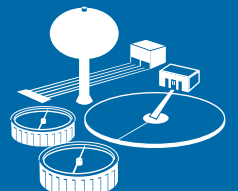


Water & Wastewater

System Guide

Coatings and Linings



Collection Systems

Concrete Repair

CHEMICAL EXPOSURE	PREP	PRODUCT	DESCRIPTION
Restructuring and resurfacing of concrete Applications – Manholes, wet wells, lift stations, piping, sewer interceptors			
Moderate to severe	NACE 6 / SSPC-SP13 and surface profile of ICRI CSP 3-6	Carbocrete 522	Water based fiber-reinforced cementitious mortar 1/2" - 3 1/2" (1.5 - 9 cm)
Moderate to severe		Carboguard 510	Water based epoxy repair mortar Various mixes for voids and bug holes up to 3" (8 cm)
Moderate to severe		Carboguard 510 SG	Spray grade epoxy cementitious mortar, <1/4" (6250 microns)
Severe		Plasite 5371	Chemical resistant trowel applied aggregate-filled epoxy for severe environments, 125 mils (3125 microns)

Concrete Protection

CHEMICAL EXPOSURE	PREP	1ST COAT (OPTIONAL)	DESCRIPTION	2ND COAT	DESCRIPTION
Collections Applications – Manholes, wet wells, lift stations, concrete pipe and conduit, sewer interceptors					
Moderate to severe	NACE 6 / SSPC-SP13 and surface profile of ICRI CSP 3-6	Carboguard 1340 WB or Carboguard 690	Water based epoxy primer or Phenalkamine epoxy	Reactamine 760 Series	Hybrid polyurethane with flexibility and chemical resistance
Moderate to severe		Carboguard 1340 WB or Semstone 110	Water based epoxy primer or Solvent free epoxy primer	Plasite 4500 Series	Chemical resistant epoxy 100% solids, meets AWWA C210
Severe				Plasite 4550 Series	Highly chemical resistant epoxy novolac 100% solids
Severe				Plasite 5371	Chemical resistant epoxy 100% solids, trowel applied

Transportation Systems

Steel Protection

CHEMICAL EXPOSURE	PREP	PRODUCT	DESCRIPTION
Transportation - Exposure of steel, ductile or cast iron pipe Applications – Interior and exterior protection of submersed valves & pumps, penstocks, piping and sewer interceptors			
Moderate	Carbon steel: NACE 3 / SSPC-SP6 Ductile iron/cast iron: NAPF 500 (latest edition)-04	Bitumastic 300M	Coal-tar epoxy
Moderate to severe		Polyclad 757, 777 PL	Structural polyurethane for corrosion and abrasion resistance. Meets AWWA C222.
Moderate to severe		Polyclad 767	Structural polyurethane for corrosion and abrasion resistance. Approved for potable water use NSF/ANSI 61. Meets AWWA C222.
Moderate to severe		Reactamine 760 Series	Hybrid polyurethane with flexibility and chemical resistance.
Severe		Plasite 4500 Series	Chemical resistant epoxy 100% solids. Approved for potable water use NSF/ANSI 61. Meets AWWA C210.

Preliminary Treatment

Steel Surfaces used in Screening, Settling, and Aeration Tanks

CHEMICAL EXPOSURE	PREP	1ST COAT	DESCRIPTION
Immersion - Steel			
Applications – Steel surfaces exposed to wastewater for vessels, settling tanks, and buried pipe that connects them			
Moderate	NACE 2 / SSPC-SP10	Bitumastic 300 M	Coal-tar epoxy
Moderate		Carboguard 890	Cycloaliphatic epoxy
Moderate to severe		Reactamine 760 Series	Hybrid polyurethane with flexibility and chemical resistance
Moderate to severe		Plasite 4500 Series	Chemical resistant epoxy 100% solids. Meets AWWA C210.

Concrete Surfaces used in Screening, Settling, and Aeration Tanks

CHEMICAL EXPOSURE	PREP	1ST COAT (OPTIONAL)	DESCRIPTION	2ND COAT	DESCRIPTION
Immersion - Concrete					
Applications – Concrete surfaces exposed to wastewater for vessels, settling tanks, and buried pipe that connects them					
Moderate	NACE 6 / SSPC-SP13 and surface profile of ICRI CSP 4-6	Carboguard 1340 WB or Semstone 110	Water borne epoxy concrete sealer or High build epoxy concrete sealer	Bitumastic 300 M	Coal-tar epoxy
Moderate				Carboguard 890	Cycloaliphatic epoxy
Moderate to severe		Carboguard 1340 WB or Carboguard 690	Water borne epoxy concrete sealer or Phenalkamine epoxy	Reactamine 760 Series	100% Solids elastomeric polyurethane hybrid
Moderate to severe		Carboguard 1340 WB or Semstone 110	Water borne epoxy concrete sealer or High build epoxy concrete sealer	Plasite 4500 Series	Chemical resistant epoxy 100% solids. Meets AWWA C210.

Water Treatment & Purification

Water Treatment Tanks

CHEMICAL EXPOSURE	PRODUCT	DESCRIPTION
Immersion- Concrete or steel Applications - Protection from raw water contact in clarifiers, aeration tanks, treatment tanks, etc.		
Moderate	Bitumastic 300M	Coal-tar epoxy
Moderate	Carboguard 890	Cycloaliphatic epoxy
Moderate to severe	Reactamine 760	100% Solids elastomeric polyurethane hybrid
Moderate to severe	Reactamine 760 HB	High build polyurethane (up to 200 mils/5080 µm)
Severe	Phenoline Tank Shield Series	Epoxy 100% solids
Severe	Plasite 4550 Series	Highly chemical resistant epoxy novolac 100% solids

Sludge Handling

Steel Surfaces Exposed to Wastewater Sludge

CHEMICAL EXPOSURE	PREP	1ST COAT	DESCRIPTION
Steel - Immersion or partial immersion in wastewater sludge and solids Applications - Miscellaneous steel surfaces, structural steel, equipment, piping, tanks, etc. exposed to wastewater sludge			
Moderate	NACE 2 / SSPC-SP10	Carboguard 890	Cycloaliphatic epoxy, applied in 2 coats
Moderate		Bitumastic 300 M	Coal tar epoxy applied in 1-2 coats
Moderate to severe		Plasite 4500 Series	Chemical resistant epoxy, 100% solids, applied in 1 coat. Meets AWWA C210.
Severe		Phenoline 1205	Glass-flake reinforced novolac epoxy, applied in 1-2 coats
Severe		Plasite 4550 Series	Highly chemical resistant, 100% solids novolac epoxy, applied in 1 coat

Concrete Surfaces Exposed to Wastewater Sludge

CORROSION RESISTANCE	PREP	1ST COAT OPTIONAL PRIMER	DESCRIPTION	2ND COAT	DESCRIPTION
Concrete - Immersion or partial immersion in wastewater sludge and solids Applications - Miscellaneous concrete surfaces exposed to wastewater sludge					
Moderate	NACE 2 / SSPC-SP10	Carboguard 1340 WB or Semstone 110	Water based epoxy primer or Solvent free epoxy primer	Bitumastic 300 M	Coal tar epoxy applied in 1-2 coats
Moderate to severe				Plasite 4500 Series	Chemical resistant epoxy, 100% solids, applied in 1 coat. Meets AWWA C210.
Severe				Phenoline 1205	Glass-flake reinforced novolac epoxy, applied in 1-2 coats
Severe				Plasite 4550 Series	Highly chemical resistant, 100% solids novolac epoxy, applied in 1 coat

Chemical Storage

Storage Tank Linings

CHEMICAL EXPOSURE	PRODUCT	DESCRIPTION	TOTAL THICKNESS
Immersion - Steel			
Application - Linings to protect storage tanks carrying various treatment chemicals			
Polymers	Plasite 7122 VOC	Epoxy phenolic, applied in 2 coats	12-14 mils (300-350 µm)
Demineralized, distilled and deionized water to 200°F (93.3°C)	Plasite 9052	Epoxy, applied in 2 coats	10-16 mils (250-400 µm)
	Plasite 7159	Epoxy phenolic, applied in 2 coats	10-12 mils (250-300 µm)
Sulfuric acid (5-10%) or Sodium bisulfite	Plasite 4100 or 4110	Vinyl ester	35-45 mils (875-1125 µm)
	Plasite 4500 Series	100% Solids epoxy. Meets AWWA C210.	30-35 mils (750-875 µm)
Ferric chloride sodium hypochlorite (100ppm) alum	Plasite 4300 or 4310	Vinyl ester	35-45 mils (875-1125 µm)
	Reactamine 760	100% Solids elastomeric polyurethane hybrid	20-125 mils (508-3175 µm)
Caustic: 50% @ 150°F	Phenoline 385	Polyamine epoxy, applied in 2 coats	8-12 mils (200-300 µm)
	Phenoline 353 LT	Epoxy novolac, applied in 2 coats	8-12 mils (200-300 µm)

All lining recommendations must be confirmed through Carboline Technical Service Department.

Secondary Containment and Concrete Repair

CHEMICAL EXPOSURE	PRODUCT	DESCRIPTION
Chemical storage - Secondary containment - concrete		
Applications - Tank pad, pump pads, grouts & patching mortar, form voids & bug hole fillers, sealants		
Sulfuric acid (10-98%)	Semstone 145	100% solids, highly chemical resistant, epoxy novolac coating
Polymers & ferric chloride	Semstone 140	100% solids, chemical resistant, epoxy coating
Sodium bisulfite	Semstone 145	Epoxy novolac coating
Sodium hypochlorite alum	Semstone 870	Vinyl ester coating
Caustic: 50% @ 150°F (65.5°C)	Semstone 140	Epoxy coating
APPLICATION	PRODUCT	DESCRIPTION
Complimentary products - Concrete		
Applications - Tank pad, pump pads, grouts & patching mortar, form voids & bug hole fillers, sealants		
Concrete restructuring and repair	Carboguard 510 Series	Epoxy modified cementitious mortar
Concrete restructuring and repair (severe service)	Semstone 305	Epoxy novolac polymer concrete
Concrete restructuring and repair (severe service)	Semstone 800 Series Primer Semstone 884	Vinyl ester primer Vinyl ester polymer concrete
Expansion joints, chemical exposure	Semstone 110 Semstone 806	Epoxy primer Flexible epoxy
Expansion joints, general use	Semstone 6325	Polyurethane sealant

Note: Contact Carboline Technical Service for assistance in designing secondary containment.

Plant Service Areas

Exterior of Buildings

CHEMICAL EXPOSURE	1ST COAT	DESCRIPTION	2ND COAT	DESCRIPTION	3RD COAT	DESCRIPTION
Exterior weathering - Concrete						
Applications – Exterior concrete walls, concrete masonry unity (cmu) and tilt-up facilities						
Moderate	Sanitile 120	Water based acrylic primer	Carbocrylic 3359	Water based acrylic	Carbocrylic 3359	Water based acrylic
Moderate	Flexxide elastomer	Thick film acrylic elastomer	Flexxide Elastomer	Thick film acrylic elastomer		
Moderate & CMU	Sanitile 100	Water based acrylic block filler for CMU	Sanitile 255	Water based epoxy acrylic finish		

Office Space, Process Areas, and Walkways

CHEMICAL EXPOSURE	1ST COAT	DESCRIPTION	2ND COAT	DESCRIPTION
Interior - Concrete				
Applications – Hallways, offices, laboratories, etc.				
Mild	Sanitile 120	Water based acrylic primer	Sanitile 155	Water based acrylic
Moderate & CMU	Sanitile 100	Water based acrylic block filler for CMU	Sanitile 555	Water based epoxy finish
Severe	Sanitile 755	Solvent free epoxy	Sanitile 855	Polyester urethane
Interior - Concrete flooring				
Applications – Service areas, process room floors, walkways				
Mild to moderate	Sanitile 555	Water based epoxy primer	Sanitile 555	Water based epoxy finish
Moderate to severe	Semstone 110	Clear epoxy sealer	Semstone 140 SL	Self leveling epoxy
Severe	Call Carboline Technical Service for Recommendations			
Miscellaneous substrates				
Applications – Miscellaneous steel, handrails, steps				
Mild	Carbocoat 8215 Series	Direct to metal, alkyd enamel, also available in non-skid		
Mild	Carbothane 8845 Series	Direct to metal, gloss, high-build, polyurethane		

Water Storage

Interior Protection of Potable Tanks

PRODUCT	DESCRIPTION	AWWA D102 SYSTEM	PRODUCT NOTES
Interior steel - Potable water tanks (NSF/ANSI 61)			
Reactamine 760	100% solids elastomeric polyurethane hybrid	ICS-4	Applied in 1 or 2 coats at a maximum thickness of 125 mils (3,175 µm)
Reactamine 760 HB	High-build 100% solids elastomeric polyurethane hybrid	ICS-4	Applied in 1 or 2 coats at a maximum thickness of 300 mils (7,620 µm)
Phenoline 341	Low temperature curing, 100% solids epoxy	ICS-3	Applied in 1 or 2 coats at a maximum thickness of 30 mils (762 µm) per coat. Meets AWWA C210.
Phenoline Tank Shield Plus	100% solids epoxy	ICS-3	Applied in 1 or 2 coats to a maximum thickness of 60 mils (1,524 µm)
Carboguard 891 VOC	Low VOC epoxy	ICS-1, ICS-2	Applied in 2 or 3 coats to a maximum thickness of 20 mils (508 µm). Meets AWWA C210.
Carboguard 61	Epoxy	ICS-1, ICS-2	Applied in 2 or 3 coats to a maximum thickness of 20 mils (508 µm)

Note: Carbozinc 8703 or Phenoline 311 may be used as a primer in NSF potable water tanks if desired.

Exterior Protection of Potable Tanks

PROTECTION LEVEL	AWWA D102 SYSTEM	PREP	1ST COAT	DESCRIPTION	2ND COAT	DESCRIPTION	3RD COAT	DESCRIPTION
Exterior steel - Protection of steel water tanks								
Good	OCS-1	NACE 3 / SSPC-SP6	Carbocoat 153	Universal alkyd primer	Carbocoat 8215 Series	Alkyd finish	Carbocoat 8215 Series	Alkyd finish
Better	OCS-3	NACE 3 / SSPC-SP6	Carbozinc 859 Series or Carbozinc 11 Series	Zinc rich epoxy primer or Inorganic zinc primer	Carbocrylic 3359 Series	Water based acrylic	Carbocrylic 3359 Series	Water based acrylic
Best	OCS-4	NACE 3 / SSPC-SP6	Carbozinc 859 Series or Carbozinc 11 Series	Zinc rich epoxy primer or Inorganic zinc primer	Carbothane 133 Series	Aliphatic polyurethane	Carboxane 950 Series	Aliphatic fluorourethane finish
Best	OCS-4 Alternative	NACE 3 / SSPC-SP6	Carbozinc 859 Series or Carbozinc 11 Series	Zinc rich epoxy primer or Inorganic zinc primer			Carboxane 2000 Series Or Carboxane 2100 Series	Hybrid polysiloxane finish
Good	OCS-5	NACE 3 / SSPC-SP6	Carboguard 60	Epoxy	Carboguard 60	Epoxy	Carbothane 134 Series Or Carbothane 133 Series	Gloss aliphatic polyurethane finish or Satin aliphatic polyurethane finish
Better	OCS-6	NACE 3 / SSPC-SP6	Carbozinc 859 Series or Carbozinc 11 Series	Zinc rich epoxy primer or Inorganic zinc primer	Carboguard 60	Epoxy	Carbothane 134 Series Or Carbothane 133 Series	Gloss aliphatic polyurethane finish or Satin aliphatic polyurethane finish
Good	OCS-7	NACE 3 / SSPC-SP6	Carboguard 553	Water based epoxy	Carboguard 553	Water based epoxy	Carbothane 134 WB	Water based, gloss aliphatic polyurethane

Note: Rustbond, a penetrating sealer, may be used as a bonding primer for over existing coatings.

Atmospheric Protection

Steel Structures and Equipment

CORROSION EXPOSURE	PREP	1ST COAT	DESCRIPTION	2ND COAT	DESCRIPTION	3RD COAT (OPTIONAL)	DESCRIPTION
Steel - Exterior, non-immersion/atmospheric service							
Applications – All exterior steel structures, piping, and equipment exposed to atmospheric service only							
Good	NACE 3/ SSPC-SP6	Carboguard 60	Epoxy	Carboguard 60	Epoxy finish		
Good	SSPC-SP3	Carbomastic 15 or Carbomastic 615	Surface tolerant aluminum epoxy or Inert flake filled, surface tolerant epoxy			Carbothane 134 Series or Carbothane 133 Series	Gloss polyurethane finish or Satin polyurethane finish
Better	NACE 3/ SSPC-SP6	Carboguard 60	Epoxy	Carboguard 60	Epoxy	Carbothane 134 Series or Carbothane 133 Series	Gloss polyurethane finish or Satin polyurethane finish
Best	NACE 3/ SSPC-SP6	Carbozinc 859	Zinc-rich epoxy primer	Carboguard 60	Epoxy	Carbothane 134 Series or Carbothane 133 Series	Gloss polyurethane finish or Satin polyurethane finish

Note: Rustbond, a penetrating sealer, may be used as a bonding primer for over existing coatings

NOTES:

1. Carbothane 134 Series includes Carbothane 134 HG, Carbothane 134 LV, Carbothane 134 MC, and Carbothane 134 WB.
2. Carbothane 133 Series includes Carbothane 133 VOC, Carbothane 133 HB, Carbothane 133 LH, and Carbothane 133 LV versions.
3. Reactamine 760 Series includes Reactamine 760 and Reactamine 760 HB.
4. Plasite 4500 Series includes Plasite 4500 and Plasite 4500 S.
5. Carboguard 890 Series includes Carboguard 890 GF, Carboguard 890 VOC, and Carboguard 890 LT.
6. Rustbond Series includes Rustbond and Rustbond FC which are penetrating primer/sealers with excellent wetting properties. They provide good chemical resistance, and accept a variety of topcoats.
7. Carbomastic 15 Series includes Carbomastic 15 and Carbomastic 15 FC.
8. Carbomastic 615 Series includes Carbomastic 615 and Carbomastic 615 AL.
9. Carboguard 510 and Carboguard 510 SG are epoxy patching and surfacing compounds that exhibit excellent bond strength to concrete and other masonry surfaces. Available in a spray grade version.
10. Carbocoat 8215 Series includes Carbocoat 8215 Non-Skid and Carbocoat 8215 VOC: high solids, quick-dry, general purpose air dry alkyd enamel that is used as a self-priming finish coat.
11. Carbothane 8845 Series includes Carbothane 8845 and Carbothane 8845 FC: fast dry, high solids, low VOC, high gloss, high build, two component aliphatic polyurethane coatings.
12. Plasite 4550 Series includes Plasite 4550 and Plasite 4550 S.
13. Phenoline Tank Shield Series includes Phenoline Tank Shield and Phenoline Tank Shield Plus.



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