PART I GENERAL

1.01 SCOPE

A. This guide details the procedures recommended by the Carboline Company for the application of Plasite 4550 S protective coating system to the interior of process and storage vessels.

B. In cases where there is a procedure difference between this specification and any other specification or standard referred to, the other specification's author and the Carboline Company Technical Service Department shall be consulted.

C. The applicator shall review this specification and consult the Carboline Company Technical Service Department regarding its interpretation, disapproval or request for procedure changes. Deviations from this specification shall be discussed and agreed to by the Carboline Company Technical Service Department.

D. The coating material manufacturer's current product data sheets are to be used in conjunction with and become a part of this specification. The applicator shall adhere to all accommodations of product shelf life, mixing ratios and acceptable thinners.

E. The applicator shall use industry standard inspection equipment, quality control and inspection policies in regards to the application of this product.

F. It is the responsibility of the applicator to adhere to industry standard application and inspection procedures for record keeping purposes.

G. The coating system is to be applied in a single coat. The recommended coating dry film thickness for this service is a DFT range of 35-45 mils.

H. It is the applicator's responsibility to compute and supply adequate ventilation to prevent explosion and toxicity hazard conditions as prescribed by standards of good safety practices, local and state regulations, OSHA and other federal regulations.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, installation instructions, and chemical resistance data for the lining. Include verification indicating compliance of materials with requirements.

PART II PRODUCTS

2.01 COATING MATERIALS

A. Lining material shall be Plasite 4550 S consisting of one coat. Reference: The Carboline Company product data sheet Plasite 4550 S.

2.02 COLORS

A. Lt. Gray & Lt. Blue.

PART III EXECUTION

3.01 PRELIMINARY INSPECTION

Before any coating is begun, the interior surfaces of the vessel shall be inspected to see that the following has been done (as per NACE Standard SP0178 or the Carboline PA-3 bulletin).

A. All weld splatter, sharp projections, slivers and pits shall be removed.

1. Weld metal shall be used to fill repairs. Putty shall not be used without consulting the Carboline Company Technical Service Department.

B. Welds that are rough, irregular and not well formed shall be corrected by grinding smooth.

C. All sharp corners and edges shall be rounded to at least a 1/8" radius.

D. No other conditions exist which would shorten the expected life of the applied coatings.

E. Used vessels. (Based on the previous service environment, decontamination may be required.)

1. Decontamination shall be performed by one or a combination of the following methods.

(a) Prebaking at 400°F or minimum of 50°F above maximum service temperature for 4 hours.

(b) Steaming for 24 hours with 15 psi steam.

(c) Ultra high pressure (30,000 psi) washing.

(d) High pressure washing with cleaning or neutralizing chemicals.

2. Decontamination shall be verified by the use of a chloride test kit, pH test or black light, whatever is dictated by the previous service conditions.

3.02 SURFACE PREPARATION

A. Oil and grease shall be removed from the surfaces to be coated with a suitable safety solvent prior to abrasive blasting.

1. Vessel design and fabrication details shall be in accordance with NACE SP0178. All sharp edges and welds should be ground smooth to a rounded contour in accordance with NACE Weld Preparation Designation "D" and all weld splatter shall be removed prior to abrasive blasting.

2. Non-carbon steel parts that will not be coated shall be removed and/or protected prior to blasting, including but not limited to hatch covers, hatch rings, outlet valves and vents. The lining shall be terminated on the non-carbon steel approximately 1" past the interface.

3. The compressed air used for blasting should be free of water and oil. In order to determine cleanliness, blast without abrasive into a white cloth. The trap and separators shall be blown down until subsequent cloth tests show no oil or water contamination.

4. All weld seams shall be individually blasted prior to blasting other areas of the vessel. Weld seams are the areas of early coating failure. Removal of contaminants and achieving the proper anchor pattern in the heat affected zone at the welds is critical to the service life of the lining.

B. Surfaces shall be blasted to a "near-white metal" in accordance with SSPC-SP10/ NACE No. 2 Joint Surface Preparation Standard.

1. The anchor pattern or “tooth” in the metal shall be a minimum depth of 3 mils. Proper abrasive shall be a sharp natural abrasive, steel grit, slag grit similar to or equal to Black Beauty® BB1240 or other abrasives having a sharp, hard-cutting surface, properly graded, dry and of the best quality and of proper size to produce the specified anchor pattern.

2. Natural abrasives such as flints and slags shall be used only once and not recycled.

3. The recycling of steel grit will be permitted when new grit is added on a regular basis to maintain the media size. The recovery system must be a commercially manufactured air wash system capable of removing all media fines and contaminants from the blasting process.

C. All internal surfaces shall be vacuum cleaned to remove all blast media and dust after blasting is completed. External surfaces may be air blown clean using dry, oil-free air.

1. No visible oxidation shall be permitted between the time of blasting and priming the blasted surface.

2. The interior of the vessel shall be protected from moisture from the time of blasting to the time of application of the lining.

3.03 COATING APPLICATION

A. Before starting coating application, it is recommended that the applicator read all available safety data including, but not limited to, OSHA approved material safety data sheet, product data sheet and backup label.

B. Plasite 4550 S consists of two parts which must be applied using a plural or single component spray rig. Consult the product data sheet or the Carboline Technical Service Department for further information. Reference: The Carboline Company product data sheet Plasite 4550 S.

1. Do not thin the coating material unless authorization has been given by Carboline Technical Service Department. **Note: Plasite 4550 S can only be thinned if spraying with a single component spray rig.**

(a) When using a plural component spray rig, the required temperature of the material for spraying is: Part A- 110°F, Part B- 90-100°F.

(b) When using a single component spray rig, the required temperature of the material for spraying is between a range of 75-85°F to achieve optimum atomization.

C. The lining application must not proceed until the substrate temperature is a minimum of 5°F above the dew point. Minimum air and/or surface temperature at the time of application shall be above 50°F. The ambient and substrate temperatures shall be above 50°F for 36 hours after coating is applied, and will be required for proper polymerization.

Substrate temperature, relative humidity, dew point and air temperatures shall be taken and recorded at least one hour before application and every four hours during application, unless weather conditions dictate otherwise.

D. The weld seams shall be scrub striped before spray application begins.

1. The striping shall be performed with a good quality bristle brush using Plasite 4550 S.

2. Scrub striping is accomplished by moving the brush back and forth in a scrubbing motion to work the primer into crevices and undercut areas of the welds.

3. Bristles left on the surface shall be removed before the coating dries.

E. All areas subject to overspray and drips (such as the vessel floor) shall be protected by a suitable covering while spraying other areas in the vessel.

F. Plural component spraying: Use a fixed ratio 4 to 1 (by volume) plural component spray rig such as: A Graco King Hydra-Cat (or equal) with heated hoppers, in-line heaters, heated hoses to mixer manifold through a static mixer to a 50' whip hose followed by a silver gun (Binks 1M or equal) utilizing a reverse "a" tip from .019 to .035 size.

G. Single component spraying: Use an air motor with an air ratio of 45 to 1 or larger such as: a Graco "King" airless spray pump followed by a silver gun (Binks 1M or equal) utilizing a reverse "a" tip from .019 to .035 size.

.

H. Air supply shall be uncontaminated.

I. Apply the Plasite 4550 S as a single coat application.

J. Apply a criss-cross multi-pass, moving gun at a fairly rapid rate, maintaining a wet appearing film. Additional multi-passes may be applied until you have a film thickness of approximately 35 to 45 wet mils (measured on a wet film thickness gauge).

K. Venting (optional) from the bottom of the vessel is recommended during the application and initial curing process.

L. Overcoating (tie-in areas) to previously applied Plasite 4550 S. This will vary with time and temperature and may require 10 to 12 hours at 75°F. When the film becomes firm, follow the intercoat procedures as described in section 3.06.

1. Intercoat preparation is necessary to insure proper bonding. Review section 3.06 for proper procedure for intercoat preparation.

2. Substrate temperature, relative humidity, dew point and air temperatures should be taken and recorded after application to ensure minimum cure requirements are met.

M. Final coat –Is only needed in areas where the application is substandard due to low mils. In order to achieve a final thickness of 35 to 45 mils, repeat Steps I and L, using Plasite 4550 S, until homogenous film of 35 to 45 mils is obtained.

1. Topcoat shall be smooth in appearance and holiday-free as determined with a high voltage holiday tester. Use 100 volts per mil as a standard for spark testing.

N. Defects shall be sanded smooth and recoated for retest for film thickness and holidays.

3.04 CURING

A. Normally, polymerization and curing will take place in 36 hours at 75°F or 72 hours at 50°F. If temperature is in the range of 50 to 75°F, extended curing may be required.

B. Curing must be completed before the vessel is closed up or moved to weather conditions below the 50°F minimum curing requirements (time and temperature). This may require force curing.

C. Force curing at elevated temperatures does increase to certain exposures; therefore, when exposure is severe, force curing is recommended to obtain maximum resistance.

D. An air dry time of 12 hours at 70 to 100°F shall be allowed before force curing. After air dry period, substrate temperature shall be raised approximately 30°F in increments of 30 minutes until the desired temperature is reached. Curing time begins when the specific substrate temperature is reached.

SUBSTRATE TEMP	CURING TIME	SUBSTRATE TEMP	CURING TIME
130°F	12 Hours	170°F	4 Hours
140°F	9 Hours	180°F	3 Hours
150°F	7 Hours	190°F	2 Hours
160°F	5-6 Hours	200°F	1 3/4 Hours

3.05 INSPECTION

A. Determine degree of blast obtained using NACE or SSPC standards.

B. Depth of profile shall be determined by visual comparison to Clemtex anchor pattern standards or by using Press-O-Film replica tape.

C. Total dry film thickness shall be determined using non-destructive dry film thickness gauges, which have been properly calibrated. SSPC-PA2 shall be used as a guide for the number of readings required per square foot.

D. After a minimum of 12 to 24 hours of cure at 70 to 90°F, the coating film can be tested for discontinuities with a high voltage holiday detector. All discontinuities shall be repaired. **NOTE:** Discontinuity tests shall be performed with a non-destructive type holiday detector such as the Tinker Rasor Model AP/W.

3.06 REPAIR

A. Areas which contain visual rust shall be abrasive blasted feathering onto adjoining sound coating.

B. Intercoat preparation of areas of low mils shall be completed in the following manner, if the coating has cured less the 24 hours.

1. Soap and water wash the exposed surface to be recoated.

2. Rinse the surface and allow drying.

3. Apply Plasite 4550 S to achieve the specified thickness.

C. Intercoat preparation of areas of low mils should be completed in the following manner, if the coating has cured more than 24 hours.

1. Soap and water wash the exposed surface to be recoated.

2. Rinse the surface and allow drying.

3. Lightly abrade the surface to achieve an anchor profile.

4. Apply Plasite 4550 S to achieve the specified thickness.

D. Apply coating with brush, roller or spray gun depending on the size of the area to be patched. The final coat should be applied as a one coat application. The size of the area to be repaired may dictate the method of application.

3.07 SAFETY

A. WHEN HANDLING THIS PRODUCT, REFER TO THE PLASGUARD 4550 S PRODUCT DATA SHEET. PROPER CARE IS ALWAYS DEMANDED BY GOOD PRACTICE, AND/OR OSHA, STATE AND LOCAL SAFETY CODES, ETC. AND MUST BE FOLLOWED CLOSELY.

8/1/06