Bore-Wrap®
Application Specifications

1.0 Scope

1.1 Application Specifications for the use of Denso Bore-Wrap for girth weld coating protection or mainline (full encapsulation) coating protection.

2.0 General Requirements

2.1 Contractor shall comply with all written recommendations of the manufacturer regarding applications of the specified system.

2.2 To obtain the specified materials contact Denso, Inc., 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 - Products and Tools

3.1 Denso Bore-Wrap

3.1.1 Denso Bore-Wrap is an Abrasion Resistant Outerwrap (ARO) that has significant protection against Shear, Abrasion, Impact, and Gouge, (SAIG) to protect anti-corrosion coatings which will be installed in difficult terrain or by means of trenchless installation. Denso Bore-Wrap creates an abrasion resistant, sacrificial outer laminate which protects pre-approved field joint coatings and mainline coatings such as epoxies, shrink sleeves, 3LPE, 3LPP and FBE. It is compatible with all types of anti-corrosion coatings.

3.2 Rubber Gloves, Water and Water Sprayer, Fabric Cutting Tool, Perforating Roller, Denso Poly-Wrap Compression Film, Applicable Surface Preparation Tools, Anti-freeze (optional).

4.0 Surface Preparation

4.1 Prepare the area where Denso Bore-Wrap is to be applied in accordance with SSPC-SP1 "Solvent Cleaning".

4.2 For softer coatings such as Polypropylene or Polyethylene, contact Denso, Inc. for additional surface preparation guidance.

4.3 On hard coatings such as epoxy, the use of 60 to 80 grit sandpaper or brush blasting can be used on the areas that require roughening prior to applying Denso Bore-Wrap.

4.3.1 GIRTH WELD APPLICATION: roughen the surface a minimum of 6" (150 mm) on both sides of the girth weld coating to be protected.

4.3.2 FULL ENCAPSULATION: roughen the surface of the first 3' to 6' (1-2 m) of the leading pipe joint where the application will begin.

4.4 NOTE: Denso Bore-Wrap is not an anti-corrosion coating, thus the mainline and field joint coating should be

inspected for holidays prior to applying Denso Bore-Wrap so that repairs can be made.

5.0 Application

5.1 Preheating: Preheating is not required, however in cold environments below 45°F (7°C) preheating with induction or torch may be utilized to expedite curing. Ideal range between 65°F (18°C) and 120°F (49°C).

5.2 Substrate temperature range for surface preparation, application, and cure: Ideal range between 65°F (18°C) and 120°F (49°C), however heating is not necessary unless time is critical.

5.2.1 For temperatures below 45°F (7°C), to prevent the water from freezing it is allowable to dilute with 30%-50% antifreeze (ethylene glycol or propylene glycol). Note: cure times are much longer in these conditions, preheating is more effective as a method of expediting the cure.

5.3 Ambient conditions: Consideration of the dew point is not applicable. This product is applied after the anti corrosion coating is already in place. The product is cured with water. It can be applied on wet surfaces and in 100% humidity.

5.4 Coating mixing and thinning procedures: Not applicable, Denso Bore-Wrap resin does not require mixing or thinning, it is ready to use out of the bag with the addition of water during application.

5.5 Coating thickness range: Not applicable. Material is applied in layers and compressed, the thickness is determined by the specified number of layers and corresponding overlap. The product should always be applied with fiber starting and ending on top of other fibers, meaning that the minimum coverage is 2 layers.

6.0 Coating Application Method for Girth Weld Coating Protection

6.1 While wearing gloves, cut open the sealed foil pouch and remove the roll of Denso Bore-Wrap.

6.2 Wet the surface of the area that the roll will be applied onto using a water sprayer. (Ethylene glycol or propylene glycol may be used when the temperature is near or below 32°F (0°C)).

6.3 Denso Bore-Wrap is a water activated wrap. It is necessary that water is continuously sprayed onto the surface and underbelly of the roll as it is being applied. You cannot oversaturate the material, however insufficient water will slow the reaction and reduce product performance.

6.4 Begin wrapping at least 6" (150 mm) in front of the girth weld coating, ensuring the entire area that was roughened has been covered. Apply with the omni-directional matting surface facing out. The woven structured (checker board) side of the fiber is to be placed facing the surface of the pipe. Wrap the material circumferentially to begin, ensuring that the leading edge has a minimum of 2 layers. Then proceed across the field joint wrapping with a minimum of 50% overlap until the wrap has extended 6" (150 mm) beyond the field joint coating. Then do a final wrap around circumferentially and end with the fiber on top of fiber (do not leave a single layer hanging from the back).

6.5 If required by the pipeline owner, additional layers can be applied by continuing the wrap back toward the front at this time. (Note: this is not typical, most applications are 2 layers).

6.6 Ensure the wrap is completely saturated and then immediately begin wrapping compression film over the Denso Bore-Wrap quickly and with tension applied. Overlap each end of the Denso Bore-Wrap by at least 6" (150 mm) to ensure the ends lay flat and the resin can be retained. 3 passes will provide sufficient compression.

6.7 Once fully compressed, use the perforating tool to puncture the compression film. This will allow for excess resin, moisture, and CO_2 from the reaction to escape. Perforate using enough pressure to get through the compression film but not through the layers of Denso Bore-Wrap.

7.0 Coating Application Method for Mainline (Full Encapsulation) Coating Protection

7.1 It is recommended to use a team of 6-8 people for the mainline application. Two people for water application, two for Denso Bore-Wrap application, two following to apply and perforate Denso Poly-Wrap, and 1-2 to assist applicators.

7.2 While wearing gloves, cut open the sealed foil pouch and remove the roll of Denso Bore-Wrap. Wet the surface of the area that the roll will be applied onto using a water sprayer. (Ethylene glycol or propylene glycol may be used when the temperature is near or below 32°F (0°C)).

7.3 Denso Bore-Wrap is a water activated wrap. It is necessary that water is continuously sprayed onto the surface and underbelly of the roll as it is being applied. You cannot oversaturate the material, however insufficient water will slow the reaction and reduce product performance.

7.4 Begin wrapping the pipe closest to the installation point moving back toward the end of the pipe. Apply the omni-directional matting surface facing out and the woven structured (checker board) side of the fiber placed facing the surface of the pipe. Wrap the material circumferentially to begin, ensuring that the leading edge has a minimum of 2 layers (100% overlap). Then proceed to spirally wrap along the length of the pipe with a minimum of 50% overlap to the end of the roll. While it is still wet, begin the next roll with 6" (150 mm) of overlap and continue at the same angle as the prior roll.

7.5 Ensuring the wrap is completely saturated, concurrently begin wrapping Denso Poly-Wrap in the same direction that the Denso Bore-Wrap was applied. Start at least 6" (150 mm) before the Denso Bore-Wrap. Compress it quickly and with tension. The Denso Poly-Wrap should have slight necking from the tension. 3 to 4 layers should suffice to ensure proper compression.

7.6 Once fully compressed, use the perforating tool to puncture the Denso Poly-Wrap. This will allow for excess resin, moisture, and CO_2 from the reaction to escape. Perforate using enough pressure to get through the Denso Poly-Wrap but not through the layers of Denso Bore-Wrap.

7.7 To terminate application, whether at the end of the project or at a natural stopping point such as end of day or shift etc., do a final wrap around circumferentially and end with a minimum of 2 layers (100% overlap). Do not leave a single layer hanging from the back. Extend Denso Poly-Wrap beyond the end of the Denso Bore-Wrap by at least 6" (150 mm) to ensure the ends lay flat and the resin can be retained.

7.8 To tie into either a beginning or end section of Denso Bore-Wrap that has cured, remove 12" (300 mm) of the Denso Poly-wrap that covered the Denso Bore-wrap. Tie in with one layer overlapping a minimum of 6" (150 mm). Ensure all Denso Bore-Wrap is covered in Denso Poly-Wrap and perforated.

8.0 Schedule and Condition

8.1 Allow the roll to remain under compression while it cures. Resin may have escaped through the perforations. That resin is a fair indicator of the materials dry to touch time. Denso Poly-Wrap should be left in place to provide UV stability of the Denso Bore-Wrap.

8.2 When the material has fully cured and prior to installation, the Denso Poly-Wrap should be removed. Cure can be checked by using a Shore D gauge on a high point of the resin (avoid measuring near ridges and fibers as the gauge tip can move). The product is cured at a Shore D of 65 or greater.

9.0 Recoat and Repair Method

9.1 Remove damaged coating or non-adhering coating.

9.2 Remove all corrosion products in accordance with SSPC-SP2 “Hand Tool Cleaning” as a minimum. Enhanced surface cleaning beyond SSPC-SP2 is encouraged whenever practical to enhance the long term coating performance.

9.3 Repair the underlaying anti-corrosion coating according to manufacturers recommendations.

9.4 Denso Bore-Wrap is re-applied in accordance with the application methods outlined in the appropriate coating application method in section 6 or 7 above.

10.0 Backfill

10.1 May be back filled immediately after curing. Cure time is dependent on temperature and the amount of water used. Proper application at temperatures between 65°F and 120°F (18°C and 49°C) will be ready to backfill in less than one hour.

11.0 Handling and Storage Requirements for Coating Materials

11.1 Store in original, unopened packaging at 41°F to 111°F (5°C to 44°C). Denso Bore-Wrap is sensitive to temperature and when stored above the recommended storage temperature for extended periods of time the shelf life of the product could be reduced.

11.2 Do not open bag containing Denso Bore-Wrap until you are ready to use it, as Denso Bore-Wrap cures when exposed to atmospheric moisture/humidity. Care must be taken when handling the sealed bags to prevent puncturing or scuffing. If the protective foil pouch is punctured, the composite wrap will cure within the sealed foil pouch.

12.0 Temperature Limitations (e.g., Freezing, Excessive Heat)

12.1 Avoid Excessive heat and freezing. Product performs best when rolls are stored at temperatures between 41°F to 111°F (5°C to 44°C).

12.2 To expedite cure, rolls can be conditioned a few days prior to use to between 65°F and 120°F (18°C and 49°C). Temperatures above and below this range slows cure time due to limited moisture uptake which limits chemical reaction.

13.0 Protection From the Elements (e.g., snow, rain, sunlight)

13.1 Store in a dry place. Once product is applied, keep the Denso Poly-Wrap on or product covered to avoid sun exposure until immediately prior to pipeline installation.

14.0 Protection From Physical Damage

14.1 Care must be taken when handling the sealed bags to prevent puncturing or scuffing. If the protective foil pouch is punctured, the composite wrap will cure within the sealed foil pouch. Do not over-stack pallets of product.

14.2 Properly applied and cured product requires no additional special handling.

15.0 Expiration Date

15.1 1 year (12 months) when stored in original packaging at 41°F (5°C) and 111°F (44°C).

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