

TAPECOAT - TC Enviroshield Series 'R' Module For Round Piling

WRAP AROUND SYSTEMS FOR ENCAPSULATING STEEL AND CONCRETE PILING

PART I GENERAL

1.1 Description

A. Work Included

1. This section specifies requirements for coating steel and concrete piles with petrolatum based protection modules. All products used by the Contractor, as a part of the encapsulation system, shall be manufactured by a single manufacturer to ensure product compatibility. The manufacturer of the encapsulation system shall be a member of the Steel Structures Painting Council (SSPC) or the National Association of Corrosion Engineers (NACE).
2. The manufacturer shall be ISO 9001 registered.
3. The work specified in this section consists of surface preparation of the pile and encapsulation.

1.2 References

- A. Federal Standards
- B. American Society for Testing and Materials (ASTM) Publications

1.3 Quality Assurance

A. Manufacturer's Representative

The Contractor shall arrange for a qualified technical representative of the manufacturer of the approved system to be present at the construction site to instruct and demonstrate the application procedures.

1.4 Delivery, Storage, and Protection

Deliver materials in original packages, containers, boxes or crates bearing the name of the manufacturer, brand, and model. Store all materials and equipment delivered to the construction site, so that weather conditions or other potential hazardous situations are properly taken into account. Exercise particular care to avoid damaging materials throughout all lifting or handling operations.

PART 2 PRODUCTS

2.1 TC Enviroshield Series Modules

TC Enviroshield Series 'R' Modules as manufactured by The Tapecoat Company, Evanston, Illinois (800-758-6041). The corrosion protection modules used in the piling protection system will be made of materials defined in this section and have the following features:

- A. Unitized design, providing an factory assembled module with a reinforced outer urethane jacket, inner felt (impregnated with petrolatum), and a composite non-metallic bolt and clip closure system manufactured in one unit:

Assembled Module Properties:

Color	Black	
Thickness	Outer Jacket	30 mils 0.030")
	Inner Mat	<u>110 mils (0.110")</u>
	Total Thickness	140 mils (0.140")
Weight	Outer Jacket	25 oz per sq yd
	Inner Mat	<u>70 oz per sq yd</u>
	Total Weight	95 oz per sq yd

- B. Manufactured in various sizes to conform to specific job requirements. Closure to be accomplished by bolting.
- C. Encapsulation modules designed to overlap when joined together eliminating the need for ancillary banding.

2.2 Materials

A. Primer: TC Enviroprime or Filler

- 1. Composition: The primer consists of a formulated, non-toxic, highly viscous petrolatum wax have the following physical properties:

<u>Property</u>	<u>Requirements</u>	<u>ASTM</u>
Penetration, cone @ 77°F	7.4 to 22.4 mm	D 937
Viscosity, SUS, @ 210°F	150 cps. avg.	D 88
Flash point, c.o.c., °F	500°F	D 92
Drop melt point	145°F avg.	D 127

- 2. Performance: The primer shall be used as a filler material for cracks or voids over 1/8" deep.

B. TC Enviroshield Module Composition

- 1. The inner felt and petrolatum formulation shall have a 110 mill thickness with a water-impermeable backing and shall have the following properties:

a. The inner felt:

<u>Property</u>	<u>Requirements</u>
Material	Polyester Felt
Weight	10 oz / sq. yd. ASTM D-3776
Thickness	110 mil min. ASTM D-1777
Grab Strength	305 lb. ASTM D-4632
Grab Elongation	60% ASTM D-4632
Trapezoid Tear Strength	100 lb. ASTM D-4533
Puncture Resistance	130 lb. ASTM D-4833
Mullen Burst Strength	510 p.s.i. ASTM D-3786
Water Flow Rate	80 gpm/sq.ft. ASTM D-4491
Permittivity	1.07 sec(-1) ASTM D-4491
Permeability	.57 cm/sec ASTM D-4491
AOS	210 mm ASTM D-4751

b. The Petrolatum formulation:

<u>Property</u>	<u>Requirements</u>
Color	Brownish - Gray
Dielectric Strength	170 volts/mil minimum D-149
Water Vapor Transmission	0.25 mg maximum E-96
Saturant Drop Melt Point	150 degrees F minimum D-127 180 degrees F typical value
Saturant Cone Penetration	
100 g weight, 5 sec @ 77 F	.24 - .50 in D-937
Weight per Gallon	7.7 lb./gal
Viscosity, 150 F, 0.5 RPM Spindle S21	20,300 cps D-88

2. The outer jacket shall be made of a multi-layer urethane coated, reinforced polyester, UV resistant composite material meeting the following physical properties:

<u>Property</u>	<u>Requirements</u>
Material	Multi-layer reinforced Urethane
Color	Black
Thickness	30 mil
Total Weight	25 oz per sq. yd.
Tensile Strength (grab lb.)	warp 440, fill 340 D751-A
Tensile Strength (1" strip lb.)	warp 275, fill 225 D751-B
Tear Strength (tongue lb.)	warp 160, fill 160 D751-B
Hydro Resistance	400 p.s.i. D751-A
Low Temperature	-60 degrees F D2136
Abrasion Resistance (tabor cycles)	5000 D3884
Accelerated Weathering	300 hr. - Excellent
Hydrocarbon Resistance	Excellent (MIL-C-20696B)

3. The Closure System shall consist of (4) pultruded fiberglass stiffener rods, two (2) on each side running along each longitudinal seam, 7/8 inch diameter glass filled acetyl plastic bolts, and threaded and unthreaded acetyl plastic clips spaced approximately 13" on center.

- a. The bolts and clips shall have the following physical properties:

<u>Property</u>	<u>Requirements</u>
Tensile strength	34700 psi D638
Tensile Elongation @ Brk	3% D638
Flexural Modulus	2110000 psi D790
Flexural Strength	54000 psi D790
Coef. of Friction	0.52 D1894
Water absorption @ 24 hrs	0.45% D570
Ultraviolet fight (UV) resistance	Excellent
Max. Continuous Tmp	212-356 F D794

- b. The stiffener rods shall have the following physical properties:

<u>Property</u>	<u>Requirements</u>
Material	E-glass fiber in proprietary resin

Tensile Strength	120,000 p.s.i.	D3915/D38
Tensile Modulus	6.0 x 10(8 th) p.s.i.	D3915/D38
Flexural Strength	120,000 p.s.i.	D4476/D790
Flexural Modulus	6.0 x 10(6 th) psi	D4476/D790
Compressive Strength	70,000 p.s.i.	D695
Barcol Hardness	60	D256
Izod Impact	40 ft.lb./in.	D256
Glass Content	75% by weight	D2584
Density	0.072 lb./cu. in.	D792
Water Absorption	0.05%	D570
Coefficient of Thermal Exp.	5.3 x 10 (-6 th)	D696

PART 3 EXECUTION

3.1 Installation

- A. Cleaning and Surface Preparation - The entire surface of each pile shall be thoroughly cleaned to remove all marine growth and foreign matter for the entire length covered by the modular system. The cleaning process does require removal of all surface projections such as bolts, welded projections, fouling organisms, and other surface conditions that would either penetrate the module or cause undue deformation. It shall not be necessary to remove surface bumps or other similar unevenness, provided these are smooth, as the material has sufficient elasticity to pass over these surface defects.
- B. Primer or filler - Priming the surface is not required under the Module. TC Enviroprime should be used as a filler in any areas that have deep indentations and cracks over 1/8" inch deep as directed by the project engineer.
- C. TC Enviroshield System

After cleaning and filling as required the Modules are installed as follows:

1. Remove the bolts (bolts and clips will not float) and Modules from the shipping carton. Unroll the Module and remove the protective release liner from the inner petrolatum mat.
2. Re-roll the Module and lower it to diver (Module will float).
3. Wrap the Module around the piling and insert center bolt.
4. Position the Module in the proper location at the top of the piling. Secure Module by tightening center bolt just enough to hold Module in correct location.
5. Insert balance of bolts in the clips, on Top Modules remove the release liner over the 2" wide Seal at the top of the Module. (Top seals only required on the Top Module).
6. Tighten the bolts with a pneumatic or hand wrench, alternating bolts up and down the Module. Note: Do not over-torque the bolts at first tightening. Allow to rest, proceed to the next Module and finish tightening the first Module after the petrolatum inner mat has cold flowed.
7. Cut off the threaded end of the bolts next to the clips with hacksaw or pneumatic cut off tool.
8. Repeat steps 1, 2, 3 and 4 with the next Module and position it with a 3-inch overlap over the bottom of the first Module. Continue to install Modules until the piling has the required coverage.

A manufacturer meeting these specifications is:

The Tapecoat Company
Evanston, IL
Ph 800-758-6041

A local Supplier for this product is:

Schrader Co. Sales, LLC
1326 5th Street – Suite B-2
Marysville, WA 98270
Ph 425-377-1550
Fx 425-377-0408