

1. DESCRIPTION:

- 1.01 This work shall consist of all preparation, cleaning, coating, etc. that is required to complete the work as shown on the plans or specified by the Engineer.

2. MATERIALS:

- 2.01 **Coatings and Thinner:** The coating system to be used shall be an active calcium sulfonate coating system supplied by one of the following manufacturers, or an approved equal.

Termarust Technologies
www.termarust.com

Praxis Technologies, Inc.
www.praxistechnologies.biz

- A. The above coating systems have been approved for use on this project. Performance characteristics of alternative products submitted shall meet or exceed those of the coating systems listed within this specification.
- B. The topcoat color shall match the existing bridge paint color.
- C. Lighting shall be equipped with explosion-proof fixtures.
- D. The accumulation of empty coating cans, combustibles, and other debris will not be permitted.
- E. MSDS sheets for all materials shall be maintained on file and provided to the Engineer prior to receipt of the material from the manufacturer.
- 2.02 **Coating Schedule:**

- A. **Termarust Technologies – high ratio, co-polymerized, calcium sulfonate coating system:**
The following steps are to be done one after the other, wet on wet, with no waiting time between applications of the materials.

	Product(s)	Dry Film Thickness (DFT)
Apply liberally to crevices and joints and/or spaces where a gap has been created between plates and around rivets, bolts, nuts and washers.	TR2200	Thoroughly wet surfaces
Liberally apply a stripe coat – to crevice corroded and pack rusted joints and connections, provide extra material to bolts, nuts and any gaps around rivets	TR2100	15-18 mils (wet) 10-12 mils (dry)
Over exposed metal areas and areas of tightly adhered contaminate free rust or flash rust apply a spot prime, including areas mentioned in previous SPOT application.	TR2100	7-10 mils (wet) 5-7 mils (dry)
Apply an additional 5 to 7 mils DFT over the previously treated areas and as shown in the Contract Documents	TR2100	7-10 mils (wet) 5-7 mils (dry)

2. MATERIALS: (cont'd)**2.02 Coating Schedule:** (cont'd)**B. Praxis Technologies, Inc.**

	Product(s)	Dry Film Thickness (DFT)
Apply liberally to crevices and joints and/or spaces where a gap has been created between plates and around rivets, bolts, nuts and washers. Care should be taken to minimize putting Penetrant on surfaces other than in and around joints and connections. Excess Penetrant (on the surface) should be brushed out, primarily because excess Penetrant on the surface will make the surface look cosmetically poor.	Prax-Ten Penetrant	N/A
Liberally apply a stripe coat – to crevice corroded and pack rusted joints and connections, provide extra material to bolts, nuts and any gaps around rivets	Prax-Ten Topcoat	15-18 mils (wet) 10-12 mils (dry)
Over exposed metal areas and areas of tightly adhered contaminate free rust or flash rust apply a spot prime, including areas mentioned in previous SPOT application.	Prax-Ten Topcoat	7-10 mils (wet) 5-7 mils (dry)
Apply an additional 5 to 7 mils DFT over the previously treated areas and as shown in the Contract Documents	Prax-Ten Topcoat	7-10 mils (wet) 5-7 mils (dry)

2.03 Water Used in Surface Preparation: All water to be used in the surface preparation shall initially be potable water. Captured water shall be tested, transported and disposed of in accordance with Local, State and Federal regulations.

3. CONSTRUCTION DETAILS:**3.01 Contractor Qualifications:**

- A. All client/project lists shall include the names, addresses, and telephone numbers of contact persons.
- B. The Contractor or Subcontractor who will perform the cleaning and coating shall provide evidence of their qualifications in accordance with the requirements of SSPC-QP 1 and QP 2. A certificate from the SSPC's Painting Contractor Certification Program (PCCP) shall be provided as satisfactory evidence.
- C. The Contractor shall supervise and direct the work using the best skill and attention, and shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The Contractor will be responsible to see that the finished work complies with the Contract Documents.

3. CONSTRUCTION DETAILS: (cont'd)**3.01 Contractor Qualifications:** (cont'd)

- D. The Contractor shall keep a SSPC-3 Supervisor/Competent Person for Deleading Industrial Structures with current certification on the job at all times. The superintendent shall be the Contractor's representative at the site and shall have the authority to act on behalf of the Contractor. All communications given to the superintendent shall be binding upon the Contractor.

3.02 Manufacturer's Instructions: At least ten working days prior to the start of work the Contractor shall provide the Engineer with one copy of the coating manufacturer's current technical and safety data sheets for the materials/coatings furnished. Instructions, suggestions, and precautions contained in the data sheets shall be followed to the extent that they do not contradict the provisions of this specification.

3.03 Atmospheric Conditions:

- A. The temperature limitations of both the substrate to be coated and the ambient air shall be as recommended by the coating manufacturer. However, in no case shall coating work be performed when the substrate temperature is less than 36°F or greater than 104°F.
- B. No coating materials shall be applied when the relative humidity, in the immediate area to be coated, exceeds 99%, or there is a temperature-dew point temperature spread of less than 5°F.

3.04 Surface Preparation:

- A. Cleaning of the substrate will occur prior to the application of any stripe/primer. See drawings to determine location of structure components to be coated.
- B. Steel surfaces shall be prepared in accordance with Section 573-3.02 of the standard specifications with the following modifications and additions:
 - 1. Special attention must be paid to the crevice corroded joints and connections. Joints and connections must be flushed out during the cleaning process by pressure washing to the satisfaction of the Engineer.
 - 2. When it is expected (or confirmed by testing) that the surface of the steel is contaminated with soluble salts (e.g. chlorides, sulfates, or nitrates), the water used for pressure washing shall contain a soluble salt removing chemical –such as Chlor*Rid® (manufactured by CHLOR*RID International. www.chlor-rid.com (800-442-3217), or equal. [Note: Just washing with water is not adequate because the salts have a chemically and polar attraction to the steel.]

It is required that even if the joints and connections look dry – that they be blown dry with clean, dry, oil free, high pressure (100 psi) compressed air.

- C. Use the white blotter test in accordance with ASTM D4285 to verify the cleanliness of the compressed air used for blowout and drying. Conduct the test at least once per shift for each compressor system. Sufficient freedom from oil and moisture is confirmed if soiling and/or discoloration are not visible on the paper.

3. CONSTRUCTION DETAILS: (cont'd)**3.04 Surface Preparation:** (cont'd)

- D. If air is contaminated, change filters, clean traps, add moisture separators or filters, or make adjustments as necessary to achieve clean, dry air.
- E. Pack rust shall be removed as much as possible as determined by the Engineer from crevices or seams along the edges of metal to metal; contact surfaces. If necessary, supplemental hand or power tool cleaning shall be used to remove pack rust.
- F. If there is a question of whether all loose paint has been removed, adhesion testing of the remaining “tightly adhered” paint shall be done in accordance with ASTM D 4541-02 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers, with a minimum value of 300 psi.
- G. Prior to placing the subsequent coats, the Contractor will insure that the prior coat is clean of all foreign matter, such as grease, dirt, bird waste, etc., before application of the subsequent coat.
- H. Surface preparation found to be deficient will be repeated at the Contractor’s expense as directed by the Engineer.

3.05 **Mixing:** If required, coating shall be mixed in accordance with the coating manufacturer’s recommendations.

3.06 **Thinning:** The primer, stripe and other coats may be thinned only if recommended by the manufacturer, done in compliance with the manufacturer’s instructions, approved by the Engineer, and mixed in the presence of the Engineer. If recommended by the manufacturer and approved by the Engineer, a measuring cup shall be used in the addition of thinner to any coating and have graduation in ounces. No “eye balling” during addition of thinner to coating will be allowed. Coating mixed with thinner by “eye balling” will be subject to rejection by the Engineer as ruined material.

3.07 Coating Application:

- A. Provide paintbrushes, rollers, and spray equipment to conduct the work as specified in this Section.
- B. Provide specialized equipment as required for the coating of “Limited Access” areas and for the other difficult-to-clean areas. Specialized equipment may include, but is not limited to:
 - 1. Pole guns for spray coating.
 - 2. Mitts, daubers, or other methods to supplement brush application.
- C. Coating may be applied using spray, brush or roll methods as directed by the manufacturer, except that all stripe coating shall be finished using a brush.
- D. Complete protection from coating spatter, spillage, overspray, wind blown coating, or similar releases of coating shall be provided. Covers, tarps, mesh, and similar materials shall be placed around the work area to protect public and private property, pedestrian, vehicular, marine or other traffic, all portions of the bridge, highway appurtenances, waterways, and similar surrounding areas and property, upon, beneath, or adjacent to the structure.

3. CONSTRUCTION DETAILS: (cont'd)**3.07 Coating Application:** (cont'd)

- E. Spray coating will be permitted only within a containment that will contain all of the sprayed material, as approved by the Engineer.
- F. Penetrant/Sealer shall be applied liberally to all joints and connections, including around bolts, nuts and rivets where gaps exist. Care should be taken to minimize putting penetrant on surfaces other than in and around joints and connections. Excess penetrant (on the surface) must be brushed out, primarily because excess penetrant on the surface may retard curing of the topcoat and/or make the surface look cosmetically poor.
- G. Stripe coating will be required on the following girder bottom flange and web surfaces that have been cleaned: edges of plates, angles, connections (rivets and bolt heads) or other shapes, corners, crevices, back-to-back angles and built-up edges. The surfaces of existing steel members to which new steel may be connected (faying surfaces) shall also be cleaned and coated as herein described. The stripe coat shall have a band width of at least 4 in. to each side of the adjoining edges and is to completely coat the interior of all crevices. All stripe coating should be applied by spray, but immediately afterwards it must be 'brushed in' using a brush. No other method of coating application will be allowed for stripe coating.
- H. As soon as the penetrant/sealer has been applied, the self-priming topcoat may be applied into joints and connections, bolts, nuts and gaps around rivets. This application may be immediately followed by spot priming over bare steel and tightly adhered contaminant free rust.
- I. As soon as the stripe coat and spot prime have been applied, the 'finish' coat may be applied over all surfaces including tightly adhered, contaminant free, paint.
- J. Equipment – All of the following shall be provided throughout the duration of the work:
 - 1. Sling Psychrometer and Tables
 - 2. Inspection Mirror
 - 3. VIS 1-3 and 4 Standards
 - 4. Illuminated Magnifier
 - 5. Hypodermic Needle Pressure Gauge
 - 6. Calibration Standards (NIST Traceable)
 - 7. Air Thermometer, pocket type, 30°F to 100°F (two)
 - 8. Surface Thermometer, 30°F to 150°F (two)
 - 9. Wet Film Thickness, prong type (one)
 - 10. Positector 6000 F3 or equivalent fixed probe DFT (two)

3.08 Film Thickness:

- A. Stripe, spots, sealer, and finish coats shall be applied in sufficient quantity so as to produce the minimum specified Wet Film Thicknesses (WFT).

3. CONSTRUCTION DETAILS: (cont'd)**3.08 Film Thickness:** (cont'd)

- B. Because of the nature of active calcium sulfonate coatings, that they cure slowly, it is suggested that wet film measurements be used as criteria for **preliminary** acceptance of the coating. WFT measurements shall be determined as the job progresses and corrections shall be made during coating application.
- C. Dry film thicknesses should be determined using SSPC-PA2 – using a digital film thickness gage and a shim – after the coating has cured sufficiently to allow accurate measurements. [Note: Depending upon ambient air conditions, it may take more than one week before DFT measurements can be taken]

3.09 Recoating and Over-Coating: Areas failing to meet the specified wet film thickness (WFT) range shall be over-coated with the same coating to produce at least the total WFT required. Coating applied containing unauthorized thinners, coating applied to contaminated surfaces, and coating applied contrary to this Specification shall result in the re-cleaning and re-coating of the surface. The work of re-cleaning, re-coating or over-coating, if required, shall be performed within 10 days following notification by the Engineer and shall be done by the Contractor to the satisfaction of the Engineer, at no additional cost to the Owner.

3.10 Material Storage: Coating in storage shall be protected from damage and maintained between 40°F and 100°F. Coating shall be stored covered and off the ground to prevent damage by elements such as rain, etc... Any coating material found to be damaged or beyond its expiration date shown on the container shall be immediately removed from the project site and will be considered as ruined material.

A. Testing of Coating Samples:

- 1. The Owner reserves the right to conduct tests of the materials at any time, and any number of times during the period of field coating.
- 2. The Engineer may sample the coating(s) being used. A representative size sample of each component of coating(s) at the construction site will be transferred to metal containers, identified, sealed and certified in the presence of the Contractor.
- 3. Tests on coating samples may be performed by the Owner in order to confirm the manufacturer's test results submitted with each batch of material.
- 4. If the laboratory test results show that the material being used does not comply with the requirements specified in this Section, the Contractor may be directed to stop coating work and remove non-complying coating; pay for testing; re-coating surfaces coated with rejected coating; or remove rejected coating from previously coated surfaces if, upon re-recoating with specified coating, the two coatings are not compatible.

3.11 Repair of Damaged Coatings: All damaged coatings, new or existing, shall be repaired prior to project completion and acceptance in accordance with the above specifications for Re-Coating and Over-Coating and as directed by the Engineer, at no additional cost to the Owner.

3. CONSTRUCTION DETAILS: (cont'd)

- 3.12 **Engineering and Inspection:** The Engineer or his designated representative will inspect all phases of the work. The Contractor shall provide and maintain OSHA compliant access for the Engineer's inspectors. The presence of the Engineer/Inspector(s) shall not relieve the Contractor of the responsibility to provide adequate inspections of their own to assure compliance with this Specification.
- 3.13 **Coating Manufacturer's Representative:** The Contractor/Applicator shall make arrangements for a representative of the Coating Manufacturer to be present on-site to at least get the project started; to work together with the Contractor/Applicator and representatives of the owner; possibly including a third-party coating inspector – to provide comments and guidance that the cleaning, application and inspection procedures will properly be done – unless this is deemed not necessary, and approved by the Engineer.
- 3.14 **Staging and Safety:**
- A. Nothing in any section of this Specification shall be construed as relieving the Contractor from full responsibility for safe execution of the work at all times.
 - B. The Contractor shall confine apparatus, storage of materials, and work operations to the limits prescribed by ordinances or permits, or as may be directed by the Engineer/Owner and shall not unreasonably encumber the premises or any other functions or activities.
 - C. The Contractor shall not load any structure or permit any part thereof to be loaded to such an extent as to endanger its safety.
 - D. The Contractor shall comply with and enforce any instruction of the Engineer/Owner, or local laws regarding signs, advertising, fire, and smoking.
 - E. The Contractor shall keep the premises clean of trash and combustible materials. Upon completion of the work, Contractor shall remove all temporary construction facilities and unused materials provided for the work.
 - F. The Contractor shall provide all electrical services needed.
- 3.15 **Warranty:**
- A. The Coating Manufacturer and the Contractor/Applicator shall jointly warrant the coating and its application against all defects in material and workmanship for the entire project, which will commence on the date indicated on the Certificate of Substantial Completion.
 - B. The Contractor/Applicator shall supply a letter from the coating Manufacturer stating that the Manufacturer will jointly execute an agreement to provide a Joint Five-Year Coating System Failure Warranty. **NOTE:** The first two (2) years of the warranty shall be a 'bonded warranty' and the remaining three (3) years may be only a Coating Manufacturer/Contractor warranty.
 - C. Upon completion and final acceptance of the work (or) project, the Engineer/Owner will receive from the Contractor/Applicator the "Joint Five-Year Coating System Failure Warranty." The warranty, jointly executed by the Contractor/Applicator and the coating system Manufacturer, will be forwarded to the Owner before final payment by the Owner is released.

3. CONSTRUCTION DETAILS: (cont'd)**3.15 Warranty:**

- D. Intermediate inspections by the Owner may be made and warranty repairs claimed and completed by the Contractor/Applicator each year of the Five-Year Warranty period. However, at least sixty (60) days prior to the warranty's expiration, the Owner will inspect the coating system and advise the Contractor/Applicator, in writing, of any defects or repairs that are required.
- E. Failure of the coating system shall include, but not be limited to:
- Any debonding or failure of adhesion of the coating either to the structural steel or inter-coat adhesion.
 - The appearance of any rust stains on the structure due to loss of coating.
 - Failure of the coating to resist chipping due to traffic-thrown sand or road debris.
 - Any loss of normal gloss or rapid change in color of the coating.
 - Damage to the coating due to vehicle impact, snow removal equipment, other mechanical devices and chemical spills will not constitute failure of the system.
 - Within the first two (2) years of completion of the work, any sign of rust bleeding through existing intact coating film.
 - From years three (3) through five (5) of the warranty period, any surface rusting greater than 0.03% (SSPC Vis. 2 Rust Grade 9) of the total area of any structural element or component, i.e., floorbeam, girder flange, girder web, etc.
- F. Repair under warranty includes the material, labor and equipment costs necessary to restore the coating to acceptable condition.
- G. Warranty repairs shall be completed within 45 days of notification, or if this would place the repair in winter weather conditions, by May 30 of the following year.

3.16 Submittals: Contractor shall provide prior to commencing operations:

- A. Coating Manufacturer's Product Data Sheets
- B. Coating Manufacturer's Available Colors
- C. Coating Manufacturer's MSDS (Material Safety Data Sheets)
- D. Documentation of current status with SSPC QP 1 and 2

3.17 References:

American Society for Testing Materials
 ASTM D4285 Standard Test Method for Indicating Oil or Water in Compressed Air
 ASTM D4414 Standard Practice for Measurement of Wet Film Thickness by Notch Gages
 ASTM D4417 Standard Test Methods for Field Measurement of Surface Profile Blast Cleaned Steel

4. METHOD OF MEASUREMENT:

- 4.01 The measurement of this item will include the area requiring overcoating, measured to the nearest whole square foot.

5. BASIS OF PAYMENT:

- 5.01 The unit price bid shall include the cost of all labor, materials and equipment necessary to complete the work. All work shall be done in a manner satisfactory to the Engineer.
- 5.02 Progress payments will be made. They will be based upon the number of work days required to complete all of the work of cleaning and coating.
- 5.03 Prior to the beginning of any work, the Contractor shall supply the Engineer with an initial estimate of work days required to complete all of the work. This initial estimate shall not be considered final. The Engineer may request a revised estimate at any time during the progress of the work. The Engineer will determine a daily rate of payment using the estimate of work days and the unit bid price. The daily rate will be used to authorize payment in accordance with the Contract Documents.
- 5.04 Should the Engineer request a revised estimate and use that estimate to establish a new daily rate, the unit bid price shall be reduced by the total of the amounts previously authorized for payment, prior to the establishment of the new daily rate. Failure on the part of the Contractor to supply a revised estimate when requested will be cause for the progress payment procedure to be immediately terminated.
- 5.05 Progress payments for this work will be made only for days during which cleaning, coating work is actually performed.