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Document History Log

Revision	Date	Originator/ Phone	Description
Basic	06.04.10	K. Snyder/ ext. 1649	Initial release, superseding 80-502. Entire document updated, reformatted and referenced updated. Section 10.1 (l): wind and airborne contaminants added. Section10.1: added n: All spray-painting operations shall be contained for particulate emissions during the work; and o: The containment system shall be designed to comply with all Federal, state and local regulations, as well as all NASA policies. Added Section 13.0d: Reports to FOSC Environmental (1) By the 10th day of each month, a report must be submitted by a FOSC Shop designate or contractor to FOSC Environmental Department detailing the amount and type of paint used during the previous month. Log sheets for this purpose are available through FOSC Environmental Department. (2)By the 10th day of each month, a report must be submitted by a FOSC Shop designate or contractor to FOSC Environmental Department detailing the amount and type of blast material used during the previous month. Log sheets for this purpose are available through FOSC Environmental Department.
A	11.03.14	K. Snyder/ ext. 1649	Five-year review of SSTD-8070-0104. This standard also supersedes SSC 80-501, Rev. A. References and acronyms updated. Added Project Management Division, Engineering & Test Directorate, and Safety & Mission Assurance to required signatures. "FOSC" changed to "NASA or its designee" in all references throughout document.
B	07.23.15	K. Snyder / Ext. 1649	Revised cover sheet to reflect approval by CO OMD, and concurrence by PMD and SMA. Updated references. Updated 6.0-g to include, "Paint containing hazardous constituents, such as lead and hexavalent chromium, shall be removed in accordance with SCWI-8500-0018-ENV." Modified 7.1-a to specify that blasting abrasive "shall contain less than 1% crystalline silica."

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B-1	02.12.16	R. Carol Wolfram 8-1164	Administrative change. Replaced “NASA or its designee” with “SACOM” throughout document.

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1.0 PURPOSE

The purpose of this John C. Stennis Space Center (SSC) standard (SSTD) is to set forth requirements for specified surface preparation and finish painting of fabricated steel structures to control corrosion; and to instruct Synergy-Achieving Consolidated Operations and Maintenance (SACOM) maintenance painters at SSC in preparing and repainting these structures. All coatings at SSC shall adhere to NASA-STD-5008.

2.0 APPLICABILITY

This SSTD shall apply to all contractors and subcontractors.

3.0 REFERENCE AND APPLICABLE DOCUMENTS

All references are assumed to be the latest version unless otherwise indicated.

NASA-STD-5008, *Protective Coating of Carbon Steel, Stainless Steel, and Aluminum on Launch Structures, Facilities, and Ground Support Equipment*
SCWI-8500-0018-ENV, *Lead Hazard Control*
SCWI-8715-0008, *SSC Construction Safety and Health Program*
SPR 1440.1, *Records Management Program Requirements*
SPR 8715.1, *SSC Safety and Health Program Requirements*
SSP-8715-0001, *SSC Safety and Health Handbook*
SSPC SP1, *Solvent Cleaning*
SSPC SP3, *Power Tool Cleaning*
SSPC SP6, *Commercial Blast Cleaning*
SSPC SP10, *Near-White Blast Cleaning*
SSTD-8070-0005-CONFIG, *Preparation, Review, Approval, and Release of SSC Standards*

4.0 RESPONSIBILITIES

a. Users of this SSTD shall comply with its requirements, ensure use of the correct version of this SSTD and the documents it references, and inform the appropriate organization of needed changes in accordance with SSTD-8070-0005-CONFIG.

b. Responsibilities for the use and control of this SSTD and for the review and approval of revisions or cancellation of this SSTD shall be as specified in SSTD-8070-0005-CONFIG and the applicable documents referenced therein.

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5.0 PERSONNEL SAFETY

a. The safe accomplishment of the operations required by this SSTD necessitate strict adherence to established safety practices. Personnel engaged in surface preparation, spray-painting, and work to be performed at elevated heights shall adhere to all applicable precautions as directed by the applicable Environmental, Industrial Hygiene, and Safety offices.

b. Some of the materials handled under this SSTD are combustible and/or toxic. Materials used shall comply with SPR 8715.1 and SSP-8715-0001.

6.0 RUST/CORROSION ELIMINATION AND TREATMENT

a. The surface designated to be painted shall first be analyzed to ascertain the reason the area has corroded.

b. After the cause has been established, the surface shall be prepared and the cause for corrosion shall be eliminated.

c. If the cause for rusting is welds that are not sealed, then the area showing rust shall be cleaned, sealed by welding or caulking, and re-primed with a metallic gray of zinc pigment.

d. It shall be the responsibility of the painting supervisor to ensure that the surface is sealed and free of weld spatter.

e. Water traps shall be eliminated.

   1. Adequate drainage holes shall be drilled to eliminate all water traps prior to surface preparation.

   2 Where this operation may affect structural integrity, the designated design engineer shall be consulted.

f. The surface of the steel requiring repainting shall be grit blasted or power tool cleaned, dry, and free from dust.

g. Paint containing hazardous constituents, such as lead and hexavalent chromium, shall be removed in accordance with SCWI-8500-0018-ENV.

h. The prepared surface shall then be primed with an inorganic zinc coating.

i. All cracks shall be caulked prior to applying the top coat.

1. All faying surfaces, joints open less than ½ inch, and skip weld joints shall be completely sealed.
2. The sealant shall be self-curing, single-component, polysulfide rubber material.
3. The sealant shall be gun-applied to the joint after the primer coat has dried.
4. The color of the sealant shall be gray.

j. Inorganic zinc-rich coatings specified by this SSTD require a near-white, metal blast cleaned surface for best results (see section 8.2). In areas where it is necessary to power tool clean the surface, in lieu of blast cleaning, an organic zinc-rich coating is required.

7.0 PRODUCTS

7.1 Abrasive

a. The blasting abrasive shall contain less than 1% crystalline silica (e.g., Black Beauty® Sponge-Jet® Silver 80R aluminum oxide, or an approved equivalent) that is capable of producing a surface profile of +/- 2 mils.

b. Abrasive shall be clean and dry.

7.2 Protective Coatings

a. Zinc rich primer and top coat systems shall be selected from the approved products list specified in NASA-STD-5008, Appendices A and B.

b. The following additional requirements shall be executed:

1. Coatings or components of coatings by different manufacturers shall not be intermixed.
2. Product instructions shall be obtained from the manufacturer.
3. The manufacturer's instructions for thinning, mixing, curing, handling, and applying products shall be considered a part of this SSTD, and be adhered to during mixing, thinning, coating, curing, handling and application operations.
4. Coatings shall be furnished in containers not larger than five (5) gallons.
5. Containers shall be delivered in their original, unopened containers bearing:

   A. Manufacturer's name
   B. Shelf-life

C. Product identification number
D. Batch number

6. A certificate of conformance shall be provided with each batch certifying that the material being supplied is equal to that supplied in accordance with NASA-STD-5008B.

7.3 Inorganic Zinc

Inorganic zinc coating shall be applied in accordance with the following:

a. Surface preparation shall be in accordance with section 8.0 of this SSTD.

b. NASA-STD-5008B Type I Class I shall be used in all areas with the exception of confined areas.

c. NASA-STD-5008B Type I Class II shall be used when coating application is performed in a confined area.

8.0 SURFACE PREPARATION

8.1 General Requirements

a. Special instructions for Test Stand Flame Deflectors are provided in section 11.0.

b. Prepared surfaces shall be coated within six (6) hours after completion of surface's preparation, and before rusting or recontamination occurs.

c. Surfaces not coated within six (6) hours or which show rusting or contamination, regardless of the length of time after preparation, shall be re-prepared.

d. Surfaces shall be inspected and degreased as required prior to subsequent surface preparation and the application of protective coatings.

e. Degreasing shall be by solvent cleaning, detergent washing, or steam cleaning.

8.2 Abrasive Blasting

a. Protective coverings, shields, or masking are to be installed as necessary to protect equipment nameplates, identification plates, surrounding mechanical and electrical equipment, machines, drainage systems, stainless steel piping, instrument lines, and any sensitive electrical and mechanical equipment.

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b. Sensitive electrical equipment is considered to be: electrical enclosures; gas detectors; fire detect sensors; drag-on cables and electrical connectors; communication boxes; paging system speakers; flex conduit; lighting, cable trays and cabling; junction boxes; interior; and work areas containing critical/sensitive hardware.

c. Sensitive mechanical equipment is considered to be: valves and actuators, purge panels and regulating stations, flanges, grayloc hubs and other mechanical connections, vacuum pull-down assemblies, actuator for rolling decks, piping bellows, run tank rupture discs, tubing and piping, and stainless steel.

d. Dry abrasive blast cleaning shall achieve a 2.0- to 2.5-mil anchor profile as indicated by a surface profile comparator, replica tape, or similar device.

e. Rust and corrosion shall be removed from pits and depressions as to obtain a near-white blast cleaned surface, as per SSPC SP 10.

f. A near-white blast surface, defined as a surface when viewed without magnification, shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coatings, oxides, corrosion products, and other foreign matter.

g. Random staining shall be limited to five (5) percent of each unit area of surface approximately 9 sq. in. (3 inch X 3 inch) and may consist of light shadows, light streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied coating.

8.3 Compressed Air

a. Compressed air used for abrasive blasting shall be free of moisture and oil.

b. A minimum nozzle pressure of 90 pounds per square inch shall be maintained.

8.4 Welds and Sharp Edges

a. Weld slag, weld spatter, and foreign matter shall be removed from surfaces to be coated prior to abrasive blasting, using mechanical methods such as needle guns, abrasive disks, or wheels.

b. A double pass with the blast nozzle on all welds shall be undertaken during the blast cleaning operation, one pass in each direction.

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8.5 Mechanical Cleaning

Where abrasive blasting is impractical, needle guns, abrasive disks or wheels shall be used in accordance with SSPC SP 3, leaving the surface cleanliness equivalent to near-white metal as per SSPC SP 10.

8.6 Dust Prevention

Blasting and coating operations shall be sequenced so that freshly coated or wet surfaces will not be contaminated by dust.

8.7 Adjacent Surfaces

Edges of coating adjacent to power tool cleaned areas shall be feathered so that the recoated surface will have a smooth appearance.

8.8 Dust Removal

Prior to application of coating material, all traces of dust shall be removed by blowing off surfaces with clean dry air, or by use of industrial type vacuum cleaners.

8.9 Test Application

Test applications shall be performed at the work area of performing activity to determine material characteristics.

9.0 COATING MATERIALS

a. The zinc rich primer shall be selected from those listed in NASA-STD-5008B.

b. The following additional requirements shall be executed:

1. Coatings or components of coatings by different manufacturers shall not be intermixed.
2. Product instructions shall be obtained from the manufacturer.
3. The manufacturer's recommendations for coating, curing, thinning, mixing, and handling of their products shall be considered a part of this SSTD.
4. Coating shall be furnished in containers not larger than five (5) gallons.
5. Containers shall be unbroken and show:

A. Designated nomenclature
B. Formula/specification number
C. Batch number
D. Color
E. Date of manufacture
F. Manufacturer's instructions
G. Manufacturer's name and address

6. A statement of conformance shall be provided with each batch, certifying that the material being supplied is equal to that supplied in accordance with NASA-STD-5008B.

10.0 COATING APPLICATION

10.1 General Requirements

a. Prepared surfaces shall be coated within six (6) hours after completion of surfaces preparation and before rusting or recontamination occurs.

b. Surfaces not coated within six (6) hours or which show rusting or contamination, regardless of the length of time after preparation, shall be re-prepared.

c. Inorganic and organic zinc coatings shall be pigmented so that there is a definite contrast between the coating and the blasted steel surface during the coating application.

d. No tint shall be added that will appreciably change the color from the characteristic color of the zinc pigment.

e. Manufacturer's instructions for thinning, mixing, handling, and applying products shall be considered a part of this standard.

f. Prior to spray application, a brush coat of the specified coatings shall be thoroughly brushed into all joints, crevices, and open spaces.

g. Special attention during the brush coat shall be paid to welds, cutouts, sharp edges, rivets, and bolts to ensure proper coverage and thickness.

h. Compressed air used for spraying coatings shall be free of moisture and oil.

i. Coating shall be applied in even, parallel passes, overlapping 50 percent.

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j. Special attention shall be paid to weld, cutouts, sharp edges, rivets, crevices, and bolts to ensure proper coverage and thickness.

k. Each coat of material applied shall be free from runs; sags; blisters; bubbles; mud cracking; variations in color, gloss, and texture; holidays (missed areas); excessive film build; foreign contaminants; and dry overspray.

l. No coating shall be applied when rain is imminent or when the temperature, wind, humidity or airborne contaminants are outside the limits recommended by the coating manufacturer.

m. Surface temperature shall be at least five (5) degrees F above the dew point.

n. All spray-painting operations shall be contained for particulate emissions during the work.

o. The containment system shall be designed to comply with all Federal, state and local regulations, as well as all NASA policies.

10.2 Dry Film Thickness (DFT)

a. When dry thoroughly (dry to handle), the film thickness shall be checked with a calibrated nondestructive dry-film thickness gage.

b. If less than specified thickness, additional material shall be applied as required.

c. Proper DFT for the organic zinc primer coating shall be obtained in a single application that may consist of multiple passes, while coating is still wet.

10.3 Minor Touch-up Painting

When 10 percent or less of the specified structure requires elimination of corroded or deteriorated finish, that particular surface shall be prepared in accordance with section 8.0 of this standard and primed with an organic zinc-rich gray primer.

11.0 TEST STAND FLAME DEFLECTORS

In addition to the general directives outlined in this standard, the following special instructions for the Test Stand Flame Deflectors are mandated.

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11.1 Surface Preparation and Treatment

a. The removal of oil and grease shall be accomplished before mechanical cleaning is started, using paraffin-free solvents having a flash point higher than 100°F.

b. Surfaces contaminated with salt shall be washed with fresh water and dried thoroughly before applying primer.

c. Surfaces contaminated with alkali shall be neutralized with weak acid solution, such as a 5% solution of muriatic acid, followed by fresh water rinsing.

d. Surfaces contaminated with acid shall be neutralized with alkaline cleaning solution, such as 2 to 4 ounces of trisodium phosphate per gallon of water, then rinsed with fresh water.

11.2 Atmospheric Requirements

Application shall not be made when the temperature is below 40°F, nor when the relative humidity is above 85%.

11.3 Requirements for Hot Side and Exterior

a. For the hot side of the flame deflector, surfaces shall be coated with Hi-Temp® Coating Hi-Temp® 1027 or approved equivalent.

b. Hi-Temp® 1027 should only be used to overcoat inorganic zinc or itself.

c. When Hi-Temp® 1027 is applied as a primer, it shall be top coated with Hi-Temp® 1000VS or approved equal.

d. The exterior surface of the flame deflector shall be primed with one coat of PPG Dimetcote® 9 or an approved equal..

e. Dry film thickness of primer shall be not less than two mil nor more than three mils.

f. The surface to be painted is required to have not more than one complete coat of primer before the finish coats are applied.

g. The exterior surface of the flame deflector shall be top coated with PPG PSX® 700. The color shall be 16440 Gray.

h. If the primer or paint is exposed more than 24 hours, dust and dirt which may have accumulated on the surface shall be removed from the dried film with a soft brush or cloth before application of any subsequent coat.

12.0 FINISHED SURFACES

a. Newly coated surfaces shall be adequately protected from damage.

b. Special care shall be taken to ensure edges, corners, crevices, welds, bolts, and rivets receive a film thickness equivalent to that of adjacent surfaces.

c. Finished surfaces shall be free of runs, drops, ridges, waves, laps, brush marks, variations in color, texture, and finish.

13.0 COLORED TOPCOAT (If required)

a. Topcoats for corrosion protection of carbon steel are not required at SSC under normal atmospheric exposure.

b. Topcoats shall be used for safety, identification, and instructional purposes, or where required in order to match large areas.

c. Topcoats required for these purposes, unless otherwise specified, shall be an epoxy type coating material and the following:

1. Material shall be a product of the same manufacturer as the zinc-rich coating used.
2. Material shall be applied to a film thickness sufficient for uniform color and coverage.

14.0 INSPECTION

a. Surface Preparation
Cleaned surfaces shall be inspected prior to coating application to ensure that surface preparation complies as specified in section 9.0.

b. Final Inspection
Final inspection for dry film thickness, porosity, and joint sealing shall occur after coating is completely dry.

c. Regular Inspection Schedule

The repainted surfaces shall be inspected by the SSC Technical Representative or designated technical support representative six months after job completion and periodically thereafter to determine maintenance coating requirements.

d. Reports to SACOM Environmental

1. By the 10th day of each month, a report must be submitted by SACOM Shop designate or contractor to SACOM Environmental Department detailing the amount and type of paint used during the previous month. Log sheets for this purpose are available through SACOM Environmental Department.

2. By the 10th day of each month, a report must be submitted by SACOM Shop designate or contractor to SACOM Environmental Department detailing the amount and type of blast material used during the previous month. Log sheets for this purpose are available through SACOM Environmental Department.

15.0 RECORDS AND FORMS

Records and forms required by the procedures of this standard shall be maintained in accordance with SPR 1440.1. All records and forms are assumed to be the latest edition unless otherwise indicated. Forms may be obtained from the SSC Electronic Forms repository or from the NASA SSC Forms Management Officer. Quality Records are identified in the SSC Master Records Index.

16.0 ACRONYMS & ABBREVIATIONS

DFT	Dry Film Thickness
F	Fahrenheit
NASA	National Aeronautics and Space Administration
SACOM	Synergy-Achieving Consolidated Operations and Maintenance
SCWI	Stennis Common Work Instruction
SPR	Stennis Procedural Requirements
SSC	John C. Stennis Space Center
SSP	John C. Stennis Safety Procedure
SSPC	The Society for Protective Coatings
SSTD	John C. Stennis Space Center Standard
STD	Standard

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