - Maintenance



- Bridge washing
- Drainage system clear
- Joints and decks are in good conditions
- Spot repair or zone painting (Joints, Facia, etc.)
- *In-House Maintenance*

Bridge Preservation Through Coatings - In-House Maintenance

- **Safety**

- Personal Protective Equipment
- Tailored to the project
- Medical Evaluation
- Follow Federal, State, and local agency

OSHA's standard 1926.62 applies to all construction work in which employees may be occupationally exposed to lead.



Bridge Preservation Through Coatings - In-House Maintenance

Containment - Lifts



Containment – Mini Enclosures



Containment – Vacuum Shrouded



Bridge Preservation Through Coatings - In-House Maintenance

- Collection
- Storage
- Disposal



SSPC-Guide 7
July 9, 2015

SSPC: The Society for Protective Coatings Technology Guide No. 7

GUIDE TO THE DISPOSAL OF LEAD-CONTAMINATED SURFACE PREPARATION DEBRIS

1. Scope

1.1 This guide provides information regarding handling, testing, and disposal of solid debris generated during preparation of surfaces previously painted with lead-containing paint.

1.2 This guide is based on U.S. federal regulations only. States or other local jurisdictions may have requirements that are stricter, such as requiring additional analytical procedures or regulating other metals. Non-hazardous waste containing lead is also regulated in some states.

1.3 This guide does not cover other waste streams such as discarded tarpaulins and personal protective equipment that may be contaminated with lead and must be tested to determine proper disposal.

1.4 This guide does not cover removal of the coating from the structure or containment of the debris. These activities are described in SSPC-Guide 6.

TABLE 1
TOXICITY LEACHATE LEVELS FOR METALS
(40 CFR 261 – as of October 1, 2013)

Element	Concentration mg/L	EPA Hazardous Waste Designation
Arsenic	5.0	D004
Barium	100.0	D005
Cadmium	1.0	D006
Chromium (total)	5.0	D007
Lead	5.0	D008
Mercury	0.2	D009
Selenium	1.0	D010
Silver	5.0	D011

1.5 While this guide is written primarily with reference to removing lead-based paints, other elements as presented in Table 1 may also cause the debris to be classified as a hazardous waste.

cadmium, chromium, or other heavy metals may result in the waste stream being classified as hazardous waste, requiring special handling and disposal. Under certain circumstances, special handling and disposal may also be required for non-hazardous wastes. It is important to note that surface preparation debris is not classified as hazardous waste until tested, although it must be regarded and handled as a hazardous material until shown to be non-hazardous. Certain waste streams, such as waste materials from chemical stripping, may also be subject to hazardous waste regulations because they are ignitable (D001), corrosive (D002) or reactive (D003).

2.2 OUTLINE OF PROCEDURE: The major activities covered in this guide are as follows:

2.2.1 Site Procedures Prior to and Including Classifying Waste (Section 5): These include collecting, packaging, transporting to a temporary storage area, as well as temporary storage, sampling, testing, and classifying waste.

2.2.2 Procedures for Disposing of Hazardous Waste (Section 6): The generator must obtain an EPA ID number and determine the disposal options. For disposing of waste offsite, the generator must select a TSD (treatment, storage, and disposal) site, select a waste hauler, prepare a manifest (see Figure 1), ship the waste, and prepare a biennial report. For treatment of waste on-site, in accumulation containers, the generator must determine the time allowed for treatment, select a treatment method, prepare and submit a waste analysis plan, obtain EPA approval, treat the waste, and verify that it is non-hazardous and can be disposed of at a non-hazardous site.

2.2.3 Procedures for Disposing of Non-Hazardous Waste (Section 7): The generator must identify any state or local requirements or restrictions, select a non-hazardous disposal facility, and ship the waste to the facility.

2.2.4 Commentary (Section 8): In addition, the guide provides an extensive commentary section discussing regulations, testing and sampling procedures, and other

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Bridge Preservation Through Coatings - In-House Maintenance

- **Surface Preparation**

- **Spot Repairs**

- ✓ *Random spots*

- **Zone Painting**

- ✓ *Defined areas*



Bridge Preservation Through Coatings - In-House Maintenance

- **Surface Preparation**

- Equipment – Handheld Scrapers, wire brushes, sandpaper



Bridge Preservation Through Coatings - In-House Maintenance

- **Surface Preparation**

- **Equipment – Power tools**



Bridge Preservation Through Coatings - In-House Maintenance


- **Surface Preparation**

- **Equipment – Abrasive blasting**



Bridge Preservation Through Coatings - In-House Maintenance

- **Coating System - Overcoating**
 - ❖ Surface tolerant epoxies
 - ❖ Penetrating Sealers
 - ❖ High Ratio Calcium Sulfonate



Protective & Marine Coatings

MACROPOXY® 646-100 FAST CURE EPOXY

PART A: B58-620
PART B: B58V620
SERIES: HARDENER

PRODUCT INFORMATION 4.52

PRODUCT DESCRIPTION

MACROPOXY 646-100 FAST CURE EPOXY is a high solids, less than 100 g/L VOC, 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.

- <100 g/L VOC
- Low odor
- Outstanding application properties
- Chemical resistant
- Abrasion resistant

RECOMMENDED USES

- Marine applications
- Fabrication shops
- Pulp and paper mills
- Power plants
- Offshore platforms
- Refineries
- Chemical plants
- Tank exteriors
- Water treatment plants

- Mill White is 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: D3 (Confirm acceptance of specific part numbers/boxes with your SW Sales Representative)
- Conforms to AWWA D102 CCS #5
- Approved with FIRETEX hydrocarbon coatings
- Meets Low Emitting Materials (VOC) content requirements as set forth in LEED v4
- NSF Certified Environmental Product Declaration (EPD) available on Ecomedes
- California Department of Public Health (CDPH) available on Ecomedes

PRODUCT CHARACTERISTICS

Finish: Semi-Gloss
Color: Mill White and a wide range of colors available through tinting

Volume Solids: 73% ± 2%, mixed
Mill White Weight Solids: 83% ± 2%, mixed

VOC (EPA Method 24): Unreduced: <100 g/L; .83 lb/gal mixed
Reduced 10%: <100 g/L; .83 lb/gal

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	1168 (28.6)	

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


Drying Schedule @ 7.0 mils wet (175 microns):			
	@ 40°F/4.5°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.

PERFORMANCE CHARACTERISTICS		
Substrate: Steel		
Surface Preparation: SSPC-SP10/NACE 2		
System Tested: 1 ct. Macropoxy 646-100 Fast Cure @ 6.0 mils (150 microns) dft <small>*unless otherwise noted below</small>		
Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	84 mg loss
Accelerated Weathering - QUV¹	ASTM D4587, QUV-A, 12,000 hours	Passes
Adhesion	ASTM D4541	1,037 psi
Corrosion Weathering¹	ASTM D5894, 36 cycles, 12,000 hours	Rating 10 per ASTM D714 for blistering; Rating 9 per ASTM D610 for rusting
Direct Impact Resistance	ASTM D2794	30 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
Immersion	1 year fresh and salt water	Passes, no rusting, blistering, or loss of adhesion
Pencil Hardness	ASTM D3363	3H

Bridge Preservation Through Coatings - In-House Maintenance

- **Coating System – Total Removal and Replacement**
 - ❖ Epoxy systems
 - ❖ Organic Zinc rich systems (Preferred)
 - ❖ Moisture Cured Urethane systems



Protective & Marine Coatings

ZINC CLAD® 4100
ORGANIC ZINC-RICH EPOXY PRIMER

PART A	B69A120	GRAY-GREEN, BASE
PART A	B69P120	PURPLE, BASE
PART B	B69V120	HARDENER
PART F	B69D11	ZINC DUST

Revised: June 28, 2023

PRODUCT INFORMATION

6.27

PRODUCT DESCRIPTION

ZINC CLAD 4100 is a three-component, polyamide epoxy, zinc-rich coating. It contains 89.2% by weight of zinc dust pigment in its dried film.

- Meets Class B requirements for slip coefficient and creep resistance
- Provides cathodic protection
- Damaged film exhibits "self-healing" properties
- Fast Recoat Time
- Outstanding application properties

PRODUCT CHARACTERISTICS

Finish: Flat
 Color: Gray-Green, Purple*
 *made to order only
 Volume Solids: 74% ± 2%
 Weight Solids: 90% ± 2%
 VOC: <340 g/L; 2.80 lb/gal, mixed
 Zinc Dust Pigment Content in Dry Film: 89.2%
 Mix Ratio: 3 components, premeasured

Recommended Spreading Rate per coat:		
	Minimum	Maximum
Wet mils (microns)	4.0 (100)	7.0 (175)
Dry mils (microns)	3.0 (75)	5.0 (125)
~Coverage sq ft/gal (m ² /L)	237 (6.0)	396 (9.7)
Theoretical coverage sq ft/gal (m ² /L) @ 1 mil / 25 microns dft	1187 (29.1)	

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

Drying Schedule @ 4.0 mils wet (100 microns):

	@ 35°F/1.7°C	@ 50°F/10°C	@ 77°F/25°C	@ 100°F/38°C
	50% RH			
To touch:	30 minutes	30 minutes	20 minutes	5 minutes
To handle:	120 minutes	100 minutes	60 minutes	15 minutes
To recoat:				
minimum:	4 hours	2 hours	30 minutes	20 minutes
maximum:	unlimited	unlimited	unlimited	unlimited

**Maximum Recoat: Unlimited. Must have a clean, dry surface for topcoating. "Loose" chalk or salts must be removed in accordance with good painting practice.*

To cure: 7 days 7 days 5 days 3 days
Drying time is temperature, humidity, and film thickness dependent.

Pot Life: 8 hours 8 hours 4 hours 2 hours
 Sweat-in-Time: none none none none

Shelf Life: 24 months, unopened
 Store indoors at 40°F (4.5°C) to 100°F (38°C).

RECOMMENDED USES

For use over properly prepared steel.

- Bridge and Highway Structures
- Fabrication Shops
- Stadiums and sports complexes
- Drilling Rigs
- Piping
- Refineries
- Barges & ships
- Shop or field application

• Approved primer for NEPCOAT Systems B and C

PERFORMANCE CHARACTERISTICS

Substrate*: HRS A36
 Surface Preparation*: SSPC-SP 10 / NACE 2
 System Tested*:
 1 ct. Zinc Clad 4100 @ 3.0-5.0 mils (75-125 microns) dft
 1 ct. Macropoxy 646 @ 3.0-10.0 mils (75-250 microns) dft
 1 ct. Hi-Solids Polyurethane 250 @ 3.0-5.0 mils (75-125 microns) dft
 *unless otherwise noted below


Test Name	Test Method	Results
Adhesion (Zinc Primer only)	ASTM D4541, PATTI	2,248 psi
Adhesion	ASTM D4541, PATTI	2,828 psi
Corrosion Weathering	ASTM D5894, 15 cycles, 5,040 hours	Rating 10 per ASTM D610 for rusting; Rating 10 per ASTM D714 for blistering
Dry Heat Resistance (Zinc Primer only)	ASTM D2485	400°F (204°C)
Salt Fog Resistance	ASTM B117, 5,040 hours	Rating 10 per ASTM D610 for rusting; Rating 10 per ASTM D714 for blistering
Slip Coefficient (Zinc Primer only)	AISC Specification for Structural Joints using ASTM A325 or ASTM A490 Bolts	Class B @ 5 mil DFT (72 hour cure)

Meets the requirements of SSPC Paint 20, Type II, Level I

Bridge Preservation Through Coatings - In-House Maintenance

Product Data Sheet – Information

- ✓ Product Description
- ✓ Recommendations
- ✓ Thickness application
- ✓ Recoat/topcoat



Marine Coatings

MACROPOXY 5000

TRANSLUCENT WHITE

CLEAR HARDENER

Revised: January 18, 2024

PRODUCT INFORMATION 4.85

CONCRETE PRODUCT DESCRIPTION	STEEL PRODUCT DESCRIPTION																																																				
<p>MACROPOXY 5000 is an ultra high solids, penetrating epoxy primer / sealer designed for priming and sealing concrete prior to the application of coatings and linings. It has excellent wetting properties and penetrates deeply into concrete to aide in controlling outgassing and to provide a firm anchor for subsequent topcoats.</p> <ul style="list-style-type: none"> A penetrating primer / sealer for concrete and masonry surfaces Excellent wetting properties VOC less than 50 g/L Suitable for application to SSD concrete 	<p>MACROPOXY 5000 is a rust-inhibitive, pigmented, ultra high solids, penetrating epoxy primer / sealer designed for use over marginally prepared steel and aged coatings. It has excellent wetting properties and penetrates light rusted steel to provide a firm anchor for subsequent topcoats. In addition, Macroproxy 5000 can be used to overcoat aged coatings and act as barrier coat for a variety of topcoats without the need for an intermediate coat.</p> <ul style="list-style-type: none"> A penetrating primer / sealer for light rusted surfaces and aged coatings Excellent wetting properties VOC less than 50 g/L Barrier coat for a broad range of topcoats 																																																				
CONCRETE RECOMMENDED USES	STEEL RECOMMENDED USES																																																				
<p>For use as a primer / sealer over prepared concrete surfaces.</p> <ul style="list-style-type: none"> Wastewater & Sewer collection systems Industrial applications Suitable for use in USDA inspected facilities Suitable for use on floors and tanks Suitable for immersion when topcoated with a Sherwin-Williams approved lining 	<p>For use as a primer / sealer over prepared steel surfaces.</p> <ul style="list-style-type: none"> Over white rusted and zinc rich coatings Petrochem exploration and offshore platforms Chalky surfaces in atmospheric conditions Tanks, piping, structural steel and vessels Industrial applications Marine applications Over marginally prepared steel when abrasive cleaning is not possible Suitable for use in USDA inspected facilities Ideal for corrosion mitigation in maintenance coating programs Suitable for use in the Mining & Minerals industry Can be used as a metalizing sealer. Consult your Sherwin-Williams Representative. 																																																				
CONCRETE PRODUCT CHARACTERISTICS	STEEL PRODUCT CHARACTERISTICS																																																				
<p>Color: Clear*, Translucent White</p> <p>*for immersion applications, see page 3</p>	<p>Color: Clear, Translucent White</p>																																																				
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**for immersion applications with acceptable topcoats (see Recommended Systems on page 3)

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Bridge Preservation Through Coatings - In-House Maintenance

Product Data Sheet – Information

✓ Surface Preparation



PART A B58W20 TRANSLUCENT WHITE
PART A B58C20 CLEAR
PART B B58V20 HARDENER

Revised: January 18, 2024 **PRODUCT INFORMATION** 4.85

CONCRETE PERFORMANCE CHARACTERISTICS	STEEL PERFORMANCE CHARACTERISTICS																																												
<ul style="list-style-type: none"> Designed for industrial environments A high performance primer/sealer for masonry surfaces Suitable for immersion when topcoated with a Sherwin-Williams approved lining Deeply penetrates concrete surfaces to aide in outgassing control Designed to completely penetrate concrete surface, does not form a surface film Formation of surface film may require sweep blasting prior to application of liners for immersion Epoxy coatings may darken or yellow following application and curing 	<ul style="list-style-type: none"> Designed for industrial and marine environments Penetrates existing, tightly adhered rust to provide a "tight" substrate prior to subsequent coats Eliminates the need for intermediate coats Can also be used as a high performance primer/sealer for masonry surfaces Not for immersion service Dry heat resistance up to 200°F (93°C) Epoxy coatings may darken or yellow following application and curing 																																												
CONCRETE SURFACE PREPARATION	STEEL SURFACE PREPARATION																																												
<p>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.</p> <p>Concrete and Masonry For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2R, CSP 1-3 (Atmospheric) CSP 3-6 (Immersion). Surfaces should be thoroughly clean and free of contaminants. New concrete must be cured at least 28 days @ 75°F (24°C). A.W. Cook and Sherwin-Williams mortars shall cure for a minimum 24 hours @ 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 an approved A.W. Cook or Sherwin-Williams approved cementitious or epoxy mortar, or Steel-Seam FT910.</p> <p>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</p>	<p>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.</p> <p>Iron & Steel 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 (1.0-2.0 mils / 25-50 microns). Prime any bare steel within 8 hours or before flash rusting occurs.</p> <p>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 products 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.</p>																																												
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Bridge Preservation Through Coatings - In-House Maintenance

Product Data Sheet – Information

✓ Recommended Systems

✓ Tips

SHERWIN-Williams Coatings		PART A	B58C20	CLEAR
		PART B	B58V20	HARDENER
Revised: January 18, 2024		PRODUCT INFORMATION		4.85
CONCRETE RECOMMENDED SYSTEMS		STEEL RECOMMENDED SYSTEMS		
Dry Film Thickness / ct.		Dry Film Thickness / ct.		
Mils (Microns)		Mils (Microns)		
Concrete & Masonry, Immersion Thick Film / Severe Service***: 1 ct. Macropoxy 5000* (Clear) - 400-500 sq ft/gal (9.8-13.0 m ² /L) 1 ct. Acceptable topcoat: Dura-Plate 6100* 80.0-125.0+ (2000-3125+) Dura-Plate 6000* 80.0-250.0 (2000-6250) Dura-Plate 6000 Mortar* 125.0-500.0 (3125-12500) Poly-Cote 115** 80.0-250.0 (2000-6250)		Steel: 1 ct. Macropoxy 5000 1.0-2.0 (25-50) 2 cts. Macropoxy 646 5.0-10.0 (125-250) Steel, zinc rich primer: 1 ct. Zinc Clad IV 3.0-5.0 (75-125) 1 ct. Macropoxy 5000 1.0-2.0 (25-50) 2 cts. Acrolon 218 3.0-6.0 (75-150)		
Concrete & Masonry, Immersion Medium Film / Moderate Service***: 1 ct. Macropoxy 5000 (Clear) - 400-500 sq ft/gal (9.8-13.0 m ² /L) 1 ct. Acceptable topcoat: Dura-Plate 6100* 40.0-80.0 (1000-2000) Dura-Plate 6000* 40.0-80.0 (1000-2000) Poly-Cote 115** 40.0-80.0 (1000-2000)		Overcoat System for Aged Coatings: 1 ct. Macropoxy 5000 1.0-2.0 (25-50) Overcoat System for Steel Bridges: 1 ct. Macropoxy 5000 1.0-2.0 (25-50) 1 ct. Epoxy Mastic Aluminum II 4.0-6.0 (100-150) 1 ct. Acrolon 218 3.0-6.0 (75-150) or 1 ct. Hi-Solids Polyurethane 250 3.0-5.0 (75-125)		
Concrete & Masonry, Atmospheric: 1 ct. Macropoxy 5000* - 400-500 sq ft/gal (9.8-13.0 m ² /L) 1 ct. Macropoxy 646 5.0-10.0 (125-250)		Acceptable topcoats: Acrolon 218 HS Pro Industrial DTM Acrylic Hi-Solids Polyurethane Macropoxy 646 Macropoxy HS Sher-Loxane 800 Sher-Cryl HPA Tile-Clad HS Epoxy Mastic Aluminum II Hi-Solids Polyurethane 250		
*Optional for outgassing control **Primer required Additional topcoat options: **Dura-Plate 6200, Sherflex, Dura-Plate UHS, and Sher-Glass GF Macropoxy 5500LT - for atmospheric service Tank Clad HS - for atmospheric service ***consult your Sherwin-Williams representative for immersion suitability The systems listed above are representative of the product's use, other systems may be appropriate.		The systems listed above are representative of the product's use, other systems may be appropriate.		
CONCRETE PERFORMANCE TIPS		STEEL PERFORMANCE TIPS		
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. No reduction of material is recommended as it can affect film build, appearance, and adhesion. Do not apply the material beyond recommended pot life. Do not mix previously catalyzed material with new. To avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Xylene, R2K4. Only use Clear version of Macropoxy 5000 for concrete substrates for immersion. Apply material when concrete temperature is decreasing. Avoid application in direct sunlight. Airless spray is acceptable for application; however, the product should be backrolled to eliminate excessive millage and puddles. Designed to completely penetrate concrete surface, do not form a surface film. Formation of surface film may require sweep blasting prior to application of liners for immersion.		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. No reduction of material is recommended as it can affect film build, appearance, and adhesion. Do not apply the material beyond recommended pot life. Do not mix previously catalyzed material with new. To avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Xylene, R2K4. For better performance in severely corrosive environments, or over heavily rusted/pitted steel or porous concrete and masonry, two coats may be required. Roll out any puddles. Airless spray is acceptable for application; however, the product should be backrolled to eliminate excessive millage and puddles. Gloss may vary depending on substrate and film thickness.		
www.sherwin-williams.com/protective		continued on back		

Bridge Preservation Through Coatings - In-House Maintenance

Product Data Sheet – Information

- ✓ Application equipment
- ✓ Ambient conditions required
- ✓ Clean up



Protective & Marine Coatings

MACROPOXY® 5000
PENETRATING EPOXY PRIMER / SEALER FOR CONCRETE & STEEL

PART A	B58W20	TRANSLUCENT WHITE
PART A	B58C20	CLEAR
PART B	B58V20	HARDENER

Revised: January 18, 2024

PRODUCT CHARACTERISTICS	APPLICATION EQUIPMENT
<p>Finish: Gloss</p> <p>Volume Solids: 96% ± 2%, mixed</p> <p>Weight Solids: 97% ± 2%, mixed</p> <p>VOC (Calculated): <50 g/L; 0.42 lb/gal, mixed</p> <p>Mix Ratio: 2 components, 3:1 ratio</p> <p>Pot Life, at 50% RH: 2 hours at 40°F/4.5°C 1 hour at 77°F/25°C 20 minutes at 100°F/38°C</p> <p>Sweat-in-Time: None required</p> <p>Shelf Life: 24 months, unopened, store indoors at 40°F (4.5°C) to 100°F (38°C)</p> <p>Flash Point: 75°F (24°C), PMCC, mixed</p> <p>Reducer: Not recommended</p> <p>Clean Up: Xylene, R2K4</p>	<p>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.</p> <p>Reducer Not recommended</p> <p>Clean-Up Xylene, R2K4</p> <p>Airless Spray*</p> <p>Pressure..... 2200 - 2500 psi</p> <p>Hose..... 1/4" ID</p> <p>Tip..... 015"</p> <p>Filter..... 60 mesh</p> <p>*Airless spray is acceptable for application; however, the product should be backrolled to eliminate excessive millage and puddles.</p> <p>Conventional Spray</p> <p>Gun..... Binks 95</p> <p>Tip..... 66</p> <p>Cap..... 63 PB</p> <p>Atomization Pressure..... 50 psi</p> <p>Fluid Pressure..... 10 psi</p> <p>Brush</p> <p>Brush..... High quality nylon/polyester bristle</p> <p>Roller</p> <p>Cover (for Steel)..... 1/4" or less woven with solvent resistant core</p> <p>Cover (for Concrete)..... 3/8" or more woven with solvent resistant core</p> <p>If specific application equipment is not listed above, equivalent equipment may be substituted.</p>
TINTING	
Do not tint.	
APPLICATION CONDITIONS	CLEAN UP INSTRUCTIONS
<p>Temperature: 40°F (4.5°C) minimum, 120°F (49°C) maximum (air, surface, and material) At least 5°F (2.8°C) above dew point</p> <p>Relative humidity: 85% maximum</p>	Clean spills and spatters immediately with Xylene, R2K4. Clean tools immediately after use with Xylene, R2K4. Follow manufacturer's safety recommendations when using any solvent.
ORDERING INFORMATION	SAFETY PRECAUTIONS
<p>Packaging:</p> <p>Part A: 3 quarts (2.8L) in a 1 gallon (3.78L) container, 3 gallons (11.3L) in a 5 gallon (18.9L) container, 1 quart (0.94L) and 1 gallon (3.78L)</p> <p>Part B: 1 gallon (3.78L) and 4 gallons (15.1L) mixed</p> <p>Weight: 9.40 ± 0.2 lb/gal ; 1.1 Kg/L, mixed</p>	Refer to the SDS sheet before use.
APPLICATION PROCEDURES	DISCLAIMER
Surface preparation must be completed as indicated.	Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.
Use low speed mechanical agitation to mix Part A and Part B separately, then add 1 part by volume of Part B to 3 parts by volume of Part A. Mix the combined parts using low speed power agitation for at least 5 minutes. Mixed material will generate heat and should be handled appropriately, using all material before pot life expiration, and cleaning lines and equipment immediately after use.	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

Bridge Preservation Through Coatings - Maintenance

Coatings - *It's the little things that can cause big issues*

– Thinning

- *Mist coating: Thin up to 32 oz/gal (263 g/l) with Thinner 2 or 33 in VOC restricted (2.8 lb/gal) areas. May thin up to 48 oz/gal where VOC restricted levels are at 3.5 lb/gal (0.42 kg/l) for mist coat only. **If necessary, use Thinner 230 only in hot (above 100°F/38°C) and windy conditions, to slow down the evaporation rate***

– Constant Agitation

- *Thoroughly mix each component using mechanical agitation making sure pigment does not remain on the bottom of can. Pour the Part A into the Part B (mixing ratio by volume: 1 part Part A to 4 parts Part B) and mix well. After mixing, pour through a 30-60 mesh screen. If thinner is required, thin only after mixing Part A with Part B. Allow 15 minutes minimum induction time at 75°F. Do not mix more than can be applied during the product's useful pot life. **Continue to agitate the mixture during application of the product to keep the zinc pigment from settling out and the product uniform***



AMPP Communities

- Technical Community of Interest – Bridge
- Technical Community of Interest – Coatings Inspection
- Technical Community of Interest – Regulatory (incl. OSHA, EPA)
- Technical Community of Interest - Construction



AMPP Committees

- SC 02 External Coatings - Atmospheric
- SC 05 Surface Preparation
- SC 23 Coating System Application, Maintenance, and Inspection
- SC 24 Environmental Health and Safety (EHS)/Regulatory



AMPP Contact

The Association for Materials Protection and Performance (AMPP)

- Website: AMPP.ORG
- Call: 1-800-797-6223
- Email: Customersupport@ampp.org



Questions?

GPI

For additional information or questions
Chris Farschon: cfarschon@gpinet.com