Plasite® 4110

PRODUCT DATA SHEET

SELECTION & SPECIFICATION DATA

Generic Type	Vinyl ester
Description	Vinyl ester resin combined with special curing system and inert flake pigment to provide outstanding chemical and physical properties. Specially formulated for excellent abrasion resistance. PLASITE 4110 meets the FDA requirements for 21 CFR, 175.300 and 177.2420 and is suitable for potable water service per NSF Std. 61. Uses: As a high chemical abrasion-resistant thick film for tank lining service and as a maintenance coating for severe exposure.
Features	Meets the criteria of NSF/ANSI/CAN 600
Color	Grey (0700)
Primer	Primer (optional, as needed): Self-priming to steel To control outgassing on concrete: Dudick Primer 27 Pit/void filler and surfacer: Dudick Scratch-Coat 800 Control Moisture Vapor Transmission (MVT): Dudick Vapor Stop
Dry Film Thickness	35 - 45 mils (889 - 1143 microns) total thickness achieved in 2-3 multi-pass spray coats recommended for immersion service. Consult Carboline Technical Service Department for any deviation to this film thickness. Refer to APPLICATION section.
Coverage Rate	Plasite 4110 will cover approximately 960 mil $ft.^2$/gal. or 86.4 sq. m. per 25 microns/gal. This is a coverage obtained from field use on small jobs and includes loss in can, spray loss, small amount of shrinkage, etc. Application by conventional spray equipment may affect coverage.
VOC Values	Thinner 76 : Thinned 5% by volume 0.78 lbs/gal (93 g/L) **As Supplied** : 0.50 lbs/gal (60 g/L) Plasite Thinner #20 : Thinned 5% by volume 0.78 lbs/gal (93 g/L)
Dry Temp. Resistance	Continuous: 380°F (193°C) Non-Continuous: 460°F (238°C) **Limited short excursions to 460 °F (238 °C) acceptable**. Wet temperature resistance depends upon concentration and reagent exposure.
Topcoats	Not Applicable
Density	79.1 lbs/ft^3 (0.26384 lbs/ft^2 at 40 mils)

SUBSTRATES & SURFACE PREPARATION

General	Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.
Steel	Cleanliness: Abrasive blast to SSPC-SP10 (minimum) Profile: Minimum 4 mil (100 micron) dense, sharp anchor profile free of peening, as measured by ASTM D 4417. Defects exposed by blasting must be repaired.

SUBSTRATES & SURFACE PREPARATION

Aluminum	Surface shall be clean and grease-free with a blast produced anchor pattern or "tooth" as described earlier under "Steel". In addition, the blasted surface shall be given a chemical treatment such as: Alodine 1200S available from Henkel Surface Tech, Iridite 14-2 produced by MacDermid Incorporated, Oakite Cryscoat 747 LTS and Oakite Cryscoat Ultraseal produced by Oakite Products.
Concrete or CMU	Concrete shall be designed, placed, cured, and prepared per NACE No. 6/SSPC-SP 13, latest edition. Abrade to remove all laitance, loose concrete, etc. and to create surface profile in accordance with the appropriate ICRI CSP 5-7.

PERFORMANCE DATA

All test data was generated under laboratory conditions. Field testing results may vary.

Test Method	System	Results
Abrasion Resistance	Plasite 4110	11 milligrams average loss per 1000 cycles Taber CS-17 Wheel, 1000 gram weight
Elongation	Plasite 4110	1.7% using Method ASTM D638
Film Density	Plasite 4110	79.1 lbs/ft^3 0.26384 lbs/ft^2 at 40 mils
Pigments	Plasite 4110	Inert fillers and flake
Surface Hardness	Plasite 4110	Konig Pendulum Hardness of 134 seconds (Glass Standard = 250 seconds); ASTM Method D4366-84.
Thermal Shock	Plasite 4110	Unaffected by minus 70 °F to plus 200 °F in 5 cycles, or 40 to 380 °F in 10 cycles

MIXING & THINNING

Mixing

Pre-mix Part A using a mechanical high speed mixer. While continuing to mix part A, gradually sift in the Part B component into Part A, maintaining a good vortex while mixing until a homogenous liquid is achieved, free of any unmixed particles of pigment (approximately 10-15 minutes). Scrape the sides of the bucket to ensure no unblended components of the mix remain before proceeding to the next step. After the pigments and liquid are thoroughly blended together, and while continuing to mix, add the entire amount of the measured Part D (liquid promoter) until no color streaking remains visible. Allow to cool if material temperature increases, (NOTE: Part A, Part B and Part D may be premixed up to 72 hours prior to adding Part C) then add Part C (catalyst) and necessary amount of Plasite Thinner 20. Mix an additional three to five minutes.
WARNING! The promoter (Part D) and the catalyst (Part C) must be separately mixed into the coating (Parts A&B). Any contact of unmixed Part C with Part D may lead to a fire or an explosion! Continuous agitation during use is required. Operator should wear face mask during high speed mixing of the coating components. Avoid breathing dust.

Kit components match as follows:
Small, 1 gallon kit:
Part A - Approximately 3/4 of a gallon in a one gallon container
Part B - Approximately 5.5 pounds in a one gallon container
Part C - Approximately 3.6 fluid ounces in a 6 ounce plastic bottle
Part D - Less than 0.27 fluid ounce in a 2 ounce plastic bottle
Large, 5 gallon kit:
Part A - Approximately 3.75 gallons in a 6 gallon container
Part B - Approximately 27 pounds in a 5 gallon container
Part C - Approximately 18 fluid ounces in a 1 quart plastic bottle
Part D - Approximately 1.4 fluid ounces in a 2 ounce plastic bottle

MIXING & THINNING

Thinning	Use 2 to 10% thinning with PLASITE Thinner #20 or Thinner 76 as needed to adjust coating for higher temperatures and various application conditions. Topcoating of previously coated films will require the addition of 2 to 20% thinner. Consult Carboline laboratory for unusual thinning requirements. See RECOATING TIME SECTION.
Pot Life	55-75 minutes at 75°F (24°C). Material temperatures in excess of 90°F (32°C) will significantly reduce pot life. **CAUTION!** Do not attempt to extend pot life by mixing newly catalyzed coating into coating near the end of its pot life.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Conventional Spray	59ASS Fluid Nozzle 251 Air Cap 559SS Needle Pot pressure of approximately 50 psi Atomizing pressure of approximately 60 psi Use standard production type pressure pot with dual regulators and lid-mounted agitator. CONTINUOUS MIXING DURING USE IS REQUIRED. Heavy-duty trigger spring on spray gun is recommended. Note: Application by conventional spray equipment may affect maximum film building capabilities and coverage rates. Applicators may prefer to apply additional coats to achieve the 40 mil nominal DFT.
Airless Spray	GPM Output 3.0 (minimum) Material hose 3/8” I.D. (minimum) Fluid nozzle 0.025” or larger Output PSI 1800-2200 12” minimum spray width All screens should be removed from pump and gun. CONTINUOUS MIXING DURING USE IS REQUIRED. Note: Conventional spray equipment is preferred. Expect higher wear rates to airless spray equipment lower units and spray tips.
Brush	Brush application is not recommended, but may be used for repairs or touch-up. Continuous mixing during use is required.

APPLICATION PROCEDURES

General

A minimum surface temperature of 70 °F (21 °C) is required to obtain polymerization of the coating system. Coating can be applied at a surface temperature as low as 60 °F (16 °C) but polymerization will be inhibited. Succeeding coats cannot be applied without damaging the system until the surface temperature rises sufficiently to obtain partial polymerization. This will require raising to the minimum surface temperature of 70 °F (21 °C) within 12 hours of application. Refer to CURING section. When surface temperatures are over 100 °F (38 °C), consult Carboline Technical Service for special instructions.

The mixed coating shall be applied utilizing a multi-pass spray system. Apply horizontal and vertical passes with 50% overlap. 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 in/36 cm from surface. For non-NSF applications, coating may be overcoated after initial “set” which will occur normally in 3 to 6 hours at 70 °F (21 °C) with proper ventilation. Initial “set” time will decrease as surface temperature increases. Refer to RECOATING TIME section.

When physical contact (foot traffic, scaffolding, etc.) with the previously applied coating, or for NSF applications is needed, a minimum of 10 hours at 70 °F (21 °C) substrate and air temperature with ventilation is 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. Overcoating shall be performed as soon as possible to prevent contamination.

LINING REPAIR

Clean damaged area, removing all contaminants and loose coating. 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 in/5 cm from damaged area.

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. Apply coating by brush or spray. Do not apply by brush on areas larger than 1 sq. ft./.093 sq.m.

RECOATING TIME

May be recoated after initial 10 hour cure. Following coating must be applied within 30 days. Each following coat should be diluted approximately 2 to 20% with PLASITE Thinner 20. Note: Previously applied coating exposed to an accumulation of 24 hours of sunlight or surface temperatures in excess of 130 °F may result in intercoat disbondment. An applied coating film must be topcoated before an accumulation of 24 hours exposure has occurred or special procedures (such as shading with tarps) must be used.

Warning: Contamination of previously exposed coating film may be detrimental to adhesion of the repair and may affect life expectancy.

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	70°F (21°C)	60°F (16°C)	60°F (16°C)	0%
Maximum	90°F (32°C)	100°F (38°C)	100°F (38°C)	80%

A minimum surface temperature of 70 °F (21 °C) is required to obtain polymerization of the coating system. Coating can be applied at a surface temperature as low as 60 °F (16 °C) but polymerization will be inhibited. Succeeding coats cannot be applied without damaging the system until the surface temperature rises sufficiently to obtain partial polymerization. This will require raising to the minimum surface temperature of 70 °F (21 °C) within 12 hours of application. Refer to CURING. When surface temperatures are over 100 °F (38 °C), consult Carboline Technical Service Department for special instructions.

CURING SCHEDULE

Surface Temp.	Cure Time
70°F (21°C)	10 Days
90°F (32°C)	7 Days

Although coating may be applied at substrate temperatures as low as 60 °F (16 °C), the substrate temperature must be raised to at least 70 °F (21 °C) within 12 hours and held until coating surface is tack-free (approximately 10 hours) to avoid possible loss of cure. A minimum of 70 °F (21 °C) surface temperature is required to obtain polymerization of this coating.

Surface Temp.	Cure Time
110°F (43°C)	72 Hours
120°F (49°C)	36 Hours
130°F (54°C)	18 Hours
140°F (60°C)	10 Hours
150°F (66°C)	6 Hours
160°F (71°C)	4.5 Hours
170°F (77°C)	3.5 Hours
180°F (82°C)	2.5 Hours
190°F (88°C)	2 Hours
200°F (93°C)	1.75 Hours

Listed are a few curing schedules that may be used for time and work planning. Prior to raising the metal to the force curing temperature, it is necessary that an air dry time of 2 to 5 hours at temperatures from 70 °F (21 °C) to 100 °F (38 °C) be allowed. After the air dry time has elapsed, the temperature should be raised in increments of approximately 30 °F (17 °C) every 30 minutes until the desired force curing metal temperatures are reached. Any moisture from condensation of any source will kill the cure on freshly applied coating before it reaches a “non-tacky” stage. A force cure at 200 °F (93 °C) metal temperature for 4 hours is necessary to comply with NSF Standard 61 requirements.
See NSF instructions below for compliance requirements.

TESTING / CERTIFICATION / LISTING

Potable Water Certifications

- **Potable Water Use Limitations @ 75°F (24°C):**
- *Meets drinking water criteria of NSF/ANSI/CAN 600*
- Max DFT: 45 mils (1143 microns)
- # Coats: 2 to 3
- Tank Rating: >600 gal (>2271 Liters)
- Pipe Rating: Not rated
- Valve Rating: Not rated
- Thinning: Plasite Thinner #20 at 10%
- Recoat Cure Time and Temperature: 12 Hours at 75°F (24°C)
- Final Cure Time and Temperature: 4 hours at 200°F
- Approved Colors: Grey (0700)

CLEANUP & SAFETY

Cleanup

Clean with PLASITE Thinner 20. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety

Read and follow all caution statements on this product data sheet and on the SDS for this product. Employ normal workmanlike safety precautions. Keep container closed when not in use.

CLEANUP & SAFETY

Ventilation	When used in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure, use MSHA/NIOSH approved respirator.
Caution	This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

PACKAGING, HANDLING & STORAGE

Packaging	**1 gallon kit:** Part A: Partially filled 1 gallon container Part B: Partially filled 1 gallon container< Part C: Partially filled 6 ounce plastic bottle Part D: Partially filled 2 ounce plastic bottle **5 gallon kit:** Part A: Partially filled 6 gallon container Part B: Partially filled 5 gallon container Part C: Partially filled 1 quart plastic bottle Part D: Partially filled 2 ounce plastic bottle
Shelf Life	At 75°F (24°C) Part A: 12 months Part B: 24 months Part C: 12 months Part D: 24 months Cooler storage temperatures will increase shelf life. Storage at higher temperatures can result in substantially shorter shelf life.
Storage	Keep out of direct sunlight. Avoid excessive heat and do not freeze.
Shipping Weight (Approximate)	12 lbs. per 1 gallon kit 60 lbs. per 5 gallon kit

WARRANTY

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance, injuries or damages resulting from use. Carbolines sole obligation, if any, is to replace or refund the purchase price of the Carboline product(s) proven to be defective, at Carbolines option. Carboline shall not be liable for any loss or damage. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All of the trademarks referenced above are the property of Carboline International Corporation unless otherwise indicated.