URS

January 10, 2013

Mr. Thomas P. Donald, PE
Director of Bridge Project Development
Massachusetts Department of Transportation
Ten Park Plaza
Boston, MA 02116

Attention: Mr. Joseph Pavao, Jr., PE

Re: Chatham – Bridge St. over Mitchell River
Bridge No. C-07-001, Project File No. 603690
Color of Steel Piles

Dear Mr. Pavao:

MassDOT will be constructing a new bridge to replace the existing structurally deficient and functionally obsolete wooden bridge along Bridge Street over the Mitchell River. The new bridge will consist of a wood superstructure supported on concrete-filled steel piles.

URS and MassDOT have considered how to treat the proposed steel piles both to gain the longest service life (75 years or more) and to blend well into the environment. Coatings represent one measure that will be employed to maximize pile durability. Pile coating in a marine environment typically consists of a shop-applied zinc primer and 2-coats of a shop-applied coal tar epoxy paint. The coating is typically touched up in the field after construction to repair areas that may have been marred during erection.

Recent discussions have centered on what color the piles should be painted on the surface course. We have considered various shades of brown, from tan to reddish, as well as grey and black. Colors in these spectra would most closely fit with both the finishes of the wooded superstructure, the proposed stone finishes for the abutments and bascule pier and the setting. We also recognized that the wood bridge superstructure would age over time, which we expect to change gradually from tan towards grey through its lifetime. Lastly, we gave some consideration to the look of the existing bridge and to previous bridges that have stood at the site. We know that many of the piles that support the bridge today were treated with creosote.

In the end, we have concluded that the new piles should be finished in black, similar to the photograph to the right. Black pilings would most closely resemble the creosote

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treatment of the existing piles and would allow the piles to be relatively inconspicuous in the shade of the new bridge. URS recommends that MassDOT adopt the black colored Bitumastic 300M marine coating manufactured by Carboline, or equal. We believe this material will both maximize pile durability in this environment and its lack of color will naturally cause local observers to focus on the wood superstructure. See attached cut sheet.

Please contact me if you have any questions.

Sincerely,

URS Corporation

Mark E. Shamon, PE
Vice President, Project Principal

enclosure

product data

carboline®

Bitumastic®300 M

Selection & Specification Data

Generic Type Coal Tar Epoxy

Description Renowned high build coal tar epoxy for protection for steel and concrete in single or two-coat applications in a broad variety of aggressive industrial applications.

Features

- Excellent chemical, corrosion and abrasion resistance
- High-build, 16-24 mils (400-610 microns) in a single coat (up to 35 mils with force curing)
- Compatible with controlled cathodic protection
- Suitable for use in exposures as referenced in the following specifications*:
  - **Corp of Engineers C-200, C200a**
  - **AWWA C-210 for exterior**
  - **SSPC-Paint 16**
  - **Steel Tank Institute Corrosion Control System STI-P_3**

Color Black (0900)

Finish Gloss. Will discolor, chalk and lose gloss in sunlight exposure.

Primers Self-priming, Carboguard 888, or others as recommended

Topcoats Not recommended

Dry Film Thickness Normally 16.0 mils (400 microns) in one or two coats.
Total dry film thickness less than 8 mils (200 microns) or in excess of 35 mils (610 microns) is not recommended. Wet-on-wet spray techniques should be used for high thicknesses allowing time for solvents to flash between passes.

Solids Content By Volume: 74% ± 2%

Theoretical Coverage Rate 1187 mil ft^2 (29.1 m^2/l at 25 microns)
Allow for loss in mixing and application

VOC Values As supplied: 1.85 lbs/gal (222 g/l)
Thinned:
20 oz/gal w/ #10:* 2.6 lbs/gal (309 g/l)
25 oz/gal w/ #10: 2.7 lbs/gal (327 g/l)
These are nominal values.
*Maximum thinning for 250 g/l restricted areas is 6 oz/gal.

Dry Temp. Resistance Continuous: 350°F (177°C)
Non-Continuous: 370°F (190°C)

Wet Temp. Resistance Immersion temperature should not exceed 120°F (49°C).

Limitations Do not use for potable water requirements

Substrates & Surface Preparation

General Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.

Steel
Immersion: SSPC-SP10
Non-Immersion: SSPC-SP6
SSPC-SP2 or SP3 as minimum requirement.
Surface Profile: 2.0-3.0 mils (50-75 micron)

Concrete Concrete must be cured 28 days at 75°F (24°C) and 50% relative humidity or equivalent. Prepare surfaces in accordance with ASTM D4258 Surface Cleaning of Concrete and ASTM D4259 Abrading Concrete. Voids in concrete may require surfacing.

Performance Data

Test Method	System	Results	Report #
ASTM D4060 Abrasion	Blasted Steel 2 cts. 300M	130 mg. loss after 1000 cycles. CS17 wheel, 1000 gm load.	02877
ASTM D4541 Adhesion	Blasted Steel 2 cts. 300M	1443 psi (Pneumatic)	02877
ASTM D2794 Impact	Blasted Steel 2 cts. 300M	Impact site diameter. Inches: 3/8, 3/8, ½ 100 in/lbs Gardner Impactor at ½ in. diam.	02877
ASTM B117 Salt Fog	Blasted Steel 2 cts. 300M	No blistering, rusting or delamination. No measurable undercutting at scribe after 2000 hrs.	02938

Test reports and additional data available upon written request.

* Disclaimer: Bitumastic 300M is a proprietary formula that is not necessarily formulated to the exact compositional guidelines set forth in some of these standards. Minor deviations that control and improve application characteristics may be present, but does not have a detrimental effect on the suitability for use outlined therein.

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Bitumastic® 300M

Application Equipment

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.
General Guidelines:

Spray Application (General) This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. 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, with 50' maximum material hose .086" I.D. fluid tip and appropriate air cap.

Airless Spray

Pump Ratio:	30:1
GPM Output:	3.0 (min.)
Material Hose:	½" I.D. (min.)
Tip Size:	.023-.035"
Output PSI:	2100-2500
Filter Size:	30 mesh

Teflon packings are recommended and available from the pump manufacturer.

Brush & Roller (General) Recommended for touch up, striping of weld seams and hard-to-coat areas only. Avoid excessive re-brushing or re-rolling.

Brush Use a medium bristle brush.

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

Mixing & Thinning

Mixing Power mix separately, then combine and power mix for a minimum of two minutes. DO NOT MIX PARTIAL KITS.

Ratio 4:1 Ratio (A to B)

Thinning Up to 20 oz/gal (16%) w/ #10
Up to 25 oz/gal (20%) w/ #10 for the first coat application to concrete. Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Pot Life

75°F (24°C)	2 Hours
90°F (32°C)	1 Hour

Pot life ends when coating loses body and begins to sag.

Cleanup & Safety

Cleanup Use #2 Thinner or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Caution This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Normal	60-85°F (16-29°C)	60-85°F (16-29°C)	60-85°F (16-29°C)	0-80%
Minimum	50°F (10°C)	50°F (10°C)	50°F (10°C)	0%
Maximum	90°F (32°C)	125°F (52°C)	110°F (43°C)	90%

Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

Curing Schedule

Surface Temp. & 50% Relative Humidity	Dry to Touch	Minimum Recoat Time	Maximum Recoat Time	Cure for Immersion
50°F (10°C)	8 Hours	10 Hours	24 Hours	14 Days
75°F (24°C)	4 Hours	6 Hours	24 Hours	7 Days
90°F (32°C)	2 Hours	3 Hours	24 Hours	5 Days

These times are based on a 16.0 mil (400 micron) dry film thickness. Higher film thickness, insufficient ventilation, high humidity or cooler temperatures will require longer cure times. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. If the **maximum recoat time** is exceeded, the surface must be abraded by sweep blasting prior to the application of additional coats. **Holiday Detection** (if required): Wet sponge types may be used if the dry film thickness is below 20 mils (500 microns). High voltage spark testing should b e used when the dry film thickness exceeds 20 mils (500 microns). Refer to NACE RP0188-90 for specific procedures.

Force Curing (recommended for thicknesses above 24 mils)

150°F (65°C)	Hold substrate temperature at 150°F for 8 hours and material will be ready to handle and ready for immersion service.

Packaging, Handling & Storage

	1.25 Gallon Kit	5 Gallon Kit
Shipping Weight (Approximate)	12 lbs (6 kg)	50 lbs (26 kg)

Flash Point (Setaflash) 75°F (24°C) for Part A
>200°F (93°C) for Part B

Storage (General) Store Indoors.

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

Shelf Life Part A: Min. 24 months at 75°F (24°C)
Part B: Min. 36 months at 75°F (24°C)

***Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.**

carboline®

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