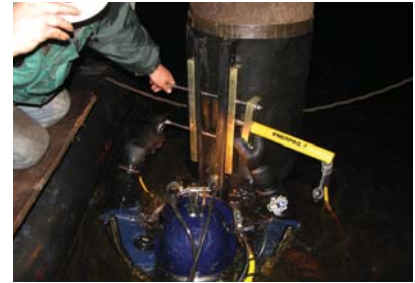


SeaShield Marine Systems



SeaShield Series 2000FD System designed to withstand the most aggressive environments.



Features

- Minimal surface preparation required (no abrasive blasting)
- Fast and easy installation
- Can be applied underwater
- Proven 80 year history of corrosion protection
- One piece jackets
- High impact resistance in aggressive environments
- UV resistant
- Safe to apply and environmentally responsible
- 30 year plus service life

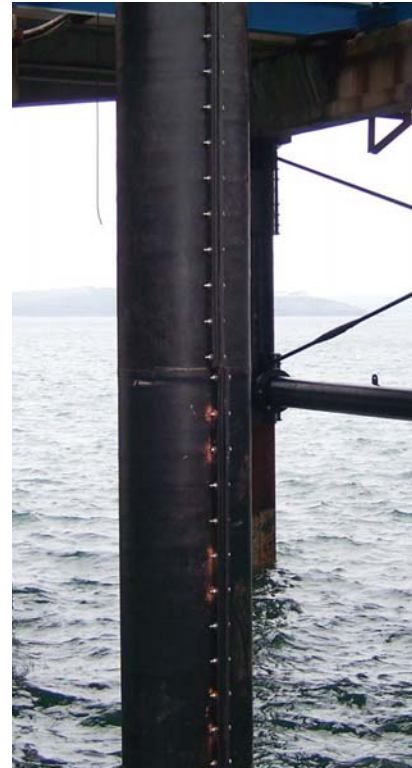
Series 2000FD

The ultimate heavy-duty pile protection system for pilings in the most aggressive environments

SeaShield Series 2000FD System provides splash zone protection for steel, concrete and wood structures. The system is ideal for environments where conditions are too severe for paint systems, epoxies and other conventional forms of protection. SeaShield Series 2000FD seals out oxygen and water, effectively stopping corrosion on metal surfaces. The system also prevents spalling and corrosion of steel reinforcement in concrete piles.

The Series 2000FD encapsulates wharf piles, riser pipes and exposed piping in splash and intertidal zones. It accommodates piles with cylindrical and octagonal configurations and is applied with a controlled tensioning system.

Denso[®]
DENSO NORTH AMERICA



The SeaShield Series 2000FD System features a controlled application tensioning system.

Materials

The SeaShield Series 2000FD System stops corrosion by using a proven petrolatum-based tape. The SeaShield Marine Tape forms an anti-corrosion membrane by displacing water and forming a moisture-resistant bond. A tough outercover surrounds this component to protect against weathering and mechanical damage.

Denso Paste S105

Underwater petrolatum paste containing water displacing, corrosion inhibiting and flow control additives. It does not contain volatile organic components. It is applied to badly corroded and pitted steel above and below water prior to the application of the tape. It displaces water and fills pits and depressions.

Densyl Mastic (optional)

A flexible, putty-like caulking and filler material used to seal irregular shapes and other areas where tape may bridge. Common applications include pile/pile cap interfaces, brackets and flanges. Mastic seals against water and air intrusion and improves contours for tape wrapping.

SeaShield Marine Tape

Synthetic fiber-reinforced tape impregnated and coated with a specially formulated, petrolatum-based compound containing inert fillers and water displacing agents. The tape provides a long-lasting, anti-corrosion membrane for steel and concrete surfaces. Applied spirally, and with sufficient tension, SeaShield Marine Tape displaces water and develops a water resistant bond. It provides the primary corrosion protection in the SeaShield Series 2000FD System.

SeaShield Outercover

A custom engineered outercover fabricated to meet the exact size and length of the application requirements. This tough, ultraviolet-resistant outercover provides mechanical protection against the elements and accidental impact. A controlled hydraulic tooling system is used to achieve the optimal tension for the outercovers. The SeaShield Series 2000FD outercovers are secured with 316 SS marine grade stainless steel bolts, nuts and washers.



Find Out More

For further details please refer to the Engineering Specifications for SeaShield Series 2000FD or call 1-888-821-2300.



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Engineering Specifications for **SeaShield Series 2000FD** Steel and Concrete Pile Protection

1.0 Scope

- 1.1 This specification may be used for the materials and application of Denso SeaShield Series 2000FD for protection of steel and concrete piles.
- 1.2 The Engineer shall select appropriate sections of the specification to insure that the specification is comprehensive for specified work.
- 2.0 General Requirements
- 2.1 Contractor shall comply with all written recommendations of the manufacturer regarding application of the specified system.
- 2.2 The manufacturer of specified materials shall be Denso North America Inc., 9747 Whithorn Drive, Houston, TX 77095, Tel: 281-821-3355, Fax: 281-821-030, e-mail: info@densona.com

3.0 Materials

- 3.1 Denso S105 Primer
- 3.1.1 The Denso S105 Paste shall be comprised of saturated petroleum hydrocarbons (petrolatum), inert fillers and passivating agents.
- 3.1.2 The paste is used to displace moisture, passivate surface oxides and fill surface imperfections on severely corroded areas.
- 3.1.3 The physical specification values shall meet the values given on the data sheet for the Denso S105 Paste.
- 3.2 Densyl Mastic
- 3.2.1 The Densyl Mastic shall be comprised of saturated petroleum hydrocarbons (petrolatum), inert fillers, reinforcing fibers and thermal extenders. Variations may contain beads of cellular polymer and flow control additives.
- 3.2.2 Densyl Mastic shall be cold applied self supporting Mastic for molding around irregular shaped fittings to

provide a suitable profile for applying the SeaShield Denso Marine Piling Tape.

- 3.2.3 The physical specification values shall meet the values given on the data sheet for the Densyl Mastic.
- 3.3 SeaShield Denso Marine Piling Tape
- 3.3.1 The SeaShield Denso Marine Piling Tape shall be comprised of a non-woven synthetic fabric carrier fully impregnated and coated with a neutral petrolatum based compound with inert siliceous fillers, water displacing agents and inhibitors. It is backed with a HD polyethylene film.
- 3.3.2 The SeaShield Denso Marine Piling Tape shall have a character stable in composition and plasticity over a wide temperature range. The tape shall be non-hardening and non-cracking. The tape shall accommodate vibration and extreme movement of substrate. Superficial oxidation renders surface less tacky. Highly resistant to mineral acids and alkalis.
- 3.3.3 The SeaShield Denso Marine Piling Tape shall meet the physical specifications values listed on the data sheet.
- 3.4 SeaShield 2000FD Outercover
- 3.4.1 The SeaShield 2000FD Outercover shall be comprised of High Density Polyethylene (HDPE). It shall be new, seamless virgin material. Use of reprocessed resin is prohibited. The sheet shall be uniform throughout, free from dirt, oil and other foreign matter and free from cracks, creases, wrinkles, bubbles, pin-holes and any other defects that may affect its service.
- 3.4.2 The SeaShield 2000FD Outercover is used to prevent damage to underlying SeaShield Denso Marine Piling Tape. The outercovers will be custom engineered to have the correct fit for the diameter of the pile. The jackets shall be manufactured with Denso proprietary equipment to ensure quality fabrication.
- 3.5 SeaShield Bolts, Nuts & Washers
- 3.5.1 The SeaShield Fasteners shall be comprised of M12 x 90 mm Hexagon Bolt, 316 Marine Grade Stainless Steel

- 3.5.2 M12 Self Locking Nylon Insert Nut, 316 Marine Grade Stainless Steel
- 3.5.3 M12 x 35 mm Penny Washer 316 Marine Grade Stainless Steel, for every nut and bolt there are two washers.

4.0 General Surface Preparation Requirements

- 4.1 Remove weld spatter, sharp points and edges.
- 4.2 Remove marine growth, loose rust, paint and foreign matter by hand and /or power tools.
- 4.3 A hydraulic whirl away or high pressure water blasting may be used to prepare the surface.

5.0 Application of Denso S105 Paste

- 5.1 If surface has corrosion pits greater than 2 mm then apply thin uniform layer over corroded area and fill all pits with Denso S105 Paste by gloved hand.
- 5.2 When applying the Denso S105 Paste underwater use a gloved hand to displace the water and slowly rub S105 Paste onto surface and into pits. (Note: When applying underwater the primer will be less visible on the pile.)

6.0 Application of Densyl Mastic

- 6.1 To protect complex surfaces and configurations such as brackets, flanges, valves etc., apply Densyl Mastic by filling and packing to achieve a uniform contour to which tape can be applied without bridging or voids.
- 6.2 Use Densyl Mastic to fill in cavities at the pile/pile cap interfaces.

7.0 Application of SeaShield Denso Marine Piling Tape to a Cylindrical Pile

- 7.1 The SeaShield tape shall be spirally wrapped onto pile using a 55% overlap, which will provide a double thickness of tape throughout. Application shall proceed at the designated high point of the area and proceed downward to the low point.
- 7.2 Hold end of the tape firmly against the starting point and firmly press on the surface. Unroll the tape, keeping the roll close to the surface. Do not get a long lead of tape as it will tend to fold and gap on the surface being wrapped.
- 7.3 Apply sufficient tension to provide continuous adhesion, but do not stretch the tape. As application proceeds, press out all folds and air pockets that may occur.
- 7.4 Maintain a minimum 6" overlap when overlapping one roll with the end of a new roll.

- 7.5 At the completion of each roll, smooth the overlaps by hand in the direction of the spiral to insure sealing of the overlap.

8.0 Application of SeaShield 2000FD Outercover

- 8.1 A Denso Hydraulic Tensioning Kit will be required to properly tension and fit the SeaShield 2000FD Outercover. Assemble the Hydraulic Tensioning Kit per to the Operating Instructions prior to application.
- 8.2 Temporary hold and locate the outercover between the elevations indicated in the specifications and drawings.
- 8.3 Align the bolting bar holes and install the middle clamping bar and slide rods through both bolting bar holes. Install the other clamping bar and tighten the nut and washer on both ends. Make sure nut is screwed right up to the shoulder so the washer can slide freely on the shaft.
- 8.4 Install the top and bottom clamping bars. The clamping bars shall be fitted so there are 2 exposed bolt holes at the top and bottom of the outercover and 2 holes between each of the 3 clamps.
- 8.5 Apply pressure evenly to each hydraulic hand pump which will show 1500psi while jacketing. Bring the bolting bars together evenly until the pump gauges read approximately 5000psi.
- 8.6 Install the M12 x 90 316 SS bolts, nuts & washers into the exposed empty holes and tightened up so that the bars are compressed and the nut has reached the end of the thread or cannot be tightened further.
- 8.7 Remove the hydraulic clamps and install the M12 x 90 316 SS bolts, nuts & washers in remaining holes and tightened up. For complete written instructions with photos please refer to the Operating Instructions for SeaShield Series 2000FD.



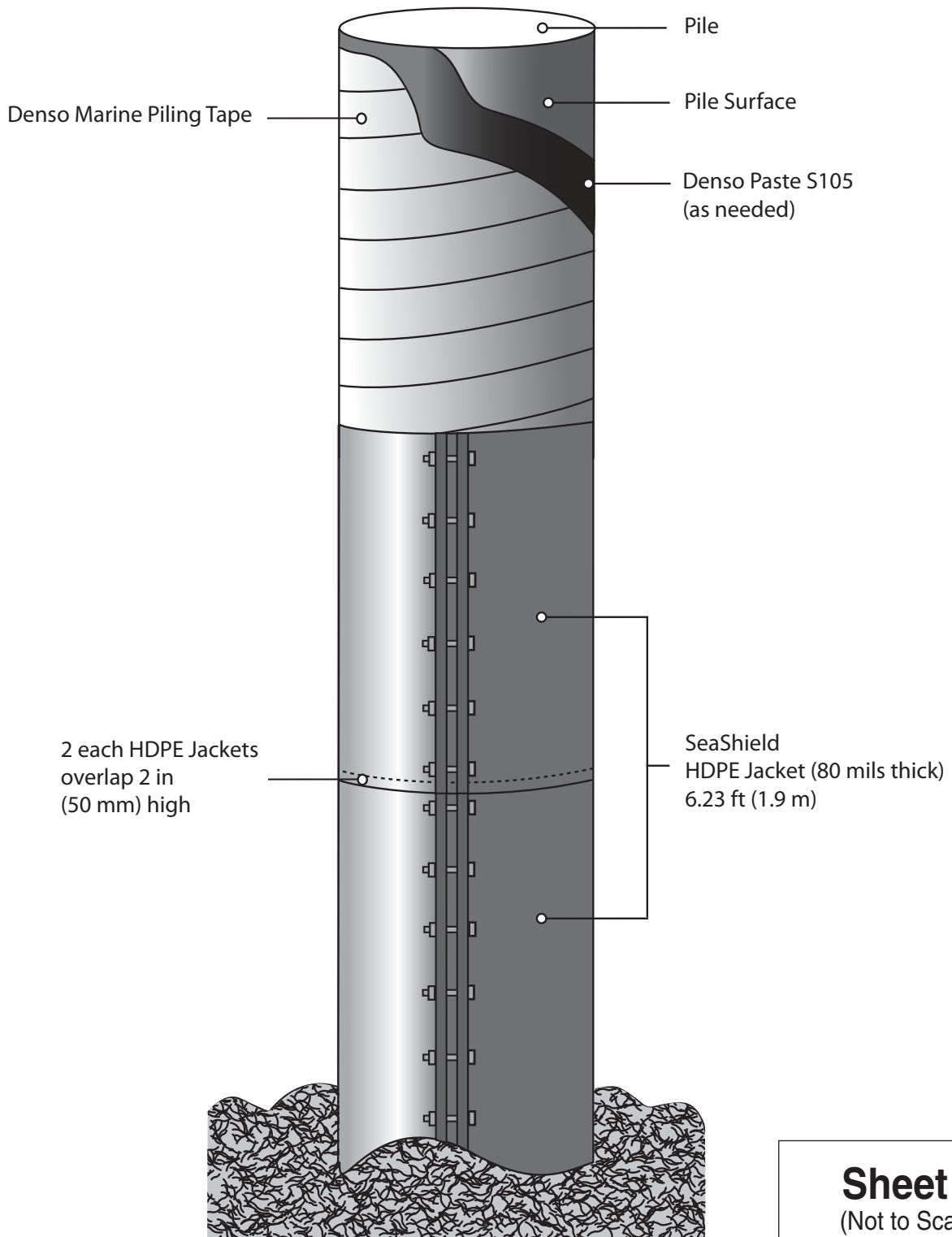
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Sheet 1
(Not to Scale)

**SeaShield Series 2000FD
Splashzone Protection System**

