Carbotherm® 551

PRODUCT DATA SHEET

SELECTION & SPECIFICATION DATA

Generic Type	Waterborne epoxy insulative coating
Description	Carbotherm 551 is a unique insulative composite coating formulated in a high temperature resistant epoxy binder. Unlike acrylic-based insulative materials it has superior toughness, hardness, impact resistance, chemical resistance and permeation resistance. It is therefore more suitable for industrial applications or other physically demanding environments. It is an ideal protective heat barrier to shield personnel from hot surfaces. It also inhibits heat transfer into or out of a structure. Its insulative properties keeps structures exposed to solar radiation significantly cooler. It can be used to minimize or eliminate condensation of pipes or other operating equipment. Its superior application properties of higher film build per coat and fewer coats offers savings and quicker return to service. Because it bonds directly to the surface (unlike standard insulation materials) it minimizes water entry and the effect of corrosion under insulation.
Features	• Excellent thin-film insulation • Unique epoxy formula outperforms acrylic-based materials • Tougher and more durable than acrylic coatings • Higher chemical resistance than acrylic coatings • Topcoats are optional • Protects personnel from hot surfaces • Ideal for industrial/aggressive applications • Insulation provides anti-condensation properties • Acceptable for use in USDA facilities • High film build per coat; fewer coats • Low VOC; low odor • May be applied to hot surfaces
Color	Off White (0800) only. See Topcoat.
Finish	Eggshell
Primer	Use the following primers for exterior use or aggressive chemical exposures. **Up to 300°F (149°C):** Use Carboguard 690, Carboguard 890 or Carbomastic 15 Series **Up to 350°F (176°C):** Use Carbozinc 859 Series, Thermaline 450 EP, Thermaline 400 GS or Thermaline 450. If the steel has been previously primed with an inorganic zinc (Carbozinc 11 Series); use one of the following coatings as a "tie-coat" prior to the application of Carbotherm: Carboguard 553, Carboguard 890, Carboguard 690 or Carbomastic 15 These tie-coats are limited to 300°F/149°C service temperature.
Service Temperature	-60° to 350°F (-51° to 176°C) For initial service avoid sudden temperature "surges". Do not exceed 200°F/93°C during the first hour.
Dry Film Thickness	35 - 40 mils (889 - 1016 microns) per coat Number of coats depends on the operating temperature and degree of insulation or protection needed. Contact your local Carboline Representative for thickness needs based on end use.
Solids Content	By Volume 82% +/- 2% Tested in accordance with ASTM D2697

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Theoretical Coverage Rate	1315 ft²/gal at 1.0 mils (32.3 m²/l at 25 microns) 38 ft²/gal at 35.0 mils (0.9 m²/l at 875 microns) 33 ft²/gal at 40.0 mils (0.8 m²/l at 1000 microns) Allow for loss in mixing and application.
VOC Values	**As Supplied** : 37 grams/liter Calculated per EPA Method 24.
Topcoats	Topcoats are optional to provide gloss, custom colors, prevent dirt pick-up, or prevent mildew. Acceptable topcoats include products such as: Sanitile 555VOC Carbothane 133 series Carbothane 134 series Carboxane 2000 and 2100 FC/BR Carbocrylic 3359 Series *Topcoating is recommended for use in USDA facilities.

SUBSTRATES & SURFACE PREPARATION

General	Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil, and all other contaminants that could intefere with adhesion of the coating.
Steel	Prime with appropriate primers as recommended or specified in section on "Primers".
Stainless Steel	Abrasive blast to a 1-1.5 mil profile and apply material direct to substrate or over appropriate non-zinc primer (See Primers).

PERFORMANCE DATA

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

Test Method	System	Results
Adhesion (ASTM D4541)	Carbotherm 551	1000 psi typical (6.9 MPa)
Cyclic QUV-A/Prohesion (ASTM D5894)	Carbotherm 551 over the following primers: Carbozinc 859 or Carbomastic 15	2016 hours No rusting or blistering in the plane or scribe
Direct Impact (ASTM D2794)	Carbotherm 551	160 lbs; Indentation only; no cracking; no disbondment
Emissivity (ASTM E408)	Carbotherm 551	0.85
Flame Spread (ASTM E84)	Carbotherm 551	Class A Rating Flame Spread Index: 0 Smoke Developed Index: 5
Humidity Cabinet (ASTM D2247)	Carbotherm 551 over the following primers: Carbozinc 859 or Carbomastic 15	2016 hours No blistering or rusting in the plane or scribe
R-Value (per inch) (ASTM C518)	Carbotherm 551	2.34 hr ft^1 °F/BTU
Shore D Hardness (ASTM D2240)	Carbotherm 551	55
Solar Reflectivity (ASTM E903)	Carbotherm 551	84.7
Tensile Strength (ASTM D638)	Carbotherm 551	800 psi (5.48 MPa)
Thermal Conductivity (ASTM C518) (at 23°C; 50°C; 149°C)	Carbotherm 551 (tested at ~.230")	23°C: 0.06183 W/m-K

MIXING & THINNING

Mixing | This is a two component product and separation of the Part A may occur and is common when stored or when shipped. Turn Part A containers upside down for a minimum of 30 minutes (or overnight) prior to mixing to dramatically improve blending. Use a drywall compound mixing paddle (in reverse) to incorporate material to a homogeneous consistency resembling a milkshake. Normally this will take several minutes. Avoid contact of mixing blade and edge of plastic buckets to avoid shearing plastic pieces into coating. If other types of blades or high powered mixers are used, avoid high shear or over mixing. Once redispersed add the Part B while mixing until uniform; usually 3-5 minutes.

Thinning | Thinning is not normally required. May be thinned up to 5% with clean potable water when pumping long distances (100+ feet) or for conventional spray application.

Ratio | By volume: 16:1 (Part A to Part B)

Pot Life | 1 hour at 75°F/23°C.

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) | Pre-rinse (and lubricate) equipment with undiluted Carboline Surface Cleaner 3 followed by clean potable water before spraying. The following spray equipment has been found suitable and is available from equipment manufacturers.

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Conventional Spray	Bottom outlet pressure pot works best, equipped with dual regulators, ½" I.D. minimum material hose, 0.070" I.D. fluid tip and appropriate air cap. Adjust line air pressure to 40 psi and pot pressure to 15 psi.
Airless Spray	Pump Ratio: 30:1 (min.)* GPM Output: 3.0 (min.) Material Hose: 3/8" I.D. (min.) Spray gun: Graco Flex Plus or XHF Airless, Binks Airless 75 Direct Connect, or WIWA 500 F. Tip Size: 0.021-0.025"** Output PSI: 1800-2200 Filter Size: Remove filters *PTFE packings are recommended and available from the pump manufacturer. Use of a surge protector is strongly recommended. **Use heavy duty reverse-a-clean non-diffuser tips. When pumping long distances (100+ feet), 1/2" diameter material hoses are recommended. To reduce material cavitation, use a hopper-feed set-up with 1-2" material inlet couplings.
Trowel	Trowel application may be used. Do not apply more than 40 mils (1 mm) per coat and do not use excessive water when smoothing.
Brush & Roller (General)	Multiple coats may be required to achieve recommended dry film thickness. Brushing may be used but may negatively affect insulative properties due to uneven thickness. Avoid excessive re-brushing. Roller application is difficult and not normally recommended.
Brush	Use a synthetic bristle brush. Use for touch up of small surface areas only.
Roller	Not recommended

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	50°F (10°C)	50°F (10°C)	50°F (10°C)	0%
Maximum	100°F (38°C)	250°F (121°C)	110°F (43°C)	80%

It is best to spray apply a light 5-10 mil coat and allow to tack dry prior to full coating. This is especially helpful over hot surfaces (150-250°F/65-121°C) which may require 2-4 light passes.
Do not apply when the surface temperature is less than 5°F (3°C) above the dew point. Do not apply if temperatures are expected to drop below 50°F (10°C) within 24 hours of application. Special application techniques may be required above or below normal application conditions. Dry times will be aided by higher temperatures, lower humidity, hotter substrates, and more air movement during application and curing.

CURING SCHEDULE

Surface Temp.	Dry to Recoat
60°F (16°C)	10 Hours
75°F (24°C)	5 Hours
90°F (32°C)	3 Hours

These times are based on a 40 mil (1000 micron) dry film thickness. Higher film thicknesses, insufficient ventilation, high humidity or cooler temperatures will require longer cure times. If a final color coat (see Topcoats) is used; allow 24 hours dry time (at 75°F/23°C) to ensure adequate dryness prior to final color coat.

CLEANUP & SAFETY

Cleanup | Use clean potable water followed with suitable solvent to dry equipment. 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.

PACKAGING, HANDLING & STORAGE

Shelf Life | Part A: 12 months at 75°F (24°C)
Part B: 12 months at 75°F (24°C)

Storage Temperature & Humidity | 40° -110°F (4°-43°C)
0-95% Relative Humidity

Storage | Store indoors (Keep from freezing)

Shipping Weight (Approximate) | 4.25 Gallons
27 lbs (12 kg)

Flash Point (Setaflash) | Part A: >200°F (93°C)
Part B: 99°F (37°C)

WARRANTY

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