

## 1. SCOPE

- 1.1 The procedures outlined in this specification are to be used in applying PLASITE 4100, 4300, 4110 and 4310 to steel and concrete surfaces in immersion service.
- 1.2 The coating system is to be applied in two to three multi-pass spray coats to a nominal film thickness of 40 mils. The acceptable minimum is 35 and the maximum is 45.
- 1.3 An appropriate 4000 Series PLASITE data sheet is to be used in conjunction with and become part of this specification.

## 2. SURFACE PREPARATION – STEEL

- 2.1 All sharp edges shall be ground to produce a radius and all imperfections, such as skip welds, delaminations, scabs, slivers and slag shall be corrected prior to abrasive blasting. Skip welds shall be welded solid.
- 2.2 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 should adhere to all accommodations of product shelf life, mixing ratios and acceptable thinners.
- 2.3 The degree of profile shall be a minimum of 4 mils as determined by comparing with Carboline's blasted panel, using adequate light and magnification if desired. Panel is available to inspectors on a job basis.
- 2.4 In preparing the surface, compressed air shall be used, maintaining a minimum of 100 psig at the blasting nozzle. The size of nozzle used shall be dictated by the scfm/psi available. The air supply shall be free of oil, water and other contaminants.
- 2.5 An abrasive for surface preparation of carbon steel shall be selected that is free of contaminants, dry, hard and of proper size to obtain the specified profile. Suggested abrasives are bagged or bulk BLACK BEAUTY® BB-1040, steel grit HG-25, or Flint Abrasive #S7 (6-30 mesh).
- 2.6 The freshly blasted surface shall be cleaned of all abrasives by blowing down with clean air, brushing and/or vacuum cleaner equipped with stiff brush. Brushing and blow down are not as satisfactory as vacuum cleaning.
- 2.7 The surface temperature shall be maintained at a minimum of 5° above the dew point to prevent oxidation of the surface. The coating shall be applied within the same day that the surface has been prepared. Visible oxidation or condensation is not allowed.

## 3. APPLICATION - 4000 SERIES

- 3.1 The 4000 series vinyl ester systems are supplied in 5-gallon and 1-gallon kits. A kit consists of 4 containers identified as Part A (the resin), Part B (the pigments), Part C (the catalyst) and Part D (the promoter). In a 1-gallon kit, Part A and Part B are supplied in one gallon containers. Part C and Part D are supplied in small containers. A 5-gallon kit, Part A is supplied in a six gallon container for ease of mixing. Part B is supplied in a 5-gallon container with the Part C and Part D supplied in small containers.
- 3.2 Airless or conventional atomizing spray shall be used for applying PLASITE 4100 and 4300. For applying PLASITE 4110 and 4310, atomizing air spray is recommended to be used because of the high wear rate of the tips and pumps on an airless spray. For airless spraying, use GRACO Bulldog or equivalent having a capacity of 3 gallons per minute and a tip size with .025 orifice or larger with a 12" minimum spray pattern. All screens should be removed from the gun. Screens no smaller than 60 mesh should be used at the pump. A 3/8" diameter fluid line is recommended with a liquid pressure of 1800 to 2200 psig. For conventional spray, use a Binks No. 2001 gun with a No. 251 air cap and No. 59ASS fluid tip or equivalent.

An alternate Binks nozzle set-up would be a No. 261 air cap and No. 59BSS fluid tip. A heavy-duty trigger spring is required with gun. The atomization pressure should be adjusted to 60 lbs. with a pot pressure of 50 lbs.

- 3.3 Do not allow substrate or air temperature to be below 69°F for more than 16 hours or a minimum temperature of 60°F for 12 hours. If the foregoing conditions occur, it is required that the substrate and air temperatures be raised to a minimum of 70°F before the time limits shown. The temperatures of 70°F and above shall be held until coating surface is tack-free. The time required to obtain this "non-tacky" condition will be decreased as surface temperature increases. When surface temperatures are over 100°F, consult the Carboline Technical Service Department for application instructions.
- 3.4 PLASITE 20 Thinner shall be used to adjust coating for various application conditions. First coat application does not necessarily require thinning. Succeeding coats will require thinning a minimum of 5% by volume. Additional thinning will be needed to adjust coating for higher temperature and various other application conditions, including the topcoat of previous coating films with long term cure.
- 3.5 Part A and Part B shall be mixed with a motorized agitator driven by air or an explosion-proof motor. Part B (the pigments) shall be slowly added so that it does not leave lumps in the resin (Part A). Part A and Part B will require approximately 15 – 30 minutes of thorough mixing to be properly blended. Part D (the promoter) shall then be added and thoroughly mixed into the Part A/Part B blend. There shall be no streaking from the Part D in the Part A and Part Blend of the Part D when the mixing in of the Part D is completed. Part C (the catalyst) can then be mixed into the Part A, Part B and Part D blend.

**CAUTION: The promoter (Part D) and the catalyst must be SEPARATELY MIXED into the Part A/Part B blend. Any contact of unmixed Part D with Part C may lead to a fire or explosion!**

- Mixing can be expedited by the blending of Part A, Part B and Part D 16 -24 hours in advance of the application. The mixture consisting of Part A, Part B and Part D must be used within 72 hours. Part C (the catalyst) can then be added and thoroughly mixed into the solution just prior to application. The pot life, after mixing, varies from 1 to 2 hours depending upon material temperature. Do not divide parts or add new mixtures to old. Continuous mixing during use is required.
- 3.6 The coating, thinned 30% by volume with PLASITE 20 Thinner, shall be brush applied to all welds and seams. The technique for brushing shall be to brush out and not to flow on the coating.
  - 3.7 The mixed coating shall be applied utilizing a multi-pass spray system. Apply horizontal and vertical passes with 50% overlap. The total wet mils per coat shall be approximately 24 to 26 mils, resulting in a dry film thickness of 18 to 22 mils. Special precautions are required at overlaps and welds to eliminate excessive film build. Spray gun should be perpendicular to surface at all times, approximately 14" from surface.
  - 3.8 Coating may be overcoated after initial "set," which will occur normally in 3 to 6 hours at 70°F with proper ventilation. Initial "set" time will decrease as surface temperature increases. When physical contact (foot traffic, scaffolding, etc.) with the previously applied coating is required, a minimum of 10 hours at 70°F substrate and air temperature with ventilation is normally required before proceeding. Previously applied coats must have reached a "non-tacky" state before being exposed to physical contact. This condition will occur in less time as surface temperature increases.  
 Note: Previously applied coating exposed to direct sunlight or surface temperature in excess of 130°F may result in intercoat disbondment. Coating film exposed to an accumulation of over 24

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hours of UV exposure before topcoating will result in intercoat disbondment. Special procedures (such as shading with tarps) should be used to prevent an accumulation of 24 hours of UV exposure. Overcoating shall be performed as soon as possible to prevent contamination. Any moisture from condensation or any source will kill the cure on freshly applied coating before it reaches a "non-tacky" stage.

## 4. CURING

- 4.1 The minimum air dry time at 70°F surface temperature is 10 days. If force curing is incorporated, an air dry time with air movement of a minimum 2 hours shall be allowed. Temperatures should then be raised approximately 30°F in increments of 30 minutes to final surface temperature. Curing schedule as outlined in PLASITE data sheet 4100 or 4300 can be incorporated.

**Note:** The final cure requirement can be accumulative. Final cure requirements must be met within 14 days of application.

## 5. CURING CHECK

- 5.1 Compare hardness with cured test panels with knife point.

## 6. METAL TEMPERATURE - AIR TEMPERATURE - DEW POINT

- 6.1 Metal temperature shall be recorded at least every 4 hours and before application of coating.
- 6.2 Humidity or wet bulb reading shall be taken at same time as metal temperature reading to ensure that metal temperature is at least 5°F higher than the dew point. Dry bulb temperatures shall be recorded at the same time to ensure curing. Metal temperature is the governing factor.

## 7. INSPECTION

- 7.1 Dry film thickness shall be determined utilizing a non-destructive magnetic type high range gauge. The anticipated film thickness shall be in the middle range of the gauge. The total dry film thickness shall be a minimum of 35 mils, with a maximum of 45 mils. A suspect area, that being in excess of 45 mils or less than 35 mils, shall then be acceptable if an average of 35 - 45 mils is obtained when four additional readings are observed, taken approximately one foot from the suspect area at top, bottom and both sides.
- 7.2 For immersion service, a pinhole-free film is essential and testing with Tinker & Rasor Model AP-W or equivalent is required on final film. Use 4000 to 4500 volts for PLASITE 4100 or 4300. Use 3000 to 3500 volts for PLASITE 4110 or 4310. Allow a minimum cure of 48 hours at 70°F or 36 hours at 90°F before holiday testing.

## 8. REPAIR

- 8.1 Clean damaged area, removing all contaminants and loose coating.
- 8.2 Abrasive blast substrate to original specification where coating has been exposed to environment and where oxidation is evident. Feather the original coating not less than 2 inches from damaged area.
- 8.3 If new coating is physically damaged and has not been in service, repair as shown above. For repairing holidays, sand surface and brush apply proper thickness of coating.
- 8.4 Apply coating by brush or spray. Do not apply by brush on areas larger than 1 square foot.

**WARNING!** Contamination of previously exposed coating film may be detrimental to adhesion of the repair and may affect service life expectancy.

- 8.5 Refer to Section 4 for curing information.

## 9. SURFACE PREPARATION - CONCRETE

- 9.1 Inspect for structural failures, cracks, protrusions and fins. Grind surface flush and grind cracks to "V" configuration. Chip out all loose concrete to width of 1/4" minimum.
- 9.2 Repair all large holes, cracks, voids and other imperfections with Plasite 9029 filler-sealer, with addition of specified sand as required to provide proper stiffness used as the grout. Mixtures of specified sand up to equal parts of sand to resin may be used. Refer to Plasite data sheet 9029.
- 9.3 Concrete surface must have 30 days cure, be clean, hard, dense and free of laitance, form oil and release agents. Blow holes, pits and cavities must be opened in order that they may be properly filled and sealed. To provide the foregoing requirements, it is necessary to prepare the surface using one or more methods listed in order of preference.
- 9.3.1 Whip blast with sand that is 90% 50 or 60 mesh with nozzle pressure of approximately 70 psi. Pressure and distance of nozzle from surface depends on characteristics of concrete.
- CAUTION!** Do not overblast as it will result in high consumption of material and labor.
- 9.3.2 Water blasting at pressure of approximately 3000 psi may be used to produce similar results required in 9.3 and 9.3.1.

## 10. FILLING AND SEALING CONCRETE

- 10.1 Concrete surface must be filled and sealed with Plasite 9029 filler-sealer. Refer to PLASITE data sheet 9029 for mixing and application instructions.
- 10.2 Apply first coat by spray or hand method, thoroughly work into surface with squeegee or flexible plastic to provide a flush uniform surface.
- 10.3 Apply second coat in same manner as 10.2. This will normally fill all small voids and leave 10 to 15 mils on the flush surface. Coverage rates for 10.2 and 10.3 are approximately 80 to 120 square feet per gallon depending on the roughness of concrete surface. This coat may be applied immediately after first coat or whenever first coat is hard.
- 10.4 Damp concrete surface may be filled and sealed with Plasite9029.
- 10.5 Visually inspect all surfaces and repair any voids.

## 11. TOPCOAT APPLICATION

- 11.1 Filled and sealed surface must be clean, dry, uncontaminated and hard before topcoating. The filler-sealer will reach the foregoing condition at temperatures of 50 to 60°F with low humidity within 16 hours. At 70°F with relative humidity of 40 to 60%, it may be suitable for coating within 8 to 10 hours.
- 11.2 Apply topcoats of PLASITE 4000 series in accordance with PLASITE data sheets 4100, 4300 and the foregoing Sections 1, 3, 4 & 6.
- 11.3 Inspect final topcoat for imperfections and repair.



350 Hanley Industrial Court, St. Louis, MO 63144-1599  
314/644-1000 314/644-4617 (fax) www.carboline.com

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