Denso Bore-Wrap

Field - Applied Abrasion Resistant Outerwrap (ARO)

Composition
Denso Bore-Wrap is a fibreglass cloth impregnated with a water activated resin.

Uses
Denso Bore-Wrap is an Abrasion Resistant Outerwrap (ARO) that offers excellent performance against impact, gouge, abrasion stresses, scarring, and fracture to protect field joint anti-corrosion coatings during pipeline installations in difficult terrain or by means of trenchless installation methods such as directional drilling, HDD or boring. 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.

Denso Bore-Wrap minimises the need for spot repairs or re-pulling pipe from damage, while providing the best mechanical protection of the underlying field-joint and/or mainline coatings.

Characteristics
Denso Bore-Wrap:

- prevents coating damages,
- rapid application and cure time,
- no mixing or VOCs,
- tapered surface profile,
- outstanding abrasion, gouge and impact resistance, and
- resistant to aggressive soil conditions.

Application
See *Instructions for Use* for additional detail.

Follow the anti-corrosion coating manufacturer's recommended installation procedure. When using a two-part epoxy resin system as the anti-corrosion coating, Denso Bore-Wrap should be applied within the manufacturers re-coat window to minimize additional surface preparation requirements. Roughen existing coating to de-gloss before application of Denso Bore-Wrap, where required. Do not open the foil pouch containing Denso Bore-Wrap until you are ready to use product.

Begin wrapping 150mm in front of the field joint coating, with the randomised angle 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 (100% overlap). Proceed to spirally wrap with a minimum 50% overlap, spraying each layer with water as it is applied, until the wrap has extended 150mm beyond the field joint coating. If required by the pipeline owner, additional layers can be applied by continuing the wrap back toward the front at this time. 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).

Ensure the wrap is completely saturated with water and then immediately begin wrapping Denso Clear Outerwrap the same direction the layers of Bore-Wrap were applied, compress it quickly and with tension applied. Overlap each end of the Bore-Wrap by at least 50 mm to ensure the ends lay flat and the resin can be retained. 2 to 3 passes should suffice.

Once compressed, use the Denso Perforating Tool to puncture Denso Clear Outerwrap. This will allow for excess resin, moisture, and CO_2 from the reaction to escape. Perforate using enough pressure to get through the Denso Clear Outerwrap but not through the layers of Bore-Wrap.

When the material has fully cured the Denso Clear Outerwrap may 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 ready to be used at a Shore D of 65 or greater.

COLD WEATHER INSTALLATIONS: Follow procedure, however, use ethylene glycol in the sprayer 30% to 50% with the water to prevent freezing and to progress the curing process. Bore-Wrap will not cure on its own at temperature below 5˚C.

HOT WEATHER INSTALLATIONS: Follow procedure, however, use ice water in the sprayer to slow down the curing process, thus allowing the installer more working time.

Availability

Tape width	Roll length	Rolls/ carton	Approx. coverage*
150 mm	9 m	6	0.69 m^2/roll
250 mm	6 m	5	0.77 m^2/roll
250 mm	9 m	4	1.16 m^2/roll

*with 50% overlap

The material is sealed in a nitrogen filled foil bag and boxed in quantities depending on roll size.

Storage

Store in original, unopened packaging in a cool shaded area at ambient temperature of 23°C. Do not expose to temperature above 44°C, or below 5°C. Do not open a bag containing Bore-Wrap until you are ready to use it, as 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.

Health & Safety

Wear protective clothing and ensure adequate ventilation. Avoid contact with skin and eyes. See Safety Data Sheet (SDS) for further information.

Waste material

Please avoid or minimise waste wherever possible. Please do not discard waste material, including packaging, in the surrounding environment. Ensure product is fully cured before disposal and follow all relevant legislation for disposal.

Typical Properties

Thickness	1,041 microns/layer	ISO 21809-3, Annex B
Impact	113.9 Joules	RP 0394
Gauge Depth	609 microns @ 50 kg double burr	CSA Z245.20 Clause 12.15
Flexibility	3 deg/PD	CSA Z245.20 Clause 12.11
Abrasion Resistance	40,164 cycles/ply	ASTM D-4060 C-17 Wheel
Fracture Toughness Testing	21.1 MPa m1/2	ASTD E1922
TG	131°C	
Tensile Strength	230 MPa	ASTM D638
Tensile Modulus	15,320 MPa	ASTM D638
Tensile Elongation	1.66%	ASTM D638
Flexural Strength	195 MPa	ASTM D7262
Flexural Modulus	13,721 MPa	ASTM D7262
Compression Strength	820 MPa	ASTM D695
Shore D	78 (pull back ready at 65)	ISO 868 /ASTM D2240
Specific Gravity	1.71 g/cm^3	ASTM D792
Water Absorption 2h @ 100°C	0.26 grams	ASTM D570
Water Absorption 24h @ 23°C	0.11 grams	ASTM D570
Indentation at 10 N/mm^2	No observable damage	ISO 21809-3, Annex E
Adhesion to FBE/Epoxy/PU	7.38 MPa / 3.83 MPa no primer	ISO 4624
Adhesion to PE/PP coatings	1.63 MPa	ISO 4624
Dielectric Strength	110 V/mil	ASTM D149
Working time	7 minutes	
Cure Schedule	30 minutes 21°C - 26°C	
Modulus of Elasticity (young's modulus)	15.32 GPa	ASTM D3039
Lap Shear	1.63 MPa	ASTM D5868
Shelf Life	1 year with proper storage	

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