PIE CTSE1000
Application of External Coatings
PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determinations concerning fitness for purpose and particular matters or application of the Practice to particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

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Data Forms
   CTSE1000-D1 – Documentation Requirements Sheet
   The following data forms shall be part of this Practice only if indicated on the purchaser’s completed Documentation Requirements Sheet.
   CTSE1000-D2 – Color Selection Sheet
   CTSE1000-D101 - External Coating Systems, Coating System No. 1, Inorganic Zinc IZ
   CTSE1000-D102 - External Coating Systems, Coating System No. 2, Inorganic Zinc/Epoxy Polyamide IZ/EC
   CTSE1000-D103 - External Coating Systems, Coating System No. 3, Epoxy Polyamide (3 Coats) EC/EC/EC
   CTSE1000-D104 – External Coating Systems, Coating System No. 4, Epoxy Phenolic EP
   CTSE1000-D106 – External Coating Systems, Coating System No. 6, Epoxy Polyamide/Urethane EC/UR
   CTSE1000-D107 – External Coating Systems, Coating System No. 7, Coal Tar Epoxy (2 Coats) TE/TE
   CTSE1000-D108 – External Coating Systems, Coating System No. 8, Inorganic Zinc/Water-Borne Acrylic IZ/WA
   CTSE1000-D109 – External Coating Systems, Coating System No. 9, Alkyd (3 Coats) OA/OA/OA
   CTSE1000-D110 – External Coating Systems, Coating System No. 10, Inorganic Zinc/Silicone Acrylic (2 Coats) IZ/SA/SA
CTSE1000-D111 – External Coating Systems, Coating System No. 11, Silicone for Stainless Steel (2 Coats) SS/SS

CTSE1000-D112 – External Coating Systems, Coating System No. 12, Heat-Cured Silicone (2 Coats) HS/HS

CTSE1000-D113 – External Coating Systems, Coating System No. 13, Epoxy Mastic for Manufacturer’s Standard EM

CTSE1000-D114 – External Coating Systems, Coating System No. 14, Inorganic Zinc/Heat-Cured Silicone (2 Coats) IZ/HS/HS

CTSE1000-D115 – External Coating Systems, Coating System No. 15, Inorganic Zinc/Epoxy Mastic/Urethane IZ/EM/UR

CTSE1000-D116 – External Coating Systems, Coating System No. 16, Low Temperature Curing Epoxy (2 Coats) EL/EL

CTSE1000-D117 – External Coating Systems, Coating System No. 17, Polysiloxane (2 Coats) PX/PX

CTSE1000-D118 – External Coating Systems, Coating System No. 18, Epoxy Mastic (2 Coats)/Urethane EM/EM/UR

CTSE1000-D119 – External Coating Systems, Coating System No. 19, Epoxy Novolac (2 Coats) EN/EN

CTSE1000-D120 – External Coating Systems, Coating System No. 20, Epoxy Phenolic (2 Coats) EP/EP

CTSE1000-D121 – External Coating Systems, Coating System No. 21, Organic Zinc/Urethane OZ/UR

CTSE1000-D122 – External Coating Systems, Coating System No. 22, Epoxy Mastic/Water-Borne Acrylic EM/WA

CTSE1000-D123 – External Coating Systems, Coating System No. 23, Epoxy Mastic/Epoxy Polyamide EM/EC

CTSE1000-D124 – External Coating Systems, Coating System No. 24, Epoxy Mastic/Urethane EM/UR

CTSE1000-D125 – External Coating Systems, Coating System No. 25, High Build Epoxy (2 Coats)/Urethane EH/EH/UR

CTSE1000-D126 – External Coating Systems, Coating System No. 26, Coal Tar Epoxy (1 Coat) TE

CTSE1000-D127 – External Coating Systems, Coating System No. 27, Thermal Spray Aluminum/Silicone Sealer - Aluminum TSA/SSA

CTSE1000-D128 – User-Defined Coating Systems

CTSE1000-D129 – External Coating Systems, Coating System No. 28, Epoxy Novolac EN

CTSE1000-F – Daily Inspection Report
1. **Introduction**

1.1 **Purpose**

This Practice provides requirements for the application of industrial external coatings.

1.2 **Scope**

This Practice describes the general requirements for surface preparation, application, and inspection of protective coatings.

2. **References**

Applicable parts of the following Practice, industry codes and standards, and references shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles will be used herein where appropriate.

2.1 **Industry Codes and Standards**

- American Society for Testing and Materials (ASTM)
  - ASTM D3359 – Standard Test Methods for Measuring Adhesion by Tape Test
  - ASTM D4285 – Standard Test Methods for Indicating Oil or Water in Compressed Air
  - ASTM D4417 – Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
- Society of Protective Coatings (SSPC)
  - SSPC-AB 1 – Mineral and Slag Abrasives
  - SSPC-PA 1 – Shop, Field, and Maintenance Painting
  - SSPC-PA 2 – Measurement of Dry Paint Thickness with Magnetic Gages
  - SSPC-SP 1 – Solvent Cleaning
  - SSPC-SP 2 – Hand Tool Cleaning
  - SSPC-SP 3 – Power Tool Cleaning
  - SSPC-SP 7/NACE No. 4 – Brush-Off Blast Cleaning
  - SSPC-SP 11 – Power Tool Cleaning to Bare Metal
  - SSPC-VIS 1-89 – Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs)
- INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)
  - ISO 2178: Non-magnetic coatings on magnetic substrates - Measurement of coating thickness - Magnetic method
- ISO 2360: Non-conductive coatings on non-magnetic electrically conductive basis materials - Measurement of coating thickness - Amplitude-sensitive eddy current method
- ISO 2409: Paints and varnishes - Cross-cut test
- ISO 4624: Paints and varnishes Pull-off test for adhesion
- ISO 4677-2: Atmospheres for conditioning and testing - Determination of relative humidity - Part 2: Whirling psychrometer method
- ISO 8501-1: Preparation of Steel Substrates before Application of Paints and Related Products - Visual Assessment of Surface Cleanliness - Part 1: Rust Grades and Preparation Grades of Uncoated Steel Substrates and of Steel Substrates after Overall Removal of Previous Coatings
- ISO 8503-5: Preparation of Steel Substrates before Application of Paints and Related Products - Surface Roughness Characteristics of Blast-Cleaned Steel Substrates - Part 5: Replica tape method for the determination of the surface profile
- ISO 8573: Compressed air
- ISO 11126: Preparation of Steel Substrates before Application of Paints and Related Products - Surface Preparation Methods (10 Parts)
- ISO 12944-4: Paints and Varnishes - Corrosion Protection of Steel Structures by Protective Paint Systems - Part 4: Types of Surface and Surface Preparation
- ISO 12944-7: Paints and Varnishes - Corrosion Protection of Steel Structures by Protective Paint Systems - Part 7: Execution and Supervision of Paintwork

2.2 Other References

- National Institute of Occupational Safety and Health (NIOSH)
  - NIOSH Publication No. 92-102 – NIOSH Alert: Request for Assistance in Preventing Silicosis and Deaths from Sandblasting

3. Definitions

CS: Carbon and low-alloy steel
DFT: Dry film thickness
SS: Austenitic stainless steel
nonferrous: Copper, aluminum
owner: Party who owns the facility wherein the coating system will be used
purchaser: Party who awards the contract to the supplier. The purchaser may be the owner or the owner’s authorized agent.
supplier: Party responsible for furnishing and/or installing the coating system
4. Requirements

4.1 General

4.1.1 Project Scope

4.1.1.1 Documents required to define the scope of work are listed on purchaser’s data sheet CTSE1000-D1.

4.1.1.2 If selected on purchaser’s documentation requirements sheet PIP CTSE1000-D1, data sheets CTSE1000-D101 through CTSE1000-D127 shall be used to define specific requirements for each coating system.

4.1.1.3 Surface preparation, application, and materials shall be in accordance with the purchaser’s external coating system data sheets.

4.1.1.4 Coating materials used in the same system shall be supplied by the same manufacturer, unless otherwise approved by the purchaser.

4.1.1.5 Finish color requirements shall be in accordance with purchaser’s data sheet CTSE1000-D2.

4.1.2 Conflicts, Exceptions, Deviations, and Substitutions

4.1.2.1 All conflicts between the referenced documents and this Practice shall be submitted in writing to purchaser for clarification and resolution before proceeding with the coating application.

4.1.2.2 All exceptions, deviations, and substitutions to the requirements specified herein and in referenced documents shall be approved by the purchaser.

4.1.3 Regulations and Material Safety Data Sheets (MSDS)

4.1.3.1 Protective coating applications shall comply with all applicable federal, state, and local codes and regulations on surface preparation, coating application, storage, handling, safety, and environmental requirements, including the recommendations of SSPC-PA Guide 3.

4.1.3.2 The latest issue of the coating manufacturer’s product data sheets, application instructions, and MSDS shall be available at the painting site and complied with during painting operations.

4.2 Procedures

4.2.1 Surfaces not to be Coated

4.2.1.1 Unless specified otherwise, the following surfaces shall not be coated:

a. Interior surfaces of piping and equipment
b. Nonferrous metals
c. Galvanized or metallized surfaces
d. Insulation jacketing
e. Nonmetallic materials such as wood, tile, brick, concrete, and thermoplastics
f. Cast iron products such as manhole covers and grating
4.2.1.2 The following surfaces shall not be coated and shall be protected from surface preparation and painting activity in the area:
   a. Valve stems, flange faces, and other machined contact surfaces
   b. Internal surfaces of valves
   c. Electrical contact points
   d. Nameplates and identification tags
   e. Glass surfaces of gage glasses and sight glasses
   f. Resilient seal materials
   g. Gasket contact surfaces
   h. Equipment identification
   i. Inspection point identification markers

4.2.2 Precautions for Stainless Steel and Nonferrous Metals

4.2.2.1 All SS and nonferrous metals shall be protected from blasting, overspray, and coatings intended for CS, especially coatings containing zinc.

4.2.2.2 Abrasives for use on SS shall be in accordance with SSPC-AB 1 or ISO 11126, natural abrasives (except silica sand) as well as coal furnace slag and fused aluminum oxide and shall be free of metals.

4.2.2.3 If hand or power tool cleaning is required on SS and nonferrous metals, only SS wire brushes that have not been previously used on CS surfaces shall be used.

4.2.2.4 Coatings and solvents for use on SS and nonferrous metals shall be free of substances such as chlorides, sulfur, halogens, or metallic pigments that can harmfully affect SS or nonferrous metals.

4.2.2.5 For items having dual materials of construction, coatings containing zinc shall not overlap onto SS or nonferrous metals, including the SS to CS weld. Examples of such applications include:
   a. CS saddles and skirts on SS equipment
   b. SS piping within CS skirts
   c. SS nozzles, flanges, and piping on clad equipment
   d. Miscellaneous CS clips and brackets on SS equipment
   e. SS components in CS piping systems
   f. CS trunnions on SS piping and equipment
   g. CS flange rings on SS lap joint flanges

4.2.2.6 CS lap joint flanges shall be coated before assembly.

4.2.2.7 Color-coding and fabrication markings applied directly onto SS and nonferrous metals shall be applied with low-chloride markers.
4.3 Surface Preparation

4.3.1 Preparation for Blasting

4.3.1.1 All welds shall be relatively smooth, without sharp edges, and free of weld slag and weld spatter before blasting. Purchaser shall be notified of such defects for corrective action before proceeding with work.

4.3.1.2 Unless approved in writing by purchaser, neither welding nor grinding, including cosmetic grinding, shall be permitted on the pressure-resisting components and welds of pressure vessels and piping after hydrostatic testing.

4.3.1.3 Before blasting, all visible deposits of oil and grease shall be removed using the methods defined in *SSPC-SP 1 or ISO 12944-4*.

4.3.1.4 High-pressure water jetting or steam cleaning may be used to remove oil, grease, and other surface contaminants.

4.3.1.5 Presence of oil shall be checked either by rubbing a clean white cloth on the steel surface or by sprinkling water on the steel surface.

*Comment:* If oil or grease is present, the water will not spread out but will form beads.

4.3.2 Abrasive Blasting

4.3.2.1 Abrasive blast cleaning shall be performed with a clean, sharp grade of abrasive.

4.3.2.2 Grain size shall be suitable for producing the specified anchor profile.

4.3.2.3 All abrasives shall be free of dust, dirt, and other foreign matter and shall be kept dry at all times.

4.3.2.4 Silica or other abrasive substances containing more than 1 percent crystalline silica shall not be used as an abrasive blasting material. Refer to *NIOSH Publication No. 92-102*.

4.3.2.5 Only designed ventilation and containment shall be used to protect personnel.

4.3.2.6 If automatic blasting equipment is used, the abrasive mix shall be maintained so that a consistently sharp profile is produced.

4.3.2.7 Air supply compressors shall be equipped with adequately sized and properly maintained oil and water separators.

4.3.2.8 Air compressors shall be capable of maintaining 690 kPa (100 psig) minimum at the nozzle.

4.3.2.9 Air compressors shall be equipped with either dryers or aftercoolers to remove entrained moisture from the compressed air.

4.3.2.10 Abrasive blast cleaning shall not be performed if the ambient or substrate temperature is less than 3°C (5°F) above the dew point temperature.
4.3.2.11 Dew point temperature shall be determined by sling psychrometer in accordance with ASTM E337 or ISO 4677-2, at the location where work is being performed.

4.3.2.12 Substrate temperature shall be determined with a surface thermometer.

4.3.2.13 Blast-cleaned surfaces that show evidence of rust bloom or that have been left uncoated overnight shall be recleaned to the specified degree of cleanliness before coating.

4.3.2.14 All visible burrs, laminations, slivers, and scabs shall be removed or repaired after blasting.

4.3.2.15 After blasting and immediately before spraying, dust and loose residues shall be removed by brushing, blowing off with clean dry air, or vacuum cleaning.

4.3.2.16 Inhibitive washes intended to prevent rusting after blasting shall not be permitted.

4.3.2.17 Alternative forms of surface preparation shall not be used without written approval from the purchaser.

4.3.3 Degree of Cleanliness and Anchor Profile

4.3.3.1 Degree of cleanliness and anchor profile shall be as required for the specified coating system.

4.3.3.2 All blast-cleaned surfaces shall be inspected for proper cleaning before painting. SSPC-VIS 1 or ISO 8501-1 shall be used as a visual standard for confirming the degree of surface cleanliness.

4.3.3.3 Anchor profile shall be verified in accordance with ASTM D4417, Method C. Anchor profile may also be verified in accordance with ISO 8503, when approved by purchaser.

4.3.4 Hand or Power Tool Cleaning

If specified, hand tool or power tool cleaning shall be in accordance with SSPC-SP 11. SSPC-SP 2 or ISO St 2, SSPC-SP 3 or ISO St 3 may be used if SSPC-SP11 is not practical, when approved by purchaser.

4.4 Application

4.4.1 General

4.4.1.1 Application shall be in accordance with SSPC-PA 1 or ISO 12944-7, the coating manufacturer’s published application instructions, MSDS, and the requirements specified herein.

4.4.1.2 All application equipment shall be provided as recommended by the coating manufacturer, shall be clean and in good condition, and shall be suitable for applying the coating as specified.

4.4.2 Temperature, Humidity, and Weather Conditions

4.4.2.1 Paint shall not be applied while any of the following conditions are present or expected before the paint dries:
a. Temperature: Ambient, substrate, or coating material temperatures are above 49°C (120°F), below 10°C (50°F), or outside the range recommended by the coating manufacturer.

b. Humidity: The ambient or substrate temperature is less than 3°C (5°F) above the dew point or outside the range recommended by the coating manufacturer. Dew point temperature shall be determined by sling psychrometer in accordance with ASTM E337, ISO 4677-2, or equivalent electronic device at the location where work is being performed.

c. Wind: During strong or gusty wind conditions, particularly for spray application.

d. Weather: During rain, snow, or fog or on damp surfaces or surfaces that may have frost.

4.4.3 Materials

4.4.3.1 Coating materials shall be in accordance with purchaser’s external coating system data sheets.

4.4.3.2 All solvents used for thinning shall be in accordance with the coating manufacturer’s recommendations.

4.4.3.3 Coating materials shall be furnished in the coating manufacturer’s unopened containers, clearly marked, and kept covered, clean, and protected.

4.4.3.4 All materials shall be handled and stored in accordance with the coating manufacturer’s latest published instructions and SSPC-PA 1 (ISO 12944-7).

4.4.3.5 Equipment fabricators shall indicate on their drawings the coating manufacturer and coating product numbers used.

4.4.4 Mixing and Thinning

4.4.4.1 Materials shall be mixed and thinned in accordance with the coating manufacturer’s written instructions.

4.4.4.2 All mixing shall be done in clean containers that are free from grease, paints, and other contaminants. Containers shall be kept covered to prevent contamination by dust, dirt, or rain.

4.4.4.3 Mixing of partial kits shall not be permitted.

4.4.4.4 Inorganic zinc primers and all pigmented coatings shall be strained before application in accordance with the coating manufacturer’s written instructions.

4.4.4.5 Thinning shall not exceed the maximum allowable volatile organic compound (VOC) level for the coating involved.

4.4.5 Shelf and Pot Life

4.4.5.1 Materials that have exceeded the coating manufacturer’s recommended shelf life shall not be used.
4.4.5.2 Coating manufacturer’s recommended pot life shall not be exceeded. If this limit is reached, the spray pot shall be emptied and cleaned, and new material shall be mixed.

4.4.6 Priming
4.4.6.1 Primers shall be applied before flash rusting or other contamination occurs.
4.4.6.2 Previously coated surfaces shall be protected from contamination and overspray.
4.4.6.3 Primer shall have a uniform thickness over welds, edges, and corners and shall be free of mud cracking.
4.4.6.4 Primer shall not be applied within 100 mm (4 inches) of unblasted surfaces or 50 mm (2 inches) from the edges to be field welded.
4.4.6.5 Inorganic zinc primer shall be applied using an agitated pot.

4.4.7 Topcoating
4.4.7.1 Each coat of paint shall be of a contrasting color to indicate the extent of coverage.
4.4.7.2 Each coat of multiple-coat systems shall be allowed to cure sufficiently in accordance with the coating manufacturer’s directions before topcoating.
4.4.7.3 Minimum drying time between coats shall be in compliance with the coating manufacturer’s instructions.
4.4.7.4 If the maximum recoat time has been exceeded, previously applied coatings shall be roughened before topcoating or treated in accordance with the coating manufacturer’s directions.
4.4.7.5 Before topcoating over an inorganic zinc primer, the cure of the primer shall be verified.
4.4.7.6 Inorganic zinc primers shall have all overspray removed with a stiff bristle brush or wire screen and shall be clean and thoroughly cured before topcoating.
4.4.7.7 If spray applying over inorganic zinc primers, a mist coat shall be used to avoid bubbling. The mist coat may be a thinned coat or applied by a quick pass of the spray gun before applying the full coat, but sufficient time shall be allowed for solvent evaporation.

4.4.8 Film Thickness
4.4.8.1 Wet film thickness shall be checked during the application of each coat to assure the specified dry film thickness (DFT) is met.

Comment: Wet film thickness measurements are not suitable for some materials such as inorganic zinc primers, flake filled epoxies, etc.
4.4.8.2 The DFT of each coat on CS shall be checked in accordance with the procedures defined by SSPC-PA 2 using a magnetic gage that has been properly calibrated.
4.4.8.3 Coating thickness on nonmagnetic substrates shall be checked using a Type 2 gage suitable for use on nonferrous substrates.

4.4.8.4 Coating thickness may also be measured using ISO 2178 for nonmagnetic coatings on magnetic substrates or ISO 2360 for coatings on non-magnetic substrates. However, sampling procedures shall follow SSPC-PA 2.

4.4.8.4 Measurements shall be taken after removal of dry spray and overspray.

4.4.8.5 All gages shall be adjusted to compensate for the substrate effect before application of any coating.

4.4.9 Defects

4.4.9.1 Each coat of paint shall be of a uniform film, free of defects (e.g., pinholes, voids, bubbles, skips, runs, sags, blisters, wrinkles, and mud cracking), and of a uniform thickness and appearance.

4.4.9.2 Care shall be exercised to prevent overspray, spillage, or application of coatings to surfaces for which they are not intended. Dry spray and overspray shall be removed.

4.4.9.3 DFT of each coat shall not be outside the specified range.

4.4.10 Touch-Up

4.4.10.1 Before application of any coat, all defects and damage to the previous coat(s) shall be repaired. Damage to finished work shall be thoroughly cleaned and recoated.

4.4.10.2 Damaged areas shall be spot-blast cleaned, power tool cleaned, or hand tool cleaned as necessary to restore any exposed steel to an original degree of cleanliness. All loose, cracked, and damaged coating shall be removed and the adjacent sound coating feathered back approximately 50 mm (2 inches) to form a uniform and smooth surface. Feathering shall be done by hand or power sanding with a grit wheel or sandpaper. The prepared surface shall be free of loose, burnt, or blistered coating.

4.4.10.3 Unless specified otherwise, the coating used for repair shall be the same as the original and shall have the same DFT.

4.4.11 Job Stencil

4.4.11.1 After the coating system has been applied in the shop or field, if specified by the purchaser, a job stencil shall be applied in a prominent location to identify the coating system used.

4.4.11.2 Stencil shall be of 25 mm (1 inch) high letters of a color contrasting with the finished paint.

4.4.11.3 Stencil shall provide the following information:

a. Top line shall be used for the PIP External Coatings Systems Document Number.

b. Second line shall be used for SSPC surface preparation.
c. Next line(s) shall be used for each coat of paint, followed by the date of application (month and year).

d. Last line shall be the name of the shop or field coating contractor.

4.4.11.4 If there are a large number of structural shapes, a job stencil shall be applied to about 10 percent of the pieces.

4.4.11.5 Small pieces such as lap flanges, hangers, etc. shall not be stenciled.

4.5 Inspection

4.5.1 General

4.5.1.1 All inspections and tests shall be performed that are necessary to ensure that surface preparation and coating application comply with the requirements of this Practice.

4.5.1.2 Purchaser’s inspector(s) shall be given adequate notice before the start of surface preparation and coating application to witness the work.

4.5.1.3 Purchaser’s inspector(s) shall have the option to witness or repeat any of these functions as necessary.

4.5.1.4 All materials, equipment, and work shall be available to purchaser’s inspector(s) at all times.

4.5.1.5 Purchaser’s inspector(s) shall have access to the work site during the progress of the work and the right to conduct any inspection or testing deemed necessary to ensure that the coatings are properly applied.

4.5.1.6 All instruments used in inspection activities (e.g., thermometer, pyrometers, hygrometers, thickness gauges, profile gauges, and holiday detectors) shall be furnished in proper working order and calibrated before use.

4.5.1.7 Dew point, relative humidity, and surface temperature shall be determined before surface preparation. Readings are required at 4-hour intervals or at other time intervals approved by the purchaser.

4.5.1.8 Alternatively, continuous monitoring of dew point and relative humidity may be performed using systems established or accepted by the purchaser.

4.5.1.9 Substrate temperature shall be 3°C (5°F) minimum above the dew point.

4.5.1.10 Work shall not proceed if the ambient temperature or relative humidity is not in accordance with Section 4.4.2.

4.5.1.11 Air supply for blast cleaning, pneumatic tools, and spray equipment shall be tested for oil and water contamination in accordance with ASTM D4285 or applicable parts of ISO 8573, and as follows:

a. All lines shall be tested separately.

b. Testing shall be performed at the beginning and end of each work shift and at not less than 4-hour intervals.
4.5.1.12 If contamination is discovered:
   a. All necessary corrective actions shall be made and the air supply retested.
   b. Surfaces determined to have been blasted with contaminated air shall be cleaned with solvent and reblasted with clean air and abrasive.
   c. Coatings determined to have been applied using contaminated air shall be removed and reapplied using clean air.

4.5.1.13 Recirculated shot and grit used for abrasive cleaning shall be tested for the presence of oil by immersing in water and checking for oil flotation. Tests shall be made at the start of blasting, at 4-hour intervals thereafter, and at the end of blasting.

4.5.1.14 If oil contamination in the abrasive is evident:
   a. Contaminated abrasive shall be replaced with clean abrasive and retested before proceeding.
   b. All steel blasted since the last satisfactory test shall be reblasted.

4.5.1.15 Abrasive-cleaned surfaces shall be inspected for proper surface cleanliness and anchor profile using SSPC or ISO 8501-1 visual comparators.

4.5.1.16 Surface preparation anchor profile shall be verified using either coarse or extra-coarse replica tape (as required by profile depth) and a spring-loaded micrometer in accordance with ASTM D4417, Method C. Anchor profile may also be verified in accordance with ISO 8503-5, when approved by purchaser.

4.5.1.17 SSPC-VIS 1 or ISO 8501-1 visual standards shall be used for confirming the degree of surface cleanliness if adequacy of cleaning is in question.

4.5.1.18 If coating adhesion or intercoat adhesion are of suspect quality, the adhesion shall be checked periodically.

4.5.1.19 Adhesion may be assessed by means of portable pull-off adhesion tester in accordance with ASTM D4541 or ISO 4624 or one of the appropriate tape tests in accordance with ASTM D3359 or ISO 2409.

4.5.1.20 Adhesion test method shall be approved by the purchaser.

4.5.1.21 Acceptable adhesion classifications or pull-off strengths shall be in accordance with coating material manufacturer’s recommendations and approved by the purchaser.

4.5.1.22 Completed paint job shall pass inspection by the purchaser’s inspector(s).

4.5.1.23 Any work found not to be in accordance with the requirements specified herein shall be corrected.

4.5.2 Inspection Checklist

4.5.2.1 Prepainting Inspection
   1. Verify that coating, thinning, and blasting materials are as specified.
2. Verify that storage conditions for all materials are adequate and properly maintained.

3. Verify that surfaces not to be coated are masked off or otherwise protected before surface preparation and coating application of adjacent surfaces.

### 4.5.2.2 Presurface Preparation

1. Verify that oil and grease are removed before surface preparation.

2. Verify that welds and sharp edges have been suitably prepared.

### 4.5.2.3 Surface Preparation

1. Verify that the air supply is clean and free of oil and moisture.

2. Verify the cleanliness and dryness of abrasives.

3. Verify the adequacy of cleaning and blasting equipment, hoses, etc.

4. Verify that ambient, substrate, and dew point temperatures are appropriate for proper surface preparation.

5. Verify that visible burrs, slivers, scabs, and weld spatter have been removed after blasting.

6. Verify the degree of surface cleanliness and that contaminants have been removed.

7. Verify, using appropriate instruments, that the anchor profile is as specified.

### 4.5.2.4 Coating Application

1. Verify that materials are as specified, that materials are properly labeled, and that the shelf life has not been exceeded.

2. Verify that mixing, thinning, and induction times are in accordance with the coating manufacturer’s instructions.

3. Verify that the proper application equipment is being utilized.

4. Verify that the air supply is clean and free of oil and moisture.

5. Verify that the ambient, substrate, and dewpoint temperatures are appropriate.

6. Verify that the applicator is checking wet film thickness during application.

7. Verify that coating manufacturer’s requirements regarding recoat time are observed.

8. Verify that the previous coat is sufficiently cured before application of topcoats.

9. Visually inspect each coat for defects and uniform appearance.

10. Verify, by following the procedures of *SSPC-PA 2*, that the DFT is within the specified range after each coat.
4.5.2.5 Final Acceptance

1. Visually inspect the coated surface for defects and uniform appearance.
2. Verify, by following the procedures of SSPC-PA 2, that the total DFT is within the specified range.
3. Verify that all identified repairs have been properly made.
4. Verify that the coating system is cured.

4.5.3 Records

4.5.3.1 A Daily Inspection Report, PIP CTSE1000-F, for documenting that specified requirements have been met shall be completed for each work shift.

4.5.3.2 Supplier’s forms may be used with prior approval by purchaser.

4.5.3.3 A log shall be maintained of all reports, inspections, and tests (including date, time, and results of instrument calibrations).

4.6 Shipping, Handling, and Storage

4.6.1 Coated items shall not be handled or moved until all coatings have been properly dried or cured in accordance with the coating manufacturer’s instructions.

4.6.2 Coated items shall be handled with equipment such as wide belt slings, web belts, and wide padded skids selected to prevent damage to the coating.

4.6.3 Handling equipment likely to cause damage to the coating shall not be used. Items such as chains, cables, hooks, tongs, metal bars, and narrow skids shall not be permitted to come in contact with the coating.

4.6.4 Dragging or skidding coated pipe shall not be permitted.

4.6.5 Coated items shall be loaded, padded, and secured for transport in a manner such that the coating will not be damaged in transit.

4.6.6 Coated items shall be separated so that the items do not bear against each other.

4.6.7 Coated items shall be stacked off the ground using suitable means (e.g., parallel height ridges of rock-free sand, wooden timbers placed under the uncoated pipe ends, etc.) to avoid damage to the coating.
<table>
<thead>
<tr>
<th>PIP DOC NUMBER/ PROJ DOC NUMBER</th>
<th>TITLE</th>
<th>REV</th>
<th>DATE</th>
<th>NOTES</th>
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<td>DAILY INSPECTION REPORT</td>
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<td>Epoxy Phenolic</td>
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<td>CTSE1000-D126</td>
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<td>REV</td>
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<td>Epoxy Novolac</td>
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<th>REVISION DESCRIPTION</th>
<th>BY</th>
<th>CHECKED</th>
<th>APPROVED</th>
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PROJECT NO.                   PROJECT DOCUMENT NO.
FACILITY NAME
LOCATION

<table>
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<th>ITEM</th>
<th>COLOR</th>
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NOTES:
DESCRIPTION:
Inorganic zinc coating.

SURFACES:
Carbon steel. Do not apply to stainless steel or nickel alloy surfaces.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 μm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

**International Organization for Standardization (ISO)**

**The Society for Protective Coatings (SSPC)**
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

<table>
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<tr>
<th>SYSTEM</th>
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<td><strong>Coat No.</strong></td>
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<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>Total:</td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

**Notes:**
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

**Mixing and Thinning:** Mix according to manufacturer’s instructions and SSPC PA-1.

**Application:** Apply according to manufacturer’s instructions and PIP CTSE1000.
### Repair:

<table>
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<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Inorganic Zinc)</td>
<td>(None)</td>
<td>(None)</td>
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</tbody>
</table>

### Notes:
**DESCRIPTION:**
Inorganic zinc primer (IZ) with a high build polyamide catalyzed epoxy finish (EC).

**SURFACES:**
Carbon steel. Do not apply to stainless steel or nickel alloy surfaces.

**SURFACE PREPARATION:**
Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 µm (2 mils).

**REFERENCES**
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

**International Organization for Standardization (ISO)**

**The Society for Protective Coatings (SSPC)**
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

**SYSTEM**

<table>
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<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>IZ</td>
<td>Inorganic Zinc</td>
<td>S</td>
<td>65 (2.5)</td>
<td>100 (4.0)</td>
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<tr>
<td>2.</td>
<td>EC</td>
<td>Epoxy Polyamide</td>
<td>S, B, R</td>
<td>75 (3.0)</td>
<td>125 (5.0)</td>
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<td>3.</td>
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</table>

*Application Method:  S=Spray; B=Brush; R=Roller

**Notes:**
Unless otherwise specified, refer to the coating manufacturer's data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

**Mixing and Thinning:** Mix according to manufacturer's instructions and SSPC PA-1.

**Application:** Apply according to manufacturer's instructions and PIP CTSE1000.

**JobStencil Required:** Yes ☐ No ☐
### Repair:

<table>
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<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
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<tbody>
<tr>
<td></td>
<td>Inorganic Zinc</td>
<td>Epoxy Polyamide</td>
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### Notes:
ASSOC. PIP: CTSE1000

EXTERNAL COATING SYSTEMS

PIP CTSE1000-D103

COATING SYSTEM NO. 3
Epoxy Polyamide (3 Coats)
EC/EC/EC

DECEMBER 2012

NO. DATE REVISION DESCRIPTION BY CHECKED APPROVED

PROJECT NO. PROJECT DOCUMENT NO.

FACILITY NAME

LOCATION

DESCRIPTION:
A polyamide catalyzed epoxy system consisting of a catalyzed epoxy primer (EC) and two coats of catalyzed epoxy finish (EC).

SURFACES:
Carbon steel. Do not apply to stainless steel or nickel alloy surfaces.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-6 (Sa 2) with a nominal profile of 50 µm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning

SYSTEM

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<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
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<td>Epoxy Polyamide Primer</td>
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<td>Epoxy Polyamide</td>
<td>S, B, R</td>
<td>50 (2.0)</td>
<td>75 (3.0)</td>
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<td>3.</td>
<td>EC</td>
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<td>Epoxy Polyamide</td>
<td>S, B, R</td>
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<td>140 (5.5)</td>
<td>225 (9.0)</td>
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*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
**Coating System No. 3**

Epoxy Polyamide (3 Coats)

**EC/EC/EC**

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**Manufacturer** | **Coat 1** | **Coat 2** | **Coat 3**
--- | --- | --- | ---
Epoxy Polyamide Primer | Epoxy Polyamide | Epoxy Polyamide

---

**Notes:**

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**Project No.**

**Facility Name**

**Location**

---

**Notes:**
DESCRIPTION:
Catalyzed epoxy-phenolic system.

SURFACES:
Stainless steel or aluminum pipe, equipment, and vessels, usually under insulation. Suitable for stainless steel or high nickel alloys if temperature limits not exceeded.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-7 (Sa 1) with a nominal profile of 25 µm (1 mil).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 7/NACE No. 4, Brush-off Blast Cleaning

SYSTEM

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<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
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<td>Epoxy Phenolic</td>
<td>Spray</td>
<td>150 (6.0)</td>
<td>200 (8.0)</td>
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<td>3.</td>
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<td><strong>150 (6.0)</strong></td>
<td><strong>200 (8.0)</strong></td>
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*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
COATING SYSTEM NO. 4
Epoxy Phenolic
EP

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<th>Manufacturer</th>
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<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Epoxy Phenolic</td>
<td>(None)</td>
<td>(None)</td>
</tr>
</tbody>
</table>

Notes:
DESCRIPTION:
Three-coat catalyzed epoxy-phenolic system.

SURFACES:
Carbon steel, usually under insulation. May be used for mixed carbon steel/stainless steel/nickel alloys installations when economical.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 µm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EP</td>
<td>Epoxy Phenolic Primer</td>
<td>S, B, R</td>
<td>75 (3.0)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>EP</td>
<td>Epoxy Phenolic</td>
<td>S, B, R</td>
<td>65 (2.5)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>EP</td>
<td>Epoxy Phenolic</td>
<td>S, B, R</td>
<td>65 (2.5)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total: 200 (8.0)</td>
<td>300 (12.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes [ ] No [ ]
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Epoxy Phenolic Primer</td>
<td>Epoxy Phenolic</td>
<td>Epoxy Phenolic</td>
</tr>
</tbody>
</table>

**Notes:**
DESCRIPTION:
Catalyzed epoxy primer (EC) with a two-package aliphatic urethane (UR) finish.

SURFACES:
Carbon steel. Other materials or substances may be painted with this system.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-6 (Sa 2) with a nominal profile of 50 µm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/ Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EC</td>
<td>Epoxy Polyamide</td>
<td>S, B, R</td>
<td>65 (2.5)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>UR</td>
<td>Aliphatic Urethane</td>
<td>S, B, R</td>
<td>50 (2.0)</td>
<td>75 (3.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td></td>
<td></td>
<td>115 (4.5)</td>
<td>175 (7.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
### Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epoxy Polyamide</td>
<td>Aliphatic Urethane</td>
<td>(None)</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
DESCRIPTION:
Catalyzed epoxy primer (EC) with a two-package aliphatic urethane (UR) finish.

SURFACES:
Carbon steel. Other materials or substances may be painted with this system.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-6 (Sa 2) with a nominal profile of 50 µm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EC</td>
<td>Epoxy Polyamide</td>
<td>S, B, R</td>
<td>65 (2.5)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>UR</td>
<td>Aliphatic Urethane</td>
<td>S, B, R</td>
<td>50 (2.0)</td>
<td>75 (3.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total: 115 (4.5)</td>
<td>175 (7.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Epoxy Polyamide</td>
<td>Aliphatic Urethane</td>
<td>(None)</td>
</tr>
</tbody>
</table>

Notes:
DESCRIPTION:
Two-coat catalyzed coal tar epoxy (TE) paint system.

SURFACES:
Carbon steel, usually under insulation or for wet exposures.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-6 (Sa 2) with a nominal profile of 50 to 75 µm (2 to 3 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/ Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TE</td>
<td>Coal Tar Epoxy</td>
<td>S, B, R</td>
<td>175 (7.0)</td>
<td>250 (10.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>TE</td>
<td>Coal Tar Epoxy</td>
<td>S, B, R</td>
<td>175 (7.0)</td>
<td>250 (10.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total: 350 (14.0)</td>
<td>500 (20.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning:  Mix according to manufacturer’s instructions and SSPC PA-1.

Application:  Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required:  Yes ☐ No ☐
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coal Tar Epoxy</td>
<td>Coal Tar Epoxy</td>
<td>(None)</td>
</tr>
</tbody>
</table>

**Notes:**

**Repair:**

**PROJECT NO.**

**FACILITY NAME**

**LOCATION**

**PROJECT DOCUMENT NO.**
Inorganic zinc primer (IZ) with a water-borne acrylic finish (WA).

**SURFACES:**
Carbon steel. Do not apply to stainless steel or nickel alloy surfaces.

**SURFACE PREPARATION:**
Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 µm (2 mils).

**REFERENCES**
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

**International Organization for Standardization (ISO)**

**The Society for Protective Coatings (SSPC)**
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/ Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>IZ</td>
<td>Inorganic Zinc</td>
<td>S</td>
<td>65 (2.5)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>WA</td>
<td>Water-Borne Acrylic</td>
<td>S, B, R</td>
<td>50 (2.0)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: 115 (4.5) 200 (8.0)

*Application Method: S=Spray; B=Brush; R=Roller

**Notes:**
Unless otherwise specified, refer to the coating manufacturer's data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

**Mixing and Thinning:** Mix according to manufacturer's instructions and SSPC PA-1.

**Application:** Apply according to manufacturer’s instructions and PIP CTSE1000.

**Job Stencil Required:** Yes ☐ No ☐
## Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inorganic Zinc</td>
<td>Water-Borne Acrylic</td>
<td>(None)</td>
</tr>
</tbody>
</table>

## Notes:

...
DESCRIPTION:
Three-coat alkyd paint (OA) system.

SURFACES:
Carbon steel. Other substrates may be coated.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-6 (Sa 2) with a nominal profile of 50 µm (2 mils). Alternative methods of surface preparation may be used.

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>OA</td>
<td>Alkyd</td>
<td>S, B, R</td>
<td>25 (1.0)</td>
<td>50 (2.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>OA</td>
<td>Alkyd</td>
<td>S, B, R</td>
<td>40 (1.5)</td>
<td>50 (2.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>OA</td>
<td>Alkyd</td>
<td>S, B, R</td>
<td>40 (1.5)</td>
<td>50 (2.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>100 (4.0)</strong></td>
<td><strong>150 (6.0)</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkyd</td>
<td>Alkyd</td>
<td>Alkyd</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
Inorganic Zinc/Silicone Acrylic (2 Coats)  
IZ/SA/SA

DESCRIPTION:
Inorganic zinc (IZ) primer with a two-coat silicone acrylic finish.

SURFACES:
Carbon steel. Do not apply to stainless steel or nickel alloy surfaces.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 μm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)
ISO 8504-2 Preparation of Steel Substrates Before Application of Paints and Related Products - Surface Preparation Methods - Part 2: Abrasive Blast-Cleaning second edition

The Society for Protective Coatings (SSPC)
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, μm (mils)</th>
<th>Maximum DFT, μm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>IZ</td>
<td>Inorganic Zinc</td>
<td>S</td>
<td>65 (2.5)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>SA</td>
<td>Silicone Acrylic</td>
<td>S</td>
<td>10 (0.5)</td>
<td>25 (1.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>SA</td>
<td>Silicone Acrylic</td>
<td>S</td>
<td>25 (1.0)</td>
<td>50 (2.0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100 (4.0)</td>
<td>175 (7.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning:  Mix according to manufacturer’s instructions and SSPC PA-1.

Application:  Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required:  Yes ☐ No ☐
## Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inorganic Zinc</td>
<td>Silicone Acrylic</td>
<td>Silicone Acrylic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
DESCRIPTION:
Two-coat air-dry silicone system (SS/SS).

SURFACES:
Stainless steel for the prevention of stress corrosion cracking.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-7 (Sa 1) with a nominal profile of 25 µm (1 mil).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 7/NACE No. 4, Brush-Off Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>SS</td>
<td>Silicone</td>
<td>S</td>
<td>40 (1.5)</td>
<td>50 (2.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>SS</td>
<td>Silicone</td>
<td>S</td>
<td>40 (1.5)</td>
<td>50 (2.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Total:</strong></td>
<td><strong>75 (3.0)</strong></td>
<td><strong>100 (4.0)</strong></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone</td>
<td>Silicone</td>
<td>(None)</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
### SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/ Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>HS</td>
<td>Heat-Cured Silicone</td>
<td>S</td>
<td>25 (1.0)</td>
<td>50 (2.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>HS</td>
<td>Heat-Cured Silicone</td>
<td>S</td>
<td>25 (1.0)</td>
<td>50 (2.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total: 50 (2.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100 (4.0)</td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

### Notes:

Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

### Mixing and Thinning:

Mix according to manufacturer’s instructions and SSPC PA-1.

### Application:

Apply according to manufacturer’s instructions and PIP CTSE1000.
## Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Heat-Cured Silicone</td>
<td>Heat-Cured Silicone</td>
<td>(None)</td>
</tr>
</tbody>
</table>

### Notes:
DESCRIPTION:
One-coat high-build self-priming epoxy mastic.

SURFACES:
Manufacturer’s Standard finished items where abrasive blast cleaning for top-coating is not practical.

SURFACE PREPARATION:
Prepare the surface per SSPC SP-2 or -3 (St 2 or St 3). Check compatibility by top-coating a small area; proceed if no lifting of the existing Manufacturer’s Standard finish is observed.

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 2, Hand Tool Cleaning
SSPC-SP3, Power Tool Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>-</td>
<td>Manufacturer’s Standard</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>EM</td>
<td>Epoxy Mastic</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning:  Mix according to manufacturer’s instructions and SSPC PA-1.

Application:  Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required:  Yes  No
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
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<tr>
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</tr>
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</table>

Notes:
ASSOC. PIP:  CTSE1000
EXTERNAL COATING SYSTEMS  PIP CTSE1000-D114

COATING SYSTEM NO. 14
Inorganic Zinc/Heat-Cured Silicone (2 Coats)
IZ/HS/HS

---

PROJECT NO.

PROJECT DOCUMENT NO.

FACILITY NAME

LOCATION

DESCRIPTION:
Two-coat silicone paint system (HS) applied over inorganic zinc primer (IZ).

SURFACES:
Carbon Steel. Do not apply to stainless steel or nickel alloy surfaces.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 µm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/ Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>IZ</td>
<td>Inorganic Zinc</td>
<td>S</td>
<td>65 (2.5)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>HS</td>
<td>Heat Cured Silicone</td>
<td>S</td>
<td>10 (0.5)</td>
<td>25 (1.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>HS</td>
<td>Heat Cured Silicone</td>
<td>S</td>
<td>25 (1.0)</td>
<td>40 (1.5)</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>Total: 100 (4.0)</td>
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<td></td>
<td></td>
<td>165 (6.5)</td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning:  Mix according to manufacturer’s instructions and SSPC PA-1.

Application:  Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required:  Yes ☐ No ☐
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inorganic Zinc</td>
<td>Heat Cured Silicone</td>
<td>Heat Cured Silicone</td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ASSOC. PIP:  CTSE1000  EXTERNAL COATING SYSTEMS  PIP CTSE1000-D115

COATING SYSTEM NO. 15
Inorganic Zinc/Epoxy Mastic/Urethane
IZ/EM/UR

PROJECT NO.  PROJECT DOCUMENT NO.

FACILITY NAME

LOCATION

DESCRIPTION:
Inorganic zinc primer (IZ) with epoxy mastic intermediate (EM) and two-package aliphatic urethane finish (UR).

SURFACES:
Carbon Steel. Do not apply to stainless steel or nickel alloys.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 µm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>IZ</td>
<td>Inorganic Zinc</td>
<td>S</td>
<td>65 (2.5)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>EM</td>
<td>Epoxy Mastic</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>UR</td>
<td>Aliphatic Urethane</td>
<td>S, B, R</td>
<td>50 (2.0)</td>
<td>75 (3.0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total: 215 (8.5)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>325 (13.0)</td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning:  Mix according to manufacturer’s instructions and SSPC PA-1.

Application:  Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required:  Yes [ ] No [ ]
## Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inorganic Zinc</td>
<td>Epoxy Mastic</td>
<td>Aliphatic Urethane</td>
</tr>
</tbody>
</table>

## Notes:
ASSOC. PIP: CTSE1000
EXTERNAL COATING SYSTEMS
PIP CTSE1000-D116

COATING SYSTEM NO. 16
Low Temperature Curing Epoxy (2 Coats)
EL/EL

PAGE 1 OF 2
DECEMBER 2012

PROJECT NO.  
PROJECT DOCUMENT NO. 

FACILITY NAME 
LOCATION 

DESCRIPTION:
Two-coat catalyzed low temperature curing epoxy system. One coat primer (EL) and one coat finish (EL).

SURFACES:
Carbon steel, usually under insulation. Special system for ambient application temperatures of 30°F (-1°C) to 50°F (10°C). This system may be used for mixed carbon steel/stainless steel/nickel alloys installations when practical.

SURFACE PREPARATION:
 Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 μm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, μm (mils)</th>
<th>Maximum DFT, μm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EL</td>
<td>Low Temperature Cure Epoxy</td>
<td>S, B, R</td>
<td>75 (3.0)</td>
<td>125 (5.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>EL</td>
<td>Low Temperature Cure Epoxy</td>
<td>S, B, R</td>
<td>125 (5.0)</td>
<td>175 (7.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total: 200 (8.0)</td>
<td>300 (12.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Temperature Cure Epoxy</td>
<td>Low Temperature Cure Epoxy</td>
<td>(None)</td>
</tr>
<tr>
<td></td>
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<td>----------</td>
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</tbody>
</table>

Notes:
ASSOC. PIP: CTSE1000
EXTERNAL COATING SYSTEMS
PIP CTSE1000-D117

COATING SYSTEM NO. 17
Polysiloxane (2 Coats)
PX/PX

PROJECT NO. 1
PROJECT DOCUMENT NO. 1
FACILITY NAME
LOCATION

DESCRIPTION:
Two-coat polysiloxane coating system for high temperature service.

SURFACES:
Carbon steel and/or stainless steel.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 to 75 µm (2 to 3 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/ Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>PX</td>
<td>Polysiloxane</td>
<td>Spray</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>PX</td>
<td>Polysiloxane</td>
<td>Spray</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200 (8.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300 (12.0)</td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
**COATING SYSTEM NO. 17**
Polyisiloxane (2 Coats)
PX/PX

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
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<th>Coat 3</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Polysiloxane</td>
<td>Polysiloxane</td>
<td>(None)</td>
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</tr>
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</table>

**Notes:**

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**PROJECT NO.**
**PROJECT DOCUMENT NO.**
**FACILITY NAME**
**LOCATION**

**Repair:**

---

**DECEMBER 2012**
DESCRIPTION:
Epoxy mastic (EM) with a two-package aliphatic urethane (UR) finish.

SURFACES:
Carbon Steel.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-6 (Sa 2) with a nominal profile of 50 µm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning

SYSTEM

<table>
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<tr>
<th>Coat No.</th>
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<th>Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EM</td>
<td></td>
<td>Epoxy Mastic</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>EM</td>
<td></td>
<td>Epoxy Mastic</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>UR</td>
<td></td>
<td>Aliphatic Urethane</td>
<td>S, B, R</td>
<td>50 (2.0)</td>
<td>75 (3.0)</td>
<td></td>
</tr>
</tbody>
</table>

Total: 250 (10.0) 375 (13.0)

*Application Method: S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
### Project No.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epoxy Mastic</td>
<td>Epoxy Mastic</td>
<td>Aliphatic Urethane</td>
<td></td>
</tr>
</tbody>
</table>

### Notes:

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**COATING SYSTEM NO. 18**

Epoxy Mastic (2 Coats)/Urethane

EM/EM/UR

---

**Repair:**

---

**Project Document No.**
DESCRIPTION:
Two-coat catalyzed epoxy novolac system.

SURFACES:
Carbon steel, usually under insulation. This system may be used for mixed carbon steel/stainless steel/nickel alloys installations when practical.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 µm (2 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/ Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EN</td>
<td>Epoxy Novolac</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>EN</td>
<td>Epoxy Novolac</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total:</td>
<td>200 (8.0)</td>
<td>300 (12.0)</td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning:  Mix according to manufacturer’s instructions and SSPC PA-1.

Application:  Apply according to manufacturer’s instructions and PIP CTSE1000.

JobStencil Required:  Yes ☐ No ☐
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Epoxy Novolac</td>
<td>Epoxy Novolac</td>
<td>(None)</td>
</tr>
</tbody>
</table>

Notes:
**DESCRIPTION:**
Two-coat catalyzed epoxy phenolic system.

**SURFACES:**
Carbon steel, usually under insulation. May be used for mixed carbon steel/stainless steel/nickel alloys installations when economical.

**SURFACE PREPARATION:**
Abrasive blast to SSPC SP-10 (Sa 2.5) with a nominal profile of 50 μm (2 mils).

**REFERENCES**
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

**International Organization for Standardization (ISO)**

**The Society for Protective Coatings (SSPC)**
SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning

**SYSTEM**

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, μm (mils)</th>
<th>Maximum DFT, μm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EP</td>
<td>Epoxy Phenolic</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>EP</td>
<td>Epoxy Phenolic</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>200 (8.0)</td>
<td>300 (12.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

**Notes:**
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

**Mixing and Thinning:** Mix according to manufacturer’s instructions and SSPC PA-1.

**Application:** Apply according to manufacturer’s instructions and PIP CTSE1000.
## Coating System No. 20

Epoxy Phenolic (2 Coats)  
EP/EP

### Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epoxy Phenolic</td>
<td>Epoxy Phenolic</td>
<td>(None)</td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
DESCRIPTION:
Organic zinc-rich epoxy primer with aliphatic polyurethane finish.

SURFACES:
Carbon steel. Do not apply to stainless steel or other non-ferrous alloys.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-6 (Sa 2) with a nominal profile of 50 to 75 µm (2 to 3 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>OZ</td>
<td>Organic Zinc</td>
<td>S, B, R</td>
<td>50 (2.0)</td>
<td>100 (4.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>UR</td>
<td>Aliphatic Urethane</td>
<td>S, B, R</td>
<td>40 (1.5)</td>
<td>65 (2.5)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: 90 (3.5) 165 (6.5)

*Application Method: S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
## Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organic Zinc</td>
<td>Urethane</td>
<td>(None)</td>
</tr>
</tbody>
</table>

## Notes:
DESCRIPTION:
Epoxy mastic primer (EM) with water-borne acrylic finish (WA).

SURFACES:
Manufacturer’s Standard items where abrasive blast cleaning for top-coating is not practical.

SURFACE PREPARATION:
Prepare the surface per SSPC SP-2 or -3 (St 2 or St 3). Check compatibility by top-coating a small area; proceed if no lifting of the existing Manufacturer’s Standard finish is observed.

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 2, Hand Tool Cleaning
SSPC-SP 3, Power Tool Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/ Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>-</td>
<td>Manufacturer’s Standard</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>EM</td>
<td>Epoxy Mastic</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>WA</td>
<td>Water-Borne Acrylic</td>
<td>S, B, R</td>
<td>50 (2.0)</td>
<td>75 (3.0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total:</strong></td>
<td></td>
<td></td>
<td></td>
<td>150 (6.0)</td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes [ ] No [ ]
## Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manufacturer’s Standard</td>
<td>Epoxy Mastic</td>
<td>Waterborne Acrylic</td>
</tr>
</tbody>
</table>

## Notes:
**DESCRIPTION:**
Epoxy mastic (EM) with epoxy (EC).

**SURFACES:**
Manufacturer’s Standard finished items where abrasive blast cleaning for top-coating is not practical.

**SURFACE PREPARATION:**
Prepare the surface per SSPC SP-2 or -3 (St 2 or St 3). Check compatibility by top-coating a small area; proceed if no lifting of the existing Manufacturer’s Standard finish is observed.

**REFERENCES**
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

**International Organization for Standardization (ISO)**

**The Society for Protective Coatings (SSPC)**
SSPC-SP 2, Hand Tool Cleaning
SSPC-SP3, Power Tool Cleaning

**SYSTEM**

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>-</td>
<td>Manufacturer’s Standard</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>EM</td>
<td>Epoxy Mastic</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>EC</td>
<td>Epoxy Polyamide</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total:</td>
<td>200 (8.0)</td>
<td>300 (12.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

**Notes:**
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

**Mixing and Thinning:** Mix according to manufacturer’s instructions and SSPC PA-1.

**Application:** Apply according to manufacturer’s instructions and PIP CTSE1000.

**Job Stencil Required:** Yes [ ] No [ ]
## Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manufacturer’s Standard</td>
<td>Epoxy Mastic</td>
<td>Epoxy Polyamide</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Notes:
DESCRIPTION:
Epoxy mastic primer (EM) with an aliphatic urethane finish (UR)

SURFACES: Carbon steel. Can be used on stainless steel or nonferrous alloys, usually for color coding. Can be applied over manufacturer’s standard finish items where abrasive blast cleaning for top coating is not practical. This system is also suitable for galvanized surfaces.

SURFACE PREPARATION: For bare metal, abrasive blast to SSPC SP-6 (Sa 2) with a nominal profile of 50 to 75 µm (2 to 3 mils). To coat a manufacturer’s standard paint, prepare the surface in accordance with SSPC SP-2 or -3 (St 2 or St 3). For galvanized surfaces, prepare in accordance with SSPC SP-7 (Sa 1), suitably weathered, or in accordance with manufacturer’s recommendation.

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 2, Hand Tool Cleaning
SSPC-SP 3, Power Tool Cleaning
SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning
SSPC-SP 7/NACE No. 4, Brush-Off Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/ Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EM</td>
<td>Epoxy Mastic</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>UR</td>
<td>Aliphatic Urethane Finish</td>
<td>S, B, R</td>
<td>50 (2.0)</td>
<td>75 (3.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total:</td>
<td></td>
<td>150 (6.0)</td>
<td>225 (9.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method: S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.
Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes [ ] No [ ]

Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Epoxy Mastic</td>
<td>Urethane</td>
<td>(None)</td>
</tr>
</tbody>
</table>

Notes:
DESCRIPTION:
High-build epoxy (EH) with a two-package aliphatic urethane (UR) finish.

SURFACES:
Carbon Steel.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-6 (Sa 2) with a nominal profile of 50 to 75 µm (2 to 3 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/ Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EH</td>
<td>High Build Epoxy</td>
<td>S, B, R</td>
<td>250 (10.0)</td>
<td>375 (15.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>EH</td>
<td>High Build Epoxy</td>
<td>S, B, R</td>
<td>250 (10.0)</td>
<td>375 (15.0)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>UR</td>
<td>Aliphatic Urethane</td>
<td>S, B, R</td>
<td>50 (2.0)</td>
<td>75 (3.0)</td>
<td></td>
</tr>
</tbody>
</table>

Total: 650 (22.0) 825 (33.0)

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.

Application: Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required: Yes ☐ No ☐
### Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Build Epoxy</td>
<td>High Build Epoxy</td>
<td>Aliphatic Urethane</td>
</tr>
</tbody>
</table>

**Notes:**
ASSOC. PIP: CTSE1000  EXTERNAL COATING SYSTEMS  PIP CTSE1000-D126

COATING SYSTEM NO. 26
Coal Tar Epoxy
(1 Coat) TE

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Revision Description</th>
<th>By</th>
<th>Checked</th>
<th>Approved</th>
</tr>
</thead>
</table>

PROJECT NO.  PROJECT DOCUMENT NO.

FACILITY NAME

LOCATION

DESCRIPTION:
One-coat catalyzed coal tar epoxy (TE) paint system.

SURFACES:
Carbon steel or stainless steel, usually under insulation or for wet exposures.

SURFACE PREPARATION:
Abrasive blast to SSPC SP-6 (Sa 2) with a nominal profile of 50 to 75 µm (2 to 3 mils).

REFERENCES
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)
SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TE</td>
<td></td>
<td>Coal Tar Epoxy</td>
<td>S, B, R</td>
<td>200 (8.0)</td>
<td>250 (10.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td></td>
<td></td>
<td>200 (8.0)</td>
<td>250 (10.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning:  Mix according to manufacturer’s instructions and SSPC PA-1.

Application:  Apply according to manufacturer’s instructions and PIP CTSE1000.

Job Stencil Required:  Yes [ ] No [ ]
### COATING SYSTEM NO. 26
Coal Tar Epoxy  
(1 Coat) TE

#### Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coal Tar Epoxy</td>
<td>(None)</td>
<td>(None)</td>
</tr>
</tbody>
</table>

#### Notes:
**DESCRIPTION:**
Thermal sprayed aluminum with silicone aluminum sealer

**SURFACES:**
Carbon steel. Do not apply to stainless steel or nickel alloy surfaces.

**SURFACE PREPARATION:**
Ablative blast in accordance with SSPC SP-5 (Sa 3) with a minimum profile of 65 µm (2.5 mils).

**SYSTEM**

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TSA</td>
<td>Thermal Spray Aluminum</td>
<td>TS</td>
<td>200 (8.0)</td>
<td>300 (12.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>SSA</td>
<td>Silicone Sealer - Aluminum</td>
<td>S</td>
<td>See Below</td>
<td>See Below</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  TS=Thermal Spray; S=Spray; B=Brush; R=Roller

**APPLICATION REQUIREMENTS:**

**References**
The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.
- ANSI/AWS C2.18, Guide for the Protection of Steel with Thermal Sprayed Coatings of Aluminum and Zinc and Their Alloys and Composites
- SSPC-SP 5/NACE No. 1, White Metal Blast Cleaning

**Application**
Thermal spray coating (TSC) shall be applied in accordance with AWS C2.23M/C2.23 requirements, including mandatory Annex I.

**Tensile Bond**
Companion tensile test specimen coupons shall be prepared and thermal spray coated using the production application procedures. Coupons shall be minimum 6 mm (0.25 in.) thick, unless TSC supplier demonstrates thinner coupons will not distort when TSC is applied. Tensile-bond measurement required every 50 m² (500 ft²). Bond-strength measurement shall be made without application of sealer. If measured bond-strength is less than 6.89 MPa (1000 psi), the production TSC shall be removed and reapplied.

**Documentation**
TSC supplier shall submit its application procedure proposed for the contract work. Job reference standard (JRS) shall be prepared by the TSC supplier, for use as a comparator to evaluate suitability of the application process.

**Repair**
Repairs shall be in accordance with maintenance repair procedures outlined in ANSI/AWS C2.18.
Thermal spray wire shall be 99% Al, conforming to AWS C2.25/C2.25M, C2.25 Classification **W-Al-1100 (UNS No. A91100)**.

<table>
<thead>
<tr>
<th>Sealer</th>
<th>(manufacturer)</th>
<th>(tradename/product number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone Sealer - Aluminum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Top Coat</th>
<th>N.A.</th>
<th>N.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
REFERENCES

The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

International Organization for Standardization (ISO)

The Society for Protective Coatings (SSPC)

SYSTEM

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

Notes:
Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

Mixing and Thinning: Mix according to manufacturer’s instructions and SSPC PA-1.
**Application:** Apply according to manufacturer’s instructions and *PIP CTSE1000*.

**Job Stencil Required:** Yes  ☐  No  ☐

**Repair:**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
</tbody>
</table>

...
Catalyzed epoxy novolac system.

Stainless steel, usually under insulation.

Abrasive blast to SSPC SP-7 (Sa 1) with a nominal profile of 25 µm (1 mil).

The latest edition (or edition indicated) of the following industry standards and references shall be considered an integral part of this External Coating System.

**International Organization for Standardization (ISO)**


**The Society for Protective Coatings (SSPC)**

SSPC-SP 7/NACE No. 4, Brush-off Blast Cleaning

<table>
<thead>
<tr>
<th>Coat No.</th>
<th>Type Code</th>
<th>Generic Type</th>
<th>Application Method</th>
<th>Minimum DFT, µm (mils)</th>
<th>Maximum DFT, µm (mils)</th>
<th>Shop (S)/Field (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EN</td>
<td>Epoxy Novolac</td>
<td>S, B, R</td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>3.</td>
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</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>100 (4.0)</td>
<td>150 (6.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Application Method:  S=Spray; B=Brush; R=Roller

**Notes:**

Unless otherwise specified, refer to the coating manufacturer’s data sheets for information on the recommended application temperature range, wet film thickness, approximate coverage in square feet/gallon, pot life, and drying times to touch, handle, and cure for each coating product.

**Mixing and Thinning:** Mix according to manufacturer’s instructions and **SSPC PA-1**.

**Application:** Apply according to manufacturer’s instructions and **PIP CTSE1000**.

**Job Stencil Required:** Yes ☐ No ☐
### Repair:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Coat 1</th>
<th>Coat 2</th>
<th>Coat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Epoxy Novolac</td>
<td>(None)</td>
<td>(None)</td>
</tr>
</tbody>
</table>

### Notes:
Facility Name/Location: ___________________________  Purchaser/Location: ___________________________
Item Name: ___________________________  Job No: ___________________________
Item Tag No.: ___________________________  Purchaser Order No.: ___________________________
Service: ___________________________  Supplier/Location: ___________________________
Unit: ___________________________  Supplier Order/Serial Nos.: ___________________________
P&ID No.: ___________________________  

**Instructions:**
This form shall be completed for each work shift to verify compliance with PIP CTSE1000.
Record unsatisfactory work, conditions causing unsatisfactory work, and corrective action.
Attach copies of all replica tape readings taken.
Attach additional sheets, notes of meetings, or reports as necessary for backup.
Submit a copy of all forms and back-up documents to the purchaser’s inspector(s).

**Condition** | **Start of Blasting** | **Start of painting** | **Midpoint of painting** | **End of painting**
--- | --- | --- | --- | ---
Time
Ambient Temperature | □ °C □ °F |
Relative Humidity (%) |
Dew Temperature | □ °C □ °F |
Substrate Temperature | □ °C □ °F |
Weather Conditions

**Surface Preparation:**
Condition of Surface Before Blasting:
Method of Removing Contamination Before Blasting:
Method of Blasting:
Abrasive Type: Grade:
Degree of Cleanliness Obtained:
Anchor Profile: □ μm □ mils
Method of Measuring Anchor Profile:

**Application Information:**
Method of Spraying:
DFT Gage Type and Model: Date Calibrated:

<table>
<thead>
<tr>
<th>Linings</th>
<th>Lining Applied</th>
<th>Batch No.</th>
<th>Lining Color</th>
<th>Thinner No./Type Used</th>
<th>Thinner Specified</th>
<th>DFT Obtained</th>
<th>DFT Obtained Interval (hrs)</th>
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</thead>
<tbody>
<tr>
<td>Coat 1</td>
<td></td>
<td></td>
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<tr>
<td>Coat 2</td>
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<tr>
<td>Coat 3</td>
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<td></td>
</tr>
</tbody>
</table>

**Comments:**
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Supplier’s Signature: ___________________________
Inspector’s Signature: ___________________________