Engineering Specifications for SeaShield Series 70™

Petrolatum Tape & Glass Outerwrap Protection System for Steel, Concrete and Timber Piles

1.0 Scope

1.1 This specification may be used for the materials and application of Denso SeaShield Series 70 for Steel, Concrete and Timber Pile Protection.

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, 9710 Telge Road, Houston, TX 77095, Tel: 281-821-3355 or 90 Ironside Crescent, Unit 12, Toronto, Ontario, Canada M1X1M3 Tel: 416-291-3435. E-mail: info@densona.com

3.0 Materials

3.1 Denso Paste S105™

3.1.1 The Denso Paste S105 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.

3.1.3 The Denso Paste S105 shall meet the physical specification values listed on the product data sheet. Denso Paste S105 shall only be used on steel and concrete piles in pitted areas. If the surface to be protected is pitted to a depth of 2 mm or more then a layer of Denso Paste S105 should be applied over the pitted area.

3.2 Denso Marine Piling Tape™

3.2.1 The 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 water displacing agents and backed with a thin layer of HDPE.

Only Densyl Tape™ is used for H-piles. It shall be comprised of a non-woven synthetic fabric carrier fully impregnated and coated with a neutral petrolatum-based compound with inert siliceous fillers and inhibitors.

3.2.2 The Denso Marine Piling Tape and Densyl 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. Highly resistant to mineral acids and alkalies.

3.2.3 The Denso Marine Piling Tape and Densyl Tape shall meet the physical specifications values listed on the specification sheet.

3.3 Denso Glass Outerwrap™ (white, black or brown) and / or Glass Outerwrap UV (gray, black or brown)

3.3.1 Denso Glass Outerwrap and / or Glass Outerwrap UV is a fiberglass cloth impregnated with a water-activated resin that is used as a protective outer wrap over Denso Marine Piling Tape. It is a protective coating which offers exceptional mechanical and impact strength for underwater, underground, and above ground pipe and piles. It can be applied between 32°F (0°C) and 150°F (66°C).

3.3.2 Setting Times - Glass Outerwrap
50°F (10°C) - 60 minutes
70°F (21°C) - 30 minutes
90°F (32°C) - 15 minutes

3.3.3 Setting Times - Glass Outerwrap UV
50°F (10°C) - 6 hours
70°F (21°C) - 2.5 hours
90°F (32°C) - 1 hour

3.3.4 Denso Glass Outerwrap is designed to be used in

areas where UV exposure is minimal or non-existent. Denso Glass Outerwrap UV is designed to be used in areas where UV exposure is common.

3.4 Denso Poly-Wrap™

3.4.1 Denso Poly-Wrap is a 200 gauge (2.0 mil / 0.06 mm) wrap made from high-performance metallocene resins.

4.0 Surface Preparation

4.1 Identify piles to be protected between elevations indicated on the drawings.

4.2 Remove marine growth and foreign matter for the entire length which is to be protected with the series 70 system in accordance with SSPC SP 2/3 “Hand Tool Cleaning” or “Power Tool Cleaning”. A hydraulic whirl away or high-pressure water blasting may also be used to prepare the surface

5.0 Application of Denso Paste S105 (Steel Piles Only)

5.1 If surface has corrosion pits greater than 2 mm, apply a thin uniform layer of Denso Paste S105 over corroded area and fill all pits.

5.2 When applying the Denso Paste S105 underwater, use a gloved hand to displace the water and slowly rub Denso Paste S105 onto surface and into pits. (Note: When applying underwater the primer will be less visible on the pile.)

6.0 Application of Denso Mastics

6.1 To protect complex surfaces and configurations such as brackets, flanges, valves etc., apply Densyl™ Mastic or Denso Profiling 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 or Denso SeaShield SZ Underwater Epoxy™ to fill in cavities at the pile / pile cap interfaces.

7.0 Application of SeaShield Foam Blocks™ and Densyl Tape (For Steel H-Piles Only)

7.1 Wrap foam blocks with Densyl Tape with minimum 1" (25 mm) overlap.

7.2 Insert the wrapped foam blocks into the openings of the H-Piles on each side, ensuring a tight fit.

7.3 The Densyl Tape shall be spirally wrapped around the H-Pile using a 55% overlap, which will provide a double thickness of tape throughout.

7.4 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.

7.5 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.

7.6 Maintain a minimum 6" (150 mm) overlap when overlapping one roll with the end of a new roll.

7.7 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 Denso Marine Piling Tape

8.1 The Denso Marine Piling Tape shall be wrapped onto the pile using a minimum 55% overlap. Application shall begin at the designated low point indicated in the specifications and drawings and proceed upward to the high point, creating a weather board effect.

8.2 Hold end of the tape firmly against the starting point and firmly press onto the surface. Unroll the tape, keeping the roll close to the pile. Do not get a long lead of tape as it will tend to fold and gap on the surface being wrapped.

8.3 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.

8.4 Maintain a minimum 6" (150 mm) overlap when overlapping one roll with the end of a new roll.

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

9.0 Application of Denso Glass Outerwrap and/or Glass Outerwrap UV

9.1 Once removed from the sealed wrapper, the Denso Glass Outerwrap and/or Glass Outerwrap UV roll needs to initially be immersed in clean water for approx. 1 minute (clean, clear sea water will suffice) before it can be used so as to initiate the resin curing process.

9.2 In the pile protection zone, apply the outer tape in a similar fashion to the Denso Marine Piling Tape by starting with two full circumferential wraps about 2" (50 mm) below the inner tape, then proceed spirally upward along the pile progressing with a 55% overlap, this will ensure a minimum double thickness of tape.

9.3 Commence each new roll by overlapping the last roll by 6" (150 mm), as wrapping proceeds, smooth by gloved hand to exclude water, air bubbles and wrinkles from under the tape and to aid sealing of overlaps. Any overlapped edges are to be moulded and smoothed down by hand.

9.4 This process is repeated all the way along the protection zone to a point a min. of 2" (50 mm) above the end of the inner tape finishing again with two complete horizontal turns of the tape.

10.0 Application of Denso Poly-Wrap™

10.1 A temporary double layer of Denso Poly-Wrap shall be immediately applied over the uncured Glass Outerwrap and / or Glass Outerwrap UV. This allows all seams of the Glass Outerwrap to lay out more smoothly and provides a tighter cured seal.

10.2 The Poly-Wrap should be removed after approx. 4 hours depending on temperature. (Refer to section 3.3.4)

11.0 Application of Mud Line Seal

11.1 If the system is required to protect the pile below the mud line, then a mud line seal is required.

11.2 Excavate the soil around the base of the piles so that the outercover system extends to a minimum of 2 feet (.61 m) below the mud line. After installation of the Glass Outerwrap and/or Glass Outerwrap UV & removal of the Denso Poly-Wrap, backfill all excavated areas to the original mud line.

12.0 Inspection (If Necessary)

12.1 Using an oscillating Dremel tool or utility knife, carefully cut a 3" x 3" square into the layer of Denso Glass Outerwrap and/or Glass Outerwrap UV only and not the Denso Marine Piling Tape. Once the Glass Outerwrap and/or Glass Outerwrap UV is removed, make an x-cut in the Denso Marine Piling Tape revealing the substrate for inspection.

12.2 After completion of the inspection, fold the edges of the Denso Marine Piling Tape back into contact with the substrate and cover with a new 3" x 3" square piece of Denso Marine Piling Tape.

12.3 Apply a new roll of Denso Glass Outerwrap and/ or Glass Outerwrap UV & Denso Poly-Wrap in accordance with section 3.3 & 3.4 of this specification beginning 2" below the repair area and finishing 2" above the repair area.

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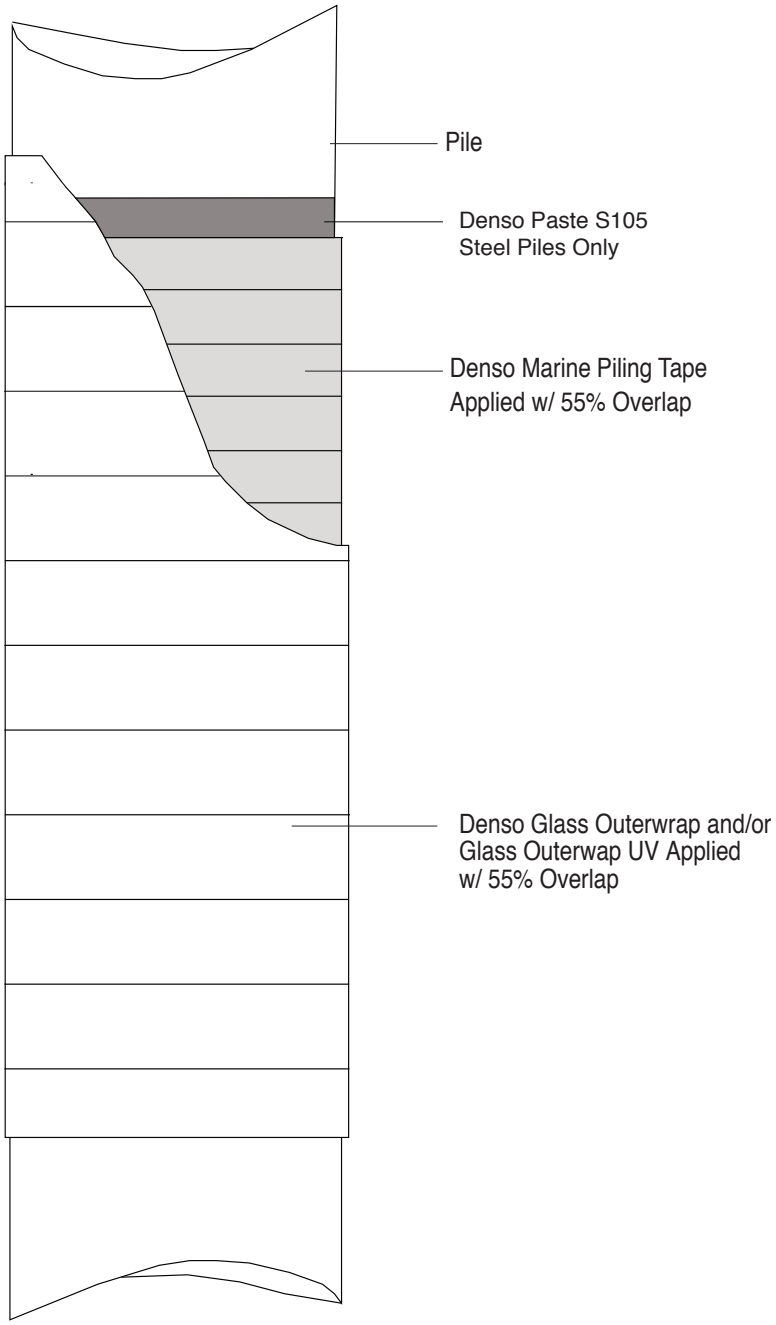

Elevation View

Sheet 1
(Not to Scale)

SeaShield Series 70
Timber Pile Protection System

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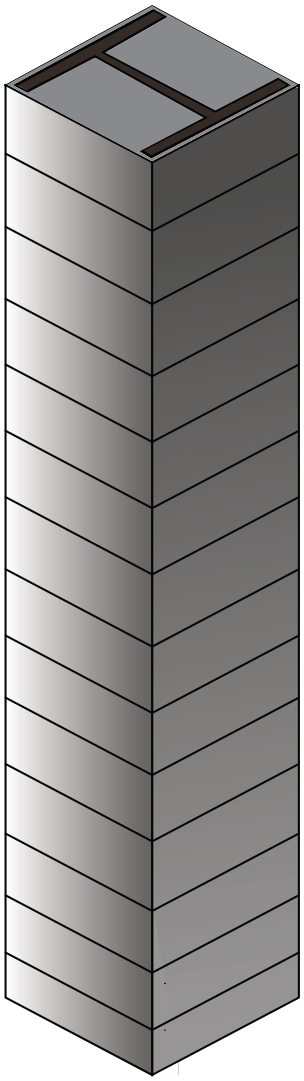
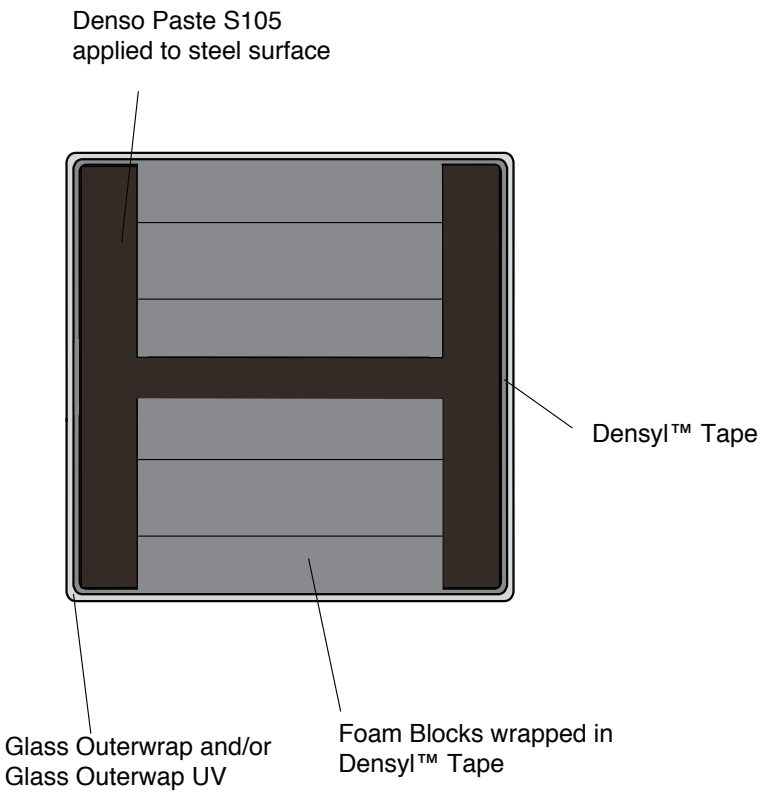


Elevation View



Plan View

Sheet 2
(Not to Scale)

SeaShield Series 70
Steel H-Pile Protection System

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