

TAPECOAT - TC Enviroshield Series 'H' Foam Module For Steel H Piles And Wide Flange Beams

SPECIFICATION: WRAP AROUND SYSTEMS FOR ENCAPSULATING STEEL H PILES AND WF BEAMS

PART I GENERAL

1.1 Description

A. Work Included

1. This section specifies requirements for coating steel H Piles or WF sections with corrosion 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 Acceptable System

TC Enviroshield Series "H Foam" as manufactured by The Tapecoat Company, Evanston, Illinois (800-758-6041). The corrosion protection modules used in the piling protection system must 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), reticulated foam layer, and a composite non-metallic bolt and clip closure system:

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 must be designed to overlap when joined together eliminating the need for ancillary banding.
- D. Module must have a reticulated open cell foam filler.

2.2 Materials

A. Primer: TC Enviroprime

- 1. Composition: The primer shall consist of a formulated, non-toxic, highly viscous petrolatum wax. The primer shall be installed to minimum of 4 mils and have the following physical properties:

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

- 2. Performance: The primer shall prime the wet surface for encapsulation.

B. TC Enviroshield Module

- 1. Composition: The encapsulation module system shall consist of an inner felt impregnated with petrolatum formulation, reticulated open cell foam filler, and an outer jacket fastened with a bolt and clip closure system.
- 2. The inner felt and petrolatum formulation shall have a 110 mil 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	Gray
Dielectric Strength	170 volts/mil minimum ASTM D-149
Water Vapor Transmission	0.25 mg maximum ASTM E-96
Saturant Drop Melt Point	150 degrees F minimum ASTM D-127 180 degrees F typical value
Saturant Cone Penetration	
100 g weight, 5 sec @ 77 F	.24 - .50 in ASTM D-937
Weight per Gallon	7.7 lb./gal
Viscosity, 150 F, 0.5 RPM	
Spindle S21	20,300 cps ASTM D-88

3. The foam filler shall be an open cell reticulated polyether foam with the following physical properties:

<u>Property</u>	<u>Requirements</u>
Material	Reticulated polyether foam
Density	1.4 PCF
Pour Size	20 ppi (65ppi)
Tensile Strength	13.0 psi
Elongation	180%
Tear Strength	2 lbs/in

4. 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)

5. 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" o/c.

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

6. Performance: The tightening process shall compress the foam filler and forcing the petrolatum into the pours of the steel surface. The outer liner on the inner mat shall prevent water penetration into the petrolatum material. The encapsulation module shall be easily and completely removable for inspection.

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 does not require the removal of surface growths from cavities or other indentations that do not come in contact with the module; but 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 without interfering with the snugness of the overall length.

- B. Priming - The entire surface area under the modules shall be primed by hand to a minimum thickness of 4 mils.

C. TC Enviroshield System

After cleaning and priming the pilings with TC Enviroprime, the Series "H-Foam" modules are installed as follows:

1. Remove the white release liners from one side of the inner petrolatum mats.
2. Position the two petrolatum mats on the H pile starting from the outer flange area and form it into the center of the web area, overlapping the two in the center of the web.

3. Insert the foam between each flange, aligning the top of the foam with the top of the inner mat, and pushing the foam tight against the web.
4. Wrap the outer jacket around the pile, inserting a bolt in the second clip from each end.
5. Tighten the two bolts sufficiently to compress the foam and then insert the balance of the bolts. Alternate the tightening sequence up and down the Module until all of the bolts are tight. Allow the materials to compress and then check and tighten all bolts.
6. Cut off the threaded end of the bolts next to the clip.
8. Repeat this sequence 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