Volume II
Section I
Catalog Cuts from Vendors

This section contains catalog cuts from vendors. The cuts were selected to be illustrative. The author intends no specific endorsement of these vendors – there may be other vendors of similar products that are comparable. The URLs given in the text and below are moving targets at best. In addition, some vendors sites require visitors to register. Here are catalog cuts, and some notes about the applications.
In order:

1. Plastic piles and structural members, cuts from Trelleborg Plastic piles and timbers, some made from recycled plastic, are used for structures and fender piles. One brand features a pile that is filled with recycled plastic with fiberglass reinforced plastic rebar and a UV light and abrasion resistant outer skin. These are available in both pile and beam shapes. http://www.trelleborgms.com/catalogue_1.aspx?id=1:30038&cat=1:469203&pagenum=1&pagesize=20 for plastic piles and http://www.trelleborgms.com/catalogue_1.aspx?id=1:30038&cat=1:469282&pagenum=1&pagesize=20 for a plastic beam.
2. Plastic pile coating, a specification from Schrader Marine. This is another method of plastic encapsulation is to coat a pile with plastic before it is installed. Spray on polyurea ("truck bed liner") is one type of plastic used [3] and the finished coat may be 250 mil (1/4 inch) thick. http://www.schraderco.com/pdf/poly1.pdf for a These are generally applied over a treated wood to reduce transfer of the treating chemicals to the environment and the coating is not structural.
3. Plastic products that attach to the outside of piles. This brand features a petrolatum mat that lays between the plastic and the wood, that, when compressed, seals the wood preventing oxygenated water from reaching the wood and thus preventing marine borers. See http://www.tapecoat.com/marine_pages/seriesr.htm
4. Epoxy. Another retrofit method that should work with installed piles is an epoxy grout that will bond to wet wood (or concrete or steel). A metal form sleeve is placed around the pile and the mixed epoxy is placed in the form. http://www.schraderco.com/pile_res.cfm
5. Supplier of ACZA, a water-born copper-based preservative Chemonite® ACZA should contain approximately 50% copper oxide, 25% zinc oxide, and 25% arsenic pentoxide dissolved in a solution of ammonia in water
6. Stainless steel fasteners or a plastic sleeve for steel fasteners are recommended for ACZA.See http://www.archchemicals.com/Fed/WOLW/Products/Preservative/Chemonite/hardware.htm

Volume II

Section I

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The following were taken from a brochure of Trelleborg Marine (www.trelleborg.com/marine), under their “engineered plastics” section. First two photos from their main site, then three page out of the brochure.

Sea Piles Plastic Piles

Sea Timber – Plastic structural member

SEAPILE® & SEATIMBER®

SeaPile and SeaTimber are advanced composite plastics with superior properties to timber, steel and concrete for many marine structures and applications.

They can withstand heavy impacts by absorption of energy through recoverable deflection. SeaPile and SeaTimber never rot, corrode or decay. They are impervious to marine borers, yet are totally non-polluting.

Manufactured from a recycled plastic matrix with unique glass fibre reinforcement bars, the stiffness of SeaPile and SeaTimber can be varied and controlled to suit each project. This makes the material the ideal choice for fenders, to build marine structures, and for coastal protection without damaging the environment.

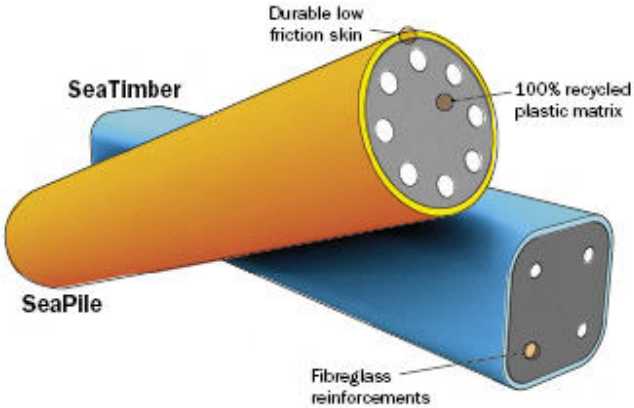
Features

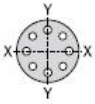
- Low lifecycle cost
- Will not rot, corrode or decay
- Unaffected by marine borers
- Choice of modulus to suit different applications
- Can be pile driven, sawn and drilled
- Low friction coefficient
- Ultra low maintenance
- Custom colours available
- Unlimited lengths*

Applications

- Fender piles and systems
- Structural piles
- Bridge protection
- Guidewalls and locks
- Corner fenders
- Dolphins
- Navigation markers
- Walings and bullrails

* subject to transport restrictions

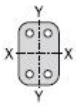




SeaPile

SeaPile section	Diameter inch	Diameter mm	Rebar quantity	Size inch	Size mm	Yield lb/in²	Yield MPa	Weight lb/ft	Weight kg/m
10 (6-1)	10	254	6	1	25	4300	29.65	24–29	36–43
10 (6-1.25)				1.25	32	5837	40.24	25–31	37–46
10 (6-1.375)				1.375	35	6766	46.65	26–32	39–48
10 (8-1)			8	1	25	5431	37.45	25–35	37–52
10 (8-1.25)				1.25	32	7482	51.59	26–32	39–48
10 (8-1.375)				1.375	35	8720	60.12	27–33	40–49
10 (8-1.5)				1.5	38	10036	69.20	28–35	42–52
10 (8-1.625)				1.625	41	11424	78.77	29–36	43–54
13 (8-1)	13	330	8	1	25	3842	26.49	39–48	58–71
13 (8-1.25)				1.25	32	5207	35.90	41–50	61–74
13 (8-1.375)				1.375	35	6028	41.56	42–51	63–76
13 (12-1)			12	1	25	5365	36.99	41–50	61–74
13 (12-1.25)				1.25	32	7413	51.11	43–53	64–79
13 (12-1.375)				1.375	35	8643	59.59	45–55	67–82
13 (12-1.5)				1.5	38	9947	68.58	46–57	68–85
13 (12-1.625)				1.625	41	11315	78.01	48–59	71–88
16 (16-1)	16	406	16	1	25	4928	33.98	61–74	91–110
16 (16-1.25)				1.25	32	6785	46.78	64–78	95–116
16 (16-1.375)				1.375	35	7899	54.46	66–81	98–121
16 (16-1.5)				1.5	38	9078	62.59	68–83	101–124
16 (16-1.625)				1.625	41	10313	71.11	70–86	104–128
16 (16-1.75)				1.75	44	11599	79.97	73–89	109–132

Modulus, stiffness and other material properties are available on request.



SeaTimber

SeaTimber section	Height inch	Height mm	Width inch	Width mm	Rebar qty	Size inch	Size mm	Yield X-X lb/in²	Yield X-X MPa	Yield Y-Y lb/in²	Yield Y-Y MPa	Weight lb/ft	Weight kg/m
12 × 8 (No rebar)	12	305	8	203	–	–	–	860	5.93	860	5.93	25–31	37–46
12 × 8 (4-1)					4	1	25	3868	26.67	3421	23.59	26–32	39–48
12 × 8 (4-1.25)						1.25	32	5155	35.54	4381	30.21	27–33	40–49
12 × 8 (4-1.375)						1.375	35	5928	40.87	4964	34.23	28–34	42–51
12 × 8 (4-1.5)						1.5	38	6746	46.51	5588	38.53	28–35	42–52
12 × 8 (4-1.625)						1.625	41	7606	52.44	6250	43.09	29–35	43–52
12 × 8 (4-1.75)						1.75	44	8501	58.61	6948	47.90	29–36	43–54
10 × 10 (No rebar)	10	254	10	254	–	–	–	860	5.93	860	5.93	27–33	40–49
10 × 10 (4-1)					4	1	25	3443	23.74	3443	23.74	28–35	42–52
10 × 10 (4-1.25)						1.25	32	4517	31.14	4517	31.14	29–36	43–54
10 × 10 (4-1.375)						1.375	35	5163	35.60	5163	35.60	30–36	45–54
10 × 10 (4-1.5)						1.5	38	5849	40.33	5849	40.33	30–37	45–55
10 × 10 (4-1.625)						1.625	41	6571	45.31	6571	45.31	31–38	46–57
10 × 10 (4-1.75)						1.75	44	7325	50.50	7325	50.50	31–38	46–57
12 × 12 (No rebar)	12	305	12	305	–	–	–	860	5.93	860	5.93	39–47	58–70
12 × 12 (4-1)					4	1	25	2706	18.66	2706	18.66	40–49	60–73
12 × 12 (4-1.25)						1.25	32	3466	23.90	3466	23.90	41–50	61–74
12 × 12 (4-1.375)						1.375	35	3923	27.05	3923	27.05	41–51	61–76
12 × 12 (4-1.5)						1.5	38	4406	30.38	4406	30.38	42–51	63–76
12 × 12 (4-1.625)						1.625	41	4914	33.88	4914	33.88	42–52	63–77

Modulus, stiffness and other material properties are available on request.

Standard manufacturing and performance tolerances apply (see pages 12–36 to 12–39)

M1100-S06-V1.2-EN. © Trelleborg AB, 2008

TRELLEBORG

Volume II
Section I
Catalog Cuts from Vendors

2. Plastic pile coating, a specification from Schrader Marine. This is another method of plastic encapsulation is to coat a pile with plastic before it is installed. Spray on polyurea ("truck bed liner") is one type of plastic used [3] and the finished coat may be 250 mil (1/4 inch) thick. http://www.schraderco.com/pdf/poly1.pdf for a These are generally applied over a treated wood to reduce transfer of the treating chemicals to the environment and the coating is not structural.

POLY-GRANITE INTERNATIONAL INC.

Specification for coating timber piling

Description
This specification will consist of preparing the surface and applying a slow cure spray Polyurea coating on treated timber piling for encapsulation. The product must have self-leveling capabilities and provide a smooth surface. This specification is for application prior to installation and to provide a compatible field applied repair material for touch up after installation.

1.01 References and Standards: All references and standards shall be in accordance with:

A. ASTM (American Society for Testing and Materials)
B. NACE (National Association of Corrosion Engineers)
C. NATA (National Association of Testing Authorities)
D. SSPC (Society of Protective Coatings)

Preparation:
These requirements include the end condition of the surface and materials and procedures necessary to achieve and verify the end condition.

A. The surface shall be dry and free of all visible oil, grease, dirt, paint, oxides and other foreign matter.

B. Required clean surface

Conditions for coating:
1.02 Coating shall be applied only after the following conditions have been met:

1.04 Submittals:

A. Submit Manufacturer's MSDS and technical data sheet, containing specified requirements indicating that the product meets required Specifications.
B. Supplier must be a manufacturer of the product or an approved distributor of the manufacturer.

Application:
The product is applied using a high-pressure heated plural component spray system with a minimum capability of 2000-psi pressure at the spray tip. The product must be heated to and maintained at 140°F to insure proper viscosities during processing. Product must be maintained at 1-1 ratio. Product must be applied in 1 continuous coat at a rate not to create drips or runs. Curing time before installation is 24 hours minimum.

2.01 Materials: Materials shall meet the following physical property requirements.

Mixing Instructions: The B-side component must be Pre-mixed prior to application at 400-600 RPM's. Application temperature range is between 0°F to as high as 120°F.

Application thickness:
The product must be applied at 125-250 mils on ALL sides of the piling.

Product description, characteristics and requirements:
Two-component 1-1 slow cure spray TDI, polytetramethylene ether glycol based Polyurea coating designed for marine environments. The products requirements include a 4-8 minute tack free time, 45-second gel time and self-leveling capabilities.

Spray Polyurea **PG-SL04**
Physical property requirements:

Total Solid Content	100 %
Mixing ratio A-B	1-1
Tack free @ 72ºF	4-minutes
Gel time	45-seconds
Elongation	580 %
Tensile (psi)	3200
Color stability	(aromatic)
Tear	520 lbs / in
Hardness	90-95A
Permeability	0.067 WVT

Product description, characteristics and requirements:
Field applied repair material is two-component 1-1 duplex tube mixed 8-minute tack free and 2-minute gel time Polyurea product that is applied and toweled to the appropriate thickness.

Repair Material **PG-JF85**
Field applied repair material

Total Solid Content	100 %
Mixing ratio A-B	1-1
Tack free @ 72ºF	12-minutes
Gel time	3-minutes
Color	(aromatic)
Hardness	90-95A
Permeability	0.067 WVT
Viscosity	A-1000 cps
	B-700 cps

Field Quality Control

A. Coating container be clearly marked designating each A & B component.

B. Perform dry film thickness tests as required. Due to rapid set of polyurea material, wet film testing is not possible. Ultrasonic testing of first and second application or of finished coating is recommended.

C. Maintain spray and other installation equipment in proper operating condition throughout installation. Provide reserve equipment as required.

Material Storage, Safety & Handling procedures: 12- Months from the original manufacturing date unopened and in the original Containers. Store material indoors @ 75ºF Check for material separation prior to blending.

Warranty: See manufactures standard material warranty.

Sources: Acceptable product meeting the above requirements are manufactured by:

Poly-Granite International
909 Mahar Ave
Wilmington, Ca 90744
Tel (310) 834-7037
Fax (310) 834-7825

Products: PG-SL04, SL08 Spray Polyurea marine coating, PG-JF85 trowel applied marine coating.

Testing was performed by independent testing facilities and believed to reliable. However since the data has been obtained under controlled laboratory conditions and typical for some product classification we can assume no liability for damages resulting from the use of this material. All information provided is given without warranty or guarantee. It is our recommendation that the user perform individual testing

Volume II

Section I

Catalog Cuts from Vendors

3. Plastic products that attach to the outside of piles. This brand features a petrolatum mat that lays between the plastic and the wood, that, when compressed, seals the wood preventing oxygenated water from reaching the wood and thus preventing marine borers. See http://www.tapecoat.com/marine_pages/seriesr.htm

Chase Specialty Coatings

SERIES R MODULE

TC ENVIROSHEILD

SERIES R Module
SERIES S Module
SERIES T Module
SERIES H Module
SERIES M Module

Rapid Closure System with corrosion inhibiting petrolatum.

Piling Encapsulation

TC ® Enviroshield ® Series

Proven Corrosion Protection for Pilings and Offshore Risers

Modular Marine Corrosion Protection System

The TC Enviroshield Series R module is designed for the maximum protection of offshore platform risers and lateral beams from the harsh marine environment. This easy field-applied modular system provides abrasion and corrosion protection of existing and new marine structures. A tough outer abrasion-resistant jacket activates an en-capsulating environmentally-safe petrolatum with the tensioning of an easy-installation closure system. The TC Enviroshield allows for quick reinspection and easy accommodation of lateral braces, peripheral beams and weld-attached anodes. This easy field-applied protection can be installed in and out of the water on a wet or dry minimally prepared surface.

The TC Enviroshield Series R module is an easy field-applied maximum marine protection system. The Series R module provides proven corrosion protection, re-inspection capability, aesthetic appearance, accommodation for lateral braces and environmental sensitivity

- **Factory assembled for field installation**
- **Install on minimally prepared surface**
- **Apply to wet, dry, or underwater surface**
- **Inner petrolatum mat encapsulates and seals substrate**
- **Tough multi-layer urethane outer jacket**
- **Composite tensioning closure system forces petrolatum into pores of surface**
- **No metal components**
- **No hand tapping or exterior bands**
- **RE-INSPECTABLE**
- **Available in 5 ft. and 2.5 ft. length with a 3 in. overlap for longer requirements**

TAPECOAT Chase Specialty Coatings

The Tapecoat Company
P.O. Box 631 Evanston, IL 60204-0631 USA • 800.758.6041

Volume II
Section I
Catalog Cuts from Vendors

4. Epoxy. Another retrofit method that should work with installed piles is an epoxy grout that will bond to wet wood (or concrete or steel). A metal form sleeve is placed around the pile and the mixed epoxy is placed in the form. http://www.schraderco.com/pile_res.cfm

SCHRADER CO. SALES LLC.

Fri, October 09, 2009

Home
Recycled Plastic Lumber
SeaPile, SeaTimber, Ecoboard
Trelleborg Fendering Systems
Pile Restoration
Fox Industries
Pile Protection
Tapecoat
UHMW
Poly-Hi Solidur
Polyurea Coating
Poly Granite
Composite Sheet Pile
Contact

PILE RESTORATION

Providing structural restoration on concrete, steel or timber pilings with inert corrosion free systems. FX-70 System can be accomplished quickly and economically. Splash zone only or complete pile restoration with the system's interlocking fiberglass jackets assures long-term protection.

FOX FX Data Sheets (PDF)

- FX70 Pile Pourable
- FX70 Pile Pumpable
- FX70-6 Pourable
- FX70-6 Pumpable
- FX70 Fiberglass Jackets

Since 1969, Fox Industries, Inc. has manufactured products and systems utilized in the construction industry to restore, protect and improve concrete, steel and wood structures. Headquartered in Baltimore, MD, Fox Industries has earned a worldwide reputation for solving problems using innovative materials and techniques. Fox's products have proven track records in the marine, industrial, transportation, commercial building and public works industries. We offer a complete line of epoxy, urethane, acrylic, polyester and cementitious materials.

Click to Enlarge

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Click to Enlarge

Click to Enlarge

FX-70Â® Inert Corrosion-Free System

DESCRIPTION:
Severe structural deterioration caused by corrosion exists in concrete, steel and wood all over the world. The FX-70Â® Inert Corrosion-Free System can be utilized to restore the structural integrity and provide corrosion protection of any pile, pier, column or pole. This patented system can be used to restore structural integrity in or out of water. This complete structural restoration can be accomplished without interrupting use of the structure, regardless of location. For marine applications, costly de-watering is not necessary. The basic FX-70Â® concept utilizes a permanent high strength reinforced hydro-ester UV-resistant outer surface for protection against salt water, corrosive pollutants, cycles of wetting and drying, cycles of freezing and thawing and deterioration by electrolysis. A group of moisture insensitive products, along with the FX-70Â® jacket are used in various combinations to economically meet a wide range of job conditions.

FX-70Â® PROTECTIVE OUTER SURFACE:
This inert corrosion-free surface is available as round or square interlocking jackets, flat sheets, seamless shells, or custom shapes. Wall thicknesses range from 1/8" to 1/2" depending on application.

PHYSICAL PROPERTIES:

The FX-70Â® FRP Shapes & Structures shall exhibit the following physical properties:

Water Absorption (ASTM D-570)	1% max.
Compressive Strength	18,000 psi min.
Ultimate Tensile Strength (ASTM D-638) Longitudinal, transverse and diagonal	15,000 psi min.
Flexural Strength (ASTM D-796)	25,000 psi min.
Flexural Modulus of Elasticity (ASTM D-790)	700,000 psi min.
Barcol Hardness (ASTM D-2583)	45 + 5
Color	Gray
Federal Color Standard No.595A Table VIII-26622	

HIGH BOND TO CONCRETE, STEEL OR WOOD
The two component FX-70Â® Hydro-Ester compounds (FX-763, FX-70-6, FX-70-9, and FX-498), all bond tenaciously to wet or dry surfaces of concrete, wood, steel, and other structural materials. The water-insensitive formulation of these materials make it possible to work successfully in wet

environments.

ADVANTAGES OF THE FX-70Â® SYSTEM
Application procedures utilize proven materials and chemical systems already well known in the construction industry. The FX-70Â® Hydro-Ester compounds are designed for field use in wet environments. High strength and bond are developed by chemical reaction. Costly maintenance and repetitive repairs are eliminated. High structural strength combined with inert chemical properties make the FX-70Â® System the most practical way to reconstruct piles and prevent steady deterioration from salt water, corrosive pollutants, ice action, floating debris, marine borers, electrolysis and ordinary weathering.

PROVEN IN SERVICE - ASK FOR TEST RESULTS
Original laboratory testing began in 1970. Field applications began in 1971 and are performing well today. Projects range widely in geographic areas including the West Coast, Gulf Coast, East Coast, inland waterways, and overseas. Exposure conditions include tidal action, river currents, salt water, fresh water, ice action, and various pollutants.

To see more products from Fox Industries, please visit their website: www.foxind.com

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Volume II

Section I

Catalog Cuts from Vendors

5. Supplier of ACZA, a water-born copper-based preservative Chemonite® ACZA should contain approximately 50% copper oxide, 25% zinc oxide, and 25% arsenic pentoxide dissolved in a solution of ammonia in water

Wood Treated Right™

Overview

Product Applications

Codes, Model Specs & Standards

Product FAQ

Product Literature

Recommended Hardware

Licensed Producers

Product Use & Handling

Chemonite® is the registered trade name for wood protected by ACZA, against termites and fungal decay. Learn more about Chemonite® woo

The treatment was originally developed, and remains today, as the onl consistently meets recognized standards of penetration and retention i treat species such as coastal Douglas fir.

Chemonite wood has been safely and successfully used since the 1940's applications. It is leach-resistant in water and ground.

Chemonite wood offers all of the appealing characteristics of wood alo protected against the major causes of wood degradation: rot, decay, te studies indicate resistance to carpenter ants, woodpeckers, and fire.

It has protection both above ground and in ground contact, as well as i stored, handled, and worked with like untreated wood.

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Volume II
Section I
Catalog Cuts from Vendors

6. Stainless steel fasteners or a plastic sleeve for steel fasteners are recommended for ACZA.See http://www.archchemicals.com/Fed/WOLW/Products/Preservative/Chemonite/hardware.htm

Overview

Product Applications

Codes, Model Specs & Standards

Product FAQ

Product Literature

Recommended Hardware

Licensed Producers

Product Use & Handling

Chemonite® Wood: Recommended Hardware

Post hot-dipped galvanized fasteners & connectors are recommended fo

- Some hardware manufacturers recommend only stainless steel conr no less then Post Hot-Dipped Galvanized, HDG, fasteners (meeting (ASTM A 653 Class G185 sheet) where there is contact with ACZA-tr be sure to observe building code requirements.
- In highly corrosive environments--such as exposure to salt air and w fertilizer storage, high humidity or constant wetting--appropriate s For below grade Permanent Wood Foundations, building codes gene
- Always use the same type metal for assembly of connectors and fas can accelerate corrosion. Aluminum or electroplated galvanized m in contact with any treated wood. These metals are not accepted b use in exterior applications.

The above recommendations are based upon years of field experience a recommendations are consistent with the recommendations made for o have been an industry practice spanning several decades.

IMPORTANT NOTE: Products which are cut, stamped or manufactured f HDG per ASTM A 653) result in raw or exposed edges. Such products are likely to exhibit greater corrosion. By definition, galvanizing is the act Dipped Galvanizing (ASTM Standard A 153) specifies total immersion in centrifuging process to ensure a smooth and uniform coating of equal tl and threads. One of the most important benefits of a HDG coating is th edges and corners - the most likely place for corrosion to begin.

***** Corrosion tests were conducted over 60 days (i/a/w Military Specifica used with Chemonite wood (and ACA, the original formulation). The tes are appropriate for use with ACZA-treated wood.

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