

SELECTION & SPECIFICATION DATA

Generic Type	Cycloaliphatic Amine Epoxy
Description	Nuclear grade, DBA tested, self priming epoxy. Tested and certified for use in Nuclear Level 1 areas in a variety of systems.
Features	<ul style="list-style-type: none"> • Can be applied direct to steel without a primer • Single coat, high build capabilities • Can be applied to minimally prepared surfaces • Compatible to many existing, aged epoxies and inorganic zinc coatings • Easily decontaminated • DBA tested and qualified for Nuclear Service Level 1 • Resistant to high levels of radiation • High solids and low VOC help reduce effects on charcoal filters • Application-friendly characteristics minimize manrem exposure • Suitable for use under insulation on hot surfaces operating up to 300°F (149°C) outside level 1 areas.
Color	Refer to Carboline Color Guide. Certain colors may require multiple coats for hiding.
Finish	Gloss
Primer	Self-priming. Qualified over Carbozinc 11SG, Carbozinc 11HSN and Carboguard 893N for fabrication applications. May be applied over existing inorganic zinc primers and epoxy based systems. A mist coat may be required to minimize bubbling over inorganic zinc primers. Consult Carboline for system recommendations and test data for use in nuclear applications.
Dry Film Thickness	<p>4 - 6 mils (102 - 152 microns) per coat 6 - 8 mils (152 - 203 microns) per coat</p> <p>Don't exceed 10 mils (250 microns) in a single coat. Excessive film thickness over inorganic zincs may increase damage during shipping or erection. Note: Acceptable DFT ranges are based on plant specific DBA test data. Carboguard 890N has been tested in multi-coat and wide DFT range scenarios. Consult Carboline for applicable DBA test data.</p>
Solids Content	<p>By Volume 75% +/- 2%</p> <p>Values vary by color</p>
Theoretical Coverage Rate	<p>1203 ft²/gal at 1.0 mils (29.5 m²/l at 25 microns) 301 ft²/gal at 4.0 mils (7.4 m²/l at 100 microns) 150 ft²/gal at 8.0 mils (3.7 m²/l at 200 microns) Allow for loss in mixing and application.</p>
VOC Value(s)	<p>As Supplied: 1.80 lbs/gal (216 g/l) Thinner 2: 7 oz/gal=2.04 lbs/gal (245 g/l) Thinner 2: 13 oz/gal=2.26 lbs/gal (270 g/l) Thinner 33: 7 oz/gal=2.06 lbs/gal (247 g/l) Thinner 33: 16 oz/gal=2.39 lbs/gal (287 g/l)</p> <p>Values vary by color</p>

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Dry Temp. Resistance	Continuous: 300°F (149°C) Non-Continuous: 350°F (177°C)
	Carboguard 890N has been successfully tested under DBA/LOCA temperatures up to 340°F (171°C). Please contact Carboline for specific variables. Discoloration and loss of gloss occurs above 200°F (93°C), but does not affect performance.
Under Insulation Resistance	Continuous: 250°F (121°C) (Normally dry). Not for use under insulation in Level 1 areas.
Limitations	Qualification of Carboguard 890N for Level 1 applications is plant specific and must be supported with relevant DBA test data. Epoxyes may lose gloss, discolor and chalk when exposed to sunlight.

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. Follow approved specification for specific project.
Steel	For shop painting: SSPC-SP6 1.5-3.0 mils (38-75 microns) For plant maintenance: SSPC-SP2 or SP3 Refer to applicable DBA testing specific to plant postulated LOCA conditions.
Concrete or CMU	Concrete must be cured 28 days at 75°F (24°C) and 50% relative humidity or equivalent. Prepare surfaces in accordance with ASTM D4258 Surface Cleaning of Concrete and ASTM D4259 Abrading Concrete. Voids in concrete may require surfacing. Prime with approved primer.
Previously Painted Surfaces	Follow approved specification for specific project. Consult Carboline for available compatibility test data.

PERFORMANCE DATA

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

Test Method	System	Results
ASTM D3911 DBA	890 / 890 Steel, SP3, SP11	Pass
ASTM D3911 DBA	893 / 890	Pass
ASTM D3911 DBA	CZ11SG / 890	Pass
ASTM D3912 Chemical Resistance	890	Pass all chemicals except Potassium Permanganate Nitric Acid and MIBK
ASTM D4060 Taber Abrasion	890	85 mg lost
ASTM D4082 Radiation Tolerance	890 / 890, 893 / 890	No defects
ASTM D4256 Decontamination	890	99.96%
ASTM D4541 Elcometer Adhesion	890	980 PSI
ASTM E1461 Thermal Conductivity	890	4.79 btu-in/hr-ft ² -°F
ASTM E84 Flame Spread	890/890	Flame Spread 5 Smoke Generation 20

Test reports and additional data available upon written request. * Carboguard 890 received a name change in June 2004 to Carboguard 890N for nuclear service projects.

MIXING & THINNING

Mixing	Power mix separately, then combine and power mix. Partial mixing of kits is not recommended without specific approval and written procedures from plant engineering and QA.
Thinning	<p>Spray: Up to 13 oz/gal (10%) w/ #2 Brush: Up to 16 oz/gal (12%) w/ #33 Roller: Up to 16 oz/gal (12%) w/ #33</p> <p>Thinner #33 can be used for spray in hot/windy conditions. Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied. *See VOC values for thinning limits.</p>
Ratio	1:1 Ratio (A to B)
Pot Life	3 Hours at 75°F (24°C) Pot life ends when coating loses body and begins to sag. Pot life times will be less at higher temperatures.

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.

Spray Application (General)	This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.
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	<p>Pump Ratio: 30:1 (min.)* Tip Size: 0.017" - 0.021" GPM Output: 3.0 (min.) Output PSI: 2100-2300 Material Hose: 3/8" I.D. (min) Filter Size: 60 mesh</p> <p>*Teflon packings are recommended and available from the pump manufacturer.</p>
HVLP	3M Accuspray Spray Gun Model HG09
Brush & Roller (General)	Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or rerolling. For best results, tie-in within 10 minutes at 75°F (24°C).
Brush	Use a medium bristle brush.
Roller	Use a short-nap synthetic roller cover with phenolic core.

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	50°F (10°C)	50°F (10°C)	50°F (10°C)	0%
Maximum	90°F (32°C)	125°F (52°C)	110°F (43°C)	90%

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above and below normal application conditions.

CURING SCHEDULE

Surface Temp.	Dry to Recoat	Dry to Recoat & Topcoat w/ other finishes	Final Cure General	Final Cure Immersion
50°F (10°C)	12 Hours	24 Hours	3 Days	NR
60°F (16°C)	8 Hours	16 Hours	2 Days	10 Days
75°F (24°C)	4 Hours	8 Hours	1 Day	5 Days
90°F (32°C)	2 Hours	4 Hours	16 Hours	3 Days

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. During high humidity conditions, it is recommended that the application be done while temperatures are increasing. Maximum recoat/topcoat times are 30 days for epoxies and 90 days for polyurethanes at 75°F (24°C). 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.

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. Wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.
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, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

PACKAGING, HANDLING & STORAGE

Shelf Life	Part A: 36 months at 75°F (24°C) Part B: 15 months at 75°F (24°C) *Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.
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PACKAGING, HANDLING & STORAGE

Storage Temperature & Humidity	40° - 120°F (4°-49°C) Store indoors. Can be stored down to 20°F (-7°C) for no longer than 30 days. 0-100% Relative Humidity
Shipping Weight (Approximate)	2 Gallon Kit - 29 lbs (13 kg) 10 Gallon Kit - 145 lbs (66 kg)
Flash Point (Setaflash)	89°F (32°C) for Part A 73°F (23°C) for Part B

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.