

TYPE

PLASITE 4110 is a 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.

INTENDED USE

As a high chemical abrasion-resistant thick film for tank lining service and as a maintenance coating for severe exposure.

NSF REQUIREMENTS

PLASITE 4110 is certified to NSF/ANSI Standard 61 for cold potable water when the following requirements are met:

- The tank is 3,000 gallons/11,100 liters or larger.
- PLASITE Thinner #20, up to maximum of 10% by volume, may be used for thinning purposes.
- The coating must be applied in 2 to 3 coats to a maximum DFT of 45 mils/1125 microns.
- Prior to placing the lining in service, it must be force cured at 200°F/93°C metal temperature for 4 hours.

TEMPERATURE RESISTANCE

Dry tests 380°F/193°C continuous; limited short excursions to 460°F/238°C acceptable. Wet temperature resistance depends upon concentration and reagent exposure.

COLOR Charcoal gray

FILM THICKNESS

2 to 3 multi-pass spray coats will produce the 35 to 45 mils/875 to 1125 microns dry film thickness recommended for immersion service. Consult Carboline Technical Service Department for any deviation to this film thickness. Refer to APPLICATION section.

VOC CONTENT (Determined Theoretically)

Coating as Supplied		Thinned 5% by Volume with PLASITE Thinner #20	
Lbs./Gal.	g/L	Lbs./Gal.	g/L
0.50 ± 2%	60 ± 2%	0.78 ± 2%	93 ± 2%

COVERAGE

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.

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 10% 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.

THINNERS

Use PLASITE Thinner #20. 2 to 10% thinning may be needed to adjust coating for higher temperatures and various application conditions. Topcoating of previously coated films will require the addition of 2 to 10% thinner. Consult Carboline laboratory for unusual thinning requirements. See RECOATING TIME SECTION.

CLEANUP THINNER: Thinner #71

PRIMERS

For steel surfaces, coating is considered to be a "self-priming" system. Do not apply PLASITE 4110 directly to concrete. See reference to fillers and sealers in CONCRETE section.

PHYSICAL SPECIFICATIONS

Pigments: Inert fillers and flake.

Pot Life: 1 1/2 to 3 hours in one gallon cans and 1 1/2 to 2 hours in five gallon cans at 70 to 90°F/21-32°C MATERIAL temperature. MATERIAL temperatures in excess of 90°F 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.

Shelf Life: Approximately 4 months at 75°F/24°C. Cooler storage temperatures will increase shelf life. Storage at higher temperatures can result in substantially shorter shelf life.

Film Density: 79.1 lbs./ft³ 0.26384 lbs./ft² at 40 mils.

Elongation: 1.7% using Method ASTM D638.

Shipping Weight: 12 lbs. per gallon kit.

Abrasion Resistance: 11 milligrams average loss per 1000 cycles Taber CS-17 Wheel, 1000 gram weight.

Surface Hardness: Konig Pendulum Hardness of 134 seconds (Glass Standard = 250 seconds); ASTM Method D4366-84.

Thermal Shock: Unaffected by minus 70°F to plus 200°F in 5 cycles, or 40 to 380°F in 10 cycles.

CHEMICAL RESISTANCE

Superior chemical resistance to organic and inorganic acids, oxidizing agents and salts.

CURING

Curing Time: 10 days at 70°F/21°C or 7 days at 90°F/32°C. 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.

Force Curing

Listed below 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.

METAL TEMPERATURE	CURING TIME	METAL TEMPERATURE	CURING TIME
110°F/43°C	72 Hrs	160°F/71°C	4 ½ Hrs
120°F/49°C	36 Hrs	170°F/77°C	3 ½ Hrs
130°F/54°C	18 Hrs	180°F/82°C	2 ½ Hrs
140°F/60°C	10 Hrs	190°F/88°C	2 Hrs
150°F/66°C	6 Hrs	200°F/93°C	1 ½ Hrs

PACKAGING1 gallon unit:

1 one gallon can of Part A
 1 one gallon can of Part B
 1 small container of Part C
 1 small container of Part D

5 gallon unit:

1 six gallon partially filled pail of Part A
 1 five gallon pail of Part B
 1 small container of Part C
 1 small container of Part D

PLASITE® 4110

NSF Certified

SURFACE PREPARATION

Steel High Temperature & Immersion

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 should be welded solid. Degrease surface prior to sandblasting. Organic solvents, alkaline solutions, steam, hot water with detergents or other systems that will completely remove dirt, oil, grease, etc. shall be used. Used tanks may require additional decontamination

The surface shall be blasted to SSPC SP-5/NACE No. 1 white metal blast grade using a Venturi blast nozzle with 100 psi/7 bars. Reference Joint Surface Preparation Std. SSPC SP-5/NACE 1, White Metal Blast Cleaning. A blast profile depth or "tooth" in the metal shall be a minimum of 4 mils as determined by comparing Carboline's 4000 Series Blast Comparator, using adequate light and magnification. Comparator panel available by request to Carboline Technical Service. The blast media used shall be properly graded, clean, sharp angular abrasive similar to Humble abrasive flint S7 (6 to 30 mesh), steel grit (HG25), or BLACK BEAUTY® BB1040 to produce the required blast depth.

Remove all traces of grit and dust, as well as, embedded abrasives with a vacuum cleaner and/or by brushing. Care should be taken to avoid contaminating surface with fingerprints or from detrimental material on the workers' clothes or atmospheric contamination.

The surface temperature shall be maintained at a minimum of 5°F/3°C 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.

Severe Corrosive Environments – Splash & Fume

Surface preparation is the same in the foregoing with the exception that NACE No. 2 or SSPC-SP10 near white metal blast may be used providing the blast profile depth as described above is achieved.

Concrete

All concrete requires abrasive blasting to remove laitance and to provide a hard, firm, clean and fully-cured concrete surface for coating. All concrete surfaces are required to be filled and sealed prior to application of PLASITE 4110. Contact Carboline for recommendations.

APPLICATION

Mixing (Note: this is a 4-component material)

Mix Part B into Part A using a mechanical high speed agitator, making sure all Part B is completely mixed with Part A. Maintain a good vortex while mixing until a smooth liquid, free of any unmixed particles of pigment, is obtained (approximately 15-30 minutes). After the pigments and liquid are thoroughly mixed, add the entire amount of the measured liquid promoter (Part D). Mix completely. (no color streaking or residue of part D should remain on the container sidewalls). Allow to cool if material temperature increases, then add Part C 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 mixing during use is required. Part A, Part B and Part D may be premixed up to 72 hours prior to adding Part C. Operator should wear face mask during high speed mixing of the coating components. Avoid breathing dust.

Spray

Conventional atomizing spray system shall be equal to: Binks Model 2001 Gun with 59ASS Fluid Nozzle — 251 Air Cap, 559SS Needle. Heavy-duty trigger spring recommended. Pot pressure of approximately 50 psi/3.5 bars. Atomizing pressure of approximately 60 psi/4.1 bars. (Use standard production type pressure pot with air motor drive agitator.)

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/1000 microns nominal DFT. Airless spray system requires a large capacity pump with a capacity of 3 g.p.m./11.1 l.p.m. similar or equal to: Graco Bulldog with 0.025" or larger fluid nozzle; 12 in/30 cm minimum spray width is recommended. Use liquid pressure of approximately 1800 to 2200 psi/124-152 bars. All screens should be removed from pump and gun. A 3/8 in/9 mm diameter fluid line is recommended. 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.

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.

Brush

Brush application is not recommended, but may be used for repairs or touch-up. Continuous mixing during use is required.

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./0.93 sq.m.

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

INSPECTION

Degree of surface preparation shall conform to appropriate specifications as outlined in SURFACE PREPARATION section.

Metal temperature shall be recorded at least every 4 hours and before application of coating. Humidity (wet bulb reading) shall be taken to ensure that metal temperature is at least 5°F/3°C higher than wet bulb temperature. Dry bulb temperatures shall be recorded at the same time to ensure curing.

For immersion service, a pinhole-free film is essential and testing with Tinker & Rator Model AP-W or Stearns Model 14/20 or equivalent is required on final film. Use 3000 to 3500 volts. Allow a minimum cure of 48 hours at 70°F/21°C or 36 hours at 90°F/32°C before holiday testing. Dry film thickness shall be a nominal 40 mils/1000 microns with acceptable minimum at 35 mils/875 microns and maximum at 45 mils/1125 microns. Refer to Plasite Bulletin PA-3, Section 3, for inspection requirements.

SAFETY READ THIS NOTICE SAFETY AND MISCELLANEOUS EQUIPMENT

For tank lining work and enclosed spaces, it is recommended that the operator provide himself with clean coveralls and rubber soled shoes and observe good personal hygiene. Certain personnel may be sensitive to various types of resins which may cause dermatitis.

THE SOLVENT IN THIS COATING IS FLAMMABLE AND CARE AS DEMANDED BY GOOD PRACTICE, OSHA, STATE AND LOCAL SAFETY CODES, ETC. MUST BE FOLLOWED CLOSELY. Keep away from heat, sparks and open flame and use necessary safety equipment such as air mask, explosion-proof electrical equipment, non-sparking tools and ladders, etc. Avoid contact with skin and breathing of vapor or spray mist. When working in tanks, rooms and other enclosed spaces, adequate ventilation must be provided. Refer to Plasite Bulletin PA-3. Keep out of the reach of children.

The catalyst (Part C) is relatively stable at room temperatures but must be protected from contamination, heat, fire and contact with promoter (in Part D). The catalyst (Part C) is classified by the Interstate Commerce Commission as an "oxidizing material." All shipping containers bear a yellow caution label. The catalyst is highly irritating if it gets into the eyes. Immediately rinse eyes thoroughly with water and get medical attention. The catalyst also can be a skin irritant and should be removed with large quantities of soap and water. Since this is an oxidizing material, it should not be allowed to accumulate or remain in soaked rags or clothing.



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

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