

**SELECTION & SPECIFICATION DATA**

<b>Generic Type</b>	Amine-Cured Novolac Epoxy
<b>Description</b>	Highly cross-linked, glass-flake filled polymer that offers exceptional barrier protection and resistance to wet/dry cycling at elevated temperatures. Suitable for insulated or uninsulated pipes (refer to Limitations), stacks and equipment operating up to 232°C (450°F). This coating provides excellent resistance to corrosion, abrasion and permeation, and its novolac-modification resists severe chemical attack. This extreme performance product has decades of performance and is recommended for CS-1,3,4 and SS-1,2,3 systems of NACE SP0198 Standard Practice for coatings to control corrosion under insulation (CUI).
<b>Features</b>	<ul style="list-style-type: none"> <li>• Temperature resistance up to 232°C (450°F)</li> <li>• High-build single-coat capabilities</li> <li>• Excellent resistance to thermal shock</li> <li>• Superior abrasion and chemical resistance</li> <li>• Glass flake reinforcement</li> <li>• Ambient-temperature cure</li> </ul>
<b>Colour</b>	Gray (5742)
<b>Finish</b>	Eggshell
<b>Primer</b>	Self-priming. May be applied over epoxies and phenolics.
<b>Film Build</b>	<p>For CUI service: 250 microns dry in 1 or 2 coats Normal application: 125-250 microns dry per coat</p> <p>Do not exceed 375 microns dry per coat.</p>
<b>Solid(s) Content</b>	By volume: 70% ±2%
<b>Theoretical Coverage Rates</b>	<p>5.6 m<sup>2</sup> per litre at 125 microns dry 4.7 m<sup>2</sup> per litre at 150 microns dry 2.8 m<sup>2</sup> per litre at 250 microns dry</p> <p>Allow for loss in mixing and application.</p>
<b>VOC Values</b>	<b>As Supplied</b> : 250 g/l
<b>Dry Temp. Resistance</b>	<p>Continuous: 218°C (424°F) Non-Continuous: 232°C (450°F)</p> <p>Discolouration and loss of gloss may be observed above 93°C.</p>
<b>Limitations</b>	<p>Epoxies lose gloss, discolour and eventually chalk in sunlight exposure. <b>NOTE:</b> Where Thermaline 450 is used on externally exposed surfaces it should be sealed with a suitable heat and UV resistant coating. Fully exposed Thermaline will erode away very rapidly under the combined effects of UV and elevated temperatures.</p>
<b>Topcoats</b>	May be topcoated with polyurethane or modified silicone to provide added UV resistance if needed. Contact Carboline for specific product recommendations.

# Thermaline 450

## PRODUCT DATA SHEET



### SUBSTRATES & SURFACE PREPARATION

<b>General</b>	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.
<b>Steel</b>	<u>Non-Insulated:</u> Abrasive blast AS 1627.4 Sa 2 (SSPC-SP 6) minimum <u>Insulated:</u> Abrasive blast AS 1627.4 Sa 2½ (SSPC-SP 10) <u>Surface Profile:</u> 50-75 microns
<b>Stainless Steel</b>	Abrasive blast using non-metallic media to render a dense, angular surface profile of 50-75 microns in accordance with SSPC-SP 16. Remove all surface contaminants that would interfere with the performance of stainless steel for the intended service such as, but not limited to, embedded iron or chlorides.

### PERFORMANCE DATA

Test Method	System	Results
ASTM D2794 Impact	Blasted Steel 1 ct. 450	0.375 in. from damaged area. 100-in./lbs
ASTM D3359 Adhesion	Blasted Steel 2 cts. 450	4A
ASTM D4060 Abrasion	Blasted Steel 2 cts 450	171 mg loss after 1000 cycles; CS17 wheel, 1000 gram load
Heat Cycling Test	Blasted Steel 1 ct. 450	No cracking, blistering, or delamination after thermal cycling (-10 to 425°F)
Modified NACE Std. Tm-01-74B Immersion	Blasted Steel 2 cts. 450	No effect after 6 month exposure, 200°F deionized water

Test reports and additional data available upon written request.

### MIXING & THINNING

<b>Mixing</b>	Power mix separately, then combine and power mix. DO NOT MIX PARTIAL KITS.
<b>Thinning</b>	<ul style="list-style-type: none"><li>• <b>Vertical &amp; Overhead Surfaces:</b> May be thinned up to 10% with Thinner #213.</li><li>• <b>Horizontal Surfaces:</b> May be thinned up to 10% with Thinner #2.</li><li>• <b>Mixed Orientation Surfaces:</b> Default to Thinner #213 recommended.</li></ul> Use of thinners other than those supplied by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.  Agitate Thinner #213 before use. Thinner #213 will have a thick viscous appearance which is normal.
<b>Ratio</b>	4:1 Ratio (A to B)
<b>Pot Life</b>	3 Hours at 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.

<b>Spray Application (General)</b>	The following spray equipment has been found suitable and is available from manufacturers.
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<b>Conventional Spray</b>	Pressure pot equipped with dual regulators, 12.5 mm (½" I.D.) minimum material hose, 2.8 mm (0.110") I.D. fluid tip and appropriate air cap.
<b>Airless Spray</b>	Pump Ratio: 45:1 (min.)* Output: 12 litres / minute (min.) Material Hose: 12.5 mm I.D. (min.) Tip Size: 0.035-0.041" Output PSI: 2200-2500 *PTFE packings are recommended and available from the pump manufacturer.
<b>Brush</b>	For striping of welds and touch-up of small areas only. Use a medium natural bristle brush and avoid rebrushing.
<b>Roller</b>	Not recommended.

## APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	13°C (55°F)	10°C (50°F)	10°C (50°F)	0%
Maximum	32°C (90°F)	43°C (109°F)	38°C (100°F)	85%

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 or below normal application conditions.

## CURING SCHEDULE

Surface Temp.	Dry to Handle	Dry to Recoat or Topcoat	Maximum Recoat Time	Final Cure
10°C (50°F)	18 Hours	48 Hours	21 Days	21 Days
16°C (61°F)	12 Hours	32 Hours	14 Days	14 Days
24°C (75°F)	6 Hours	16 Hours	7 Days	7 Days
32°C (90°F)	3 Hours	8 Hours	4 Days	4 Days

These times are based on a 250 micron dry film thickness. 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 re-coating. During high humidity conditions, it is recommended that the application be done while surface temperatures are increasing. If the final cure time is exceeded, the surface must be abraded by sweep blasting prior to the application of additional coats.

## CLEANUP & SAFETY

<b>Cleanup</b>	Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.
<b>Safety</b>	Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions.

# Thermaline 450

## PRODUCT DATA SHEET



### CLEANUP & SAFETY

<b>Ventilation</b>	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 vapour 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 suitable approved supplied air respirator.
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### PACKAGING, HANDLING & STORAGE

<b>Shelf Life</b>	Part A: 48 months at 24°C Part B: 24 months at 24°C  Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers. For products/components exceeding the stated shelf life, contact Technical Services for further advice.
<b>Storage Temperature &amp; Humidity</b>	4°-43°C 0-90% Relative Humidity
<b>Flash Point (Setaflash)</b>	Part A: 12°C Part B: >93°C
<b>Shipping Weight (Approximate)</b>	10 Litre Kit - 14 kg
<b>Storage</b>	Store Indoors.

### WARRANTY

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