



SELECTION & SPECIFICATION DATA

Generic Type	Phenalkamine epoxy
Description	High performance immersion grade epoxy that has excellent resistance to water, salt water, and municipal wastewater exposures. This coating exhibits outstanding moisture tolerance during application, low temperature cure capability, and very fast cure response for quick return to service. Can be used in immersion and non-immersion areas. Can be used as a single coat system.
Features	<ul style="list-style-type: none"> • High solids, low VOC • High build (20 mils) • Low temperature cure (20 °F) • Meets ANSI/AWWA C210-07 for interior and exterior of steel water pipelines* • Acceptable for potable water service (ANSI/NSF Standard 61) in one or two coats* • Acceptable for (ANSI/NSF Standard 61) approved linings for valves 3" in diameter and greater* • Excellent moisture tolerance during application • Fast cure response <p>*Valid when manufactured at a certified location</p>
Color	Beige (0200), Red (0500), Blue (0100) and Black (0900) are standard. Gray (0700) is special order and should be used while it is still fresh to avoid ambering as it ages.
Gloss	Semi-gloss
Primer	Self-Priming
Dry Film Thickness	5 - 8 mils (127 - 203 microns) per coat Can be applied up to 20 mils (500 microns) in a single coat or 30 mils in two coats.
Solids Content	By Volume 80% +/- 2%
Theoretical Coverage Rate	1283 ft ² /gal at 1.0 mils (31.5 m ² /l at 25 microns) 257 ft ² /gal at 5.0 mils (6.3 m ² /l at 125 microns) 160 ft ² /gal at 8.0 mils (3.9 m ² /l at 200 microns) Allow for loss in mixing and application.
VOC Values	As Supplied : 1.42 lbs/gal (170 g/l) mixed Thinner 2 : 16 oz/gal 2.06 lbs/gal (248 g/l) These are nominal values and may vary with color.
Dry Temp. Resistance	Continuous: 200°F (93°C) Non-Continuous: 250°F (121°C)
Limitations	Epoxies lose gloss, discolor and eventually chalk in sunlight exposure. Discoloration is more pronounced with Carboguard 691.
Topcoats	May be coated with Acrylics, Epoxies, Alkyds, or Polyurethanes depending on exposure and need.

SUBSTRATES & SURFACE PREPARATION

General	Remove any oil or grease from surface to be coated with clean rags soaked in Carboline Thinner 2, or acetone.
Steel	Immersion: SSPC-SP10; Surface Profile: 1.5-3.0 mils (38-75 microns). Non-Immersion: SSPC-SP6; Surface Profile: 1.5-3.0 mils (38-75 microns). In certain situations SSPC-SP3 is acceptable for thicknesses up to 8 mils (150 microns).
Concrete or CMU	Normally clean and dry. Remove all loose, unsound concrete. This product can tolerate damp concrete (green appearance but not visibly wet). Do not apply coating unless concrete has cured at least 28 days @ 70 °F (21 °C) and 50% RH or equivalent. Consult Carboline Technical Service for more specific recommendations.

MIXING & THINNING

Mixing	Mix separately, then combine and mix in the following proportions (1:4 ratio): <u>1 Gal. Kit</u> Part A: 0.2 gallon Part B: 0.8 gallon <u>Gal. Kit</u> Part A: 1 gallon Part B: 4 gallon Thin up to 12.5% by volume with Carboline Thinner 2. Do not exceed 16oz. of Thinner 2.
Pot Life	1.5 hours at 75 °F (24 °C) and less at higher temperatures. Pot life ends when coating becomes too viscous to use. *Use of Thinner other than stated may void UL or NSF approval.

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	Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, 0.070" I.D. fluid tip and appropriate air cap.
Airless Spray	Pump Ratio: 45:1 (min.) Volume: 11.5 l/min min. Output: (2.5gpm min.) Material Hose: 12.5mm min. (½" I.D. recommended) Tip Size: 0.43-0.53mm (0.017-0.021") Output: 140-175kg/cm ² Pressure: (2000-2500 psi) *PTFE packings are recommended and available from pump manufacturer.
Brush & Roller (General)	Not recommended for tank lining applications except when striping welds. For non-immersion applications over damp surfaces, brush and roller is the preferred method. Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or re-rolling. For best results, tie in within 10 minutes at 75 °F (24 °C). Thin up to 12% by volume per gallon with Thinner 2. Use a short-nap synthetic roller cover with solvent resistant core.

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	45°F (7°C)	20°F (-7°C)	20°F (-7°C)	0%
Maximum	90°F (32°C)	120°F (49°C)	100°F (38°C)	85%

Industry standards are for substrate temperatures to be above the dew point. For immersion conditions it is recommended to follow this procedure. For non-immersion conditions Carboguard 691 can tolerate damp substrates. See Brush or Roller above. Special thinning and application techniques may be required above or below normal conditions.

CURING SCHEDULE

Surface Temp.	Dry to Recoat	Maximum Recoat Time	Final Cure Immersion
20°F (-7°C)	72 Hours	30 Days	45 Days
35°F (2°C)	17 Hours	30 Days	30 Days
60°F (16°C)	6 Hours	14 Days	14 Days
75°F (24°C)	2 Hours	14 Days	7 Days
90°F (32°C)	2 Hours	7 Days	6 Days

*Surface temperatures reported were at 50 % RH.

These times are based on a 5.0-8.0 mil (125-200 micron) dry film thickness per coat. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. For force curing, contact Carboline Technical Service for specific requirements. For application and cure conditions below 35 °F, dehumidify before, during, and after application to prevent ice formation on the surface.

NOTE for maximum recoat: If the maximum recoat times have been exceeded, the surface must be abraded by sweep blasting or sanding prior to the application of additional coats. Exposure to elevated temperatures or sunlight can dramatically reduce the maximum recoat times.

To recoat at high film thicknesses (20+ mils)

20 mils @35 °F (10 °C) = 2 days

20 mils @60 °F (16 °C) = 40 hours

20 mils @75 °F (24 °C) = 24 hours

20 mils @90 °F (32 °C) = 24 hours

Carboguard 691 that has been applied at thicknesses greater than 25 mils will require longer cure times, especially if applied thinned.

CLEANUP & SAFETY

Cleanup	Use Thinner 2 or Acetone. 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.
Ventilation	When used as a tank lining or 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 or if not able to monitor levels, use MSHA/NIOSH approved supplied air 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.

Carboguard[®] 691

PRODUCT DATA SHEET



TESTING / CERTIFICATION / LISTING

Underwriters Laboratories, Inc.	Tested according to ANSI/NSF 61 for potable water use. Tanks of 20,000 gal capacity or greater are acceptable with maximum thinning of 12.5% with Thinner 2, maximum DFT in a single coat of 20 mils and a maximum total DFT in 2 coats of 30 mils. For industrial wastewater exposures consult Carboline Technical Service department for severe service recommendations.
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PACKAGING, HANDLING & STORAGE

Shelf Life	Part A: 24 months at 75 °F (24 °C) Part B: 12 months at 75 °F (24 °C) *Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.
Storage Temperature & Humidity	40-100 °F (4-38 °C) 0-95% Relative Humidity
Storage	Store Indoors. KEEP DRY
Shipping Weight (Approximate)	1 Gal. Kit - 14 lbs. (6 kg) 5 Gal. Kit - 72 lbs. (33 kg)
Flash Point (Setaflash)	Part A: 104 °F (40 °C) Part B: 45 °F (7 °C) Thinner 2: 23 °F (-5 °C)

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.