

INSTRUCTIONS FOR USE

EQUIPMENT

- Personal Protective Equipment (not supplied by SeaShield)
- Surface Preparation Equipment (not supplied by SeaShield)
- Cutting tool (not supplied by SeaShield)
- Denso Paste S105™
- SeaShield™ Marine Piling Tape
- Densyl™ Mastic, Denso Profiling Mastic™ or other mastic as specified by Denso (as required)
- Denso™ Glass Outerwrap (GOW) (as required)
- Denso™ Clear Outerwrap (as required)
- Bitumen Outerwrap (as required)
- Denso Perforation Tools (as required)
- Denso™ PVC Self-Adhesive Tape (as required)

HANDLING AND STORAGE

- All materials shall be stored upright in their original packaging, out of direct sunlight.
- All materials shall be stored in a cool dry place between 5°C and 35°C – (Note standard grades of Bitumen Outerwrap shall be stored between 5°C and 20°C).
- Denso GOW shall remain in its foil pouches until required for use. Foil pouches must not be punctured prior to use.
- All tools shall be stored in their original packaging, in a cool dry place out of direct sunlight between 5°C and 35°C.
- Please read the Safety Data Sheet for all materials before commencing application.

DISPOSAL

Please minimise or avoid waste wherever possible. Please do not discard waste material, including packaging, in the surrounding environment. Follow all relevant legislation for disposal.

IMPORTANT:

Winn & Coales (Denso) Ltd pursue a policy to develop and continually improve all of our products and therefore information given in this data sheet is intended as a general guide and does not constitute a warranty, specification or risk assessment. These guidelines may not cover all circumstances; however, our sales personnel are committed to assisting the user in establishing the suitability of the product for its intended purpose and additional specific information, including Safety Data Sheets, is available on request. We recommend that installation is carried out with due regard to Health and Safety and in accordance with relevant local statutes and regulations. Any conflict between these guidelines and the specific project specifications must be resolved by the user before work commences. All rights reserved.

SURFACE PREPARATION**METHODS AND EQUIPMENT**

The following methods may be used:

- Hand tool cleaning.
- Power tool cleaning.
- High pressure water jetting.
- Abrasive blast cleaning.
- Other methods by agreement.

The following shall be considered:

- The degree of marine growth on the pile or bracing.
- The degree of corrosion on the pile or bracing.
- Any existing corrosion prevention coatings on the pile or bracing.
- Any hot working or spark restrictions at the site.
- Any environmental restrictions at the site.
- The reduction of debris being deposited into the marine environment.
- Any other considerations specific to the site.

DEGREE OF CLEANING**Metal:**

- All loose corrosion products must be removed.
- All mill scale must be removed.
- Protrusions must be ground smooth to remove sharp edges and sudden changes of profile. Care shall be taken to avoid damage to the weld seam.

Concrete:

- All loose concrete must be removed.
- All concrete laitance must be removed.
- Protrusions must be ground smooth to remove sharp edges and sudden changes of profile.

Existing corrosion prevention coatings:

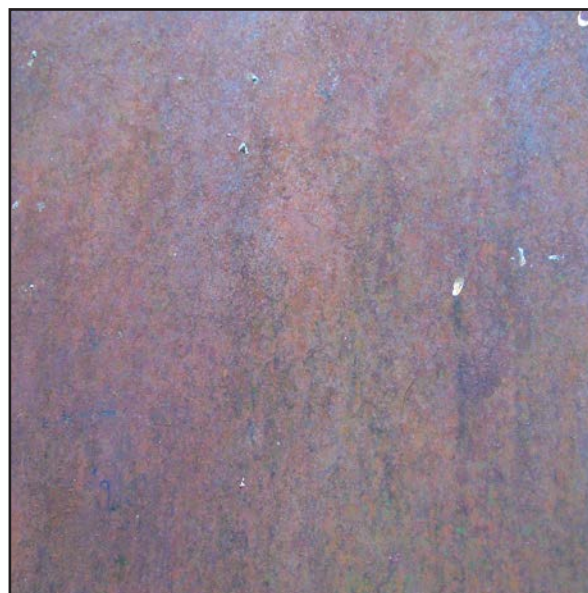
- All loose corrosion prevention coatings must be removed.
- Tightly adhering corrosion prevention coatings can remain on the surface of the pipe.

Marine growth:

All living marine growth must be removed. Marine biofilm can establish on the surface of a pipe within 24 hours. A long length of pipe may have heavy levels of marine growth and other contamination removed as a "batch". If that "batch" of pipe is then not wrapped with a SeaShield system within 24 hours, it is required as a minimum to wire brush the surface of the pipe to remove any biofilm that may have formed.

Non-living, tightly adhering mineral deposits caused by shellfish or similar can remain on the surface of the pipe.

The surface of the pipe can be washed with seawater as required to aid in achieving the above requirements.



Example image of an acceptable level of surface preparation.

CORROSION CONTROL FOR SUBMERGED & SHORELINE PIPELINES
(INCLUDING BEACH OUTFALLS/INTAKES AND PIPELINE LANDFALL)



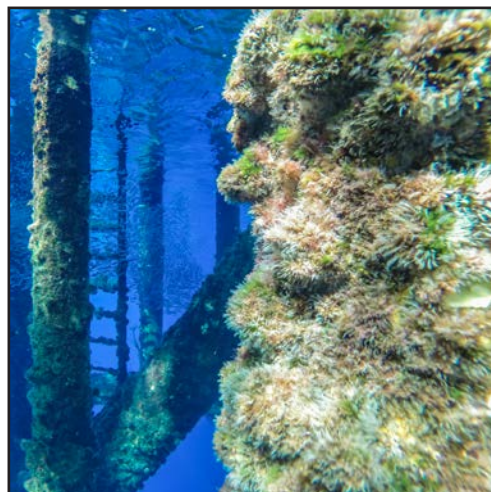
Example image of a pipe featuring loose corrosion that would require removal.



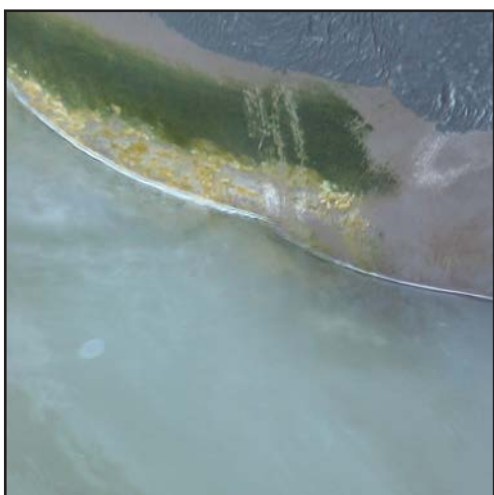
Example image of a pipe featuring a loosely adhering corrosion prevention coating that would require removal.



Example image showing tightly adhering corrosion prevention coating and corrosion (orange rust) that would **not** require removal.



Example image of marine growth.



Example image of marine biofilm.



Example image of a pipe featuring acceptable levels of non-living, tightly adhering mineral deposits.

PASTE S105 APPLICATION**DEEP PITS**

A deep pit is defined as a pit of 2.0mm or greater, where there is a risk that the Marine Piling Tape will 'bridge' the pit, creating a void. These pits shall be filled with Paste S105 to prevent there being a void (see Fig. 1).

Should there be a very deep pit, or should it be otherwise difficult to fill a deep pit with Paste S105, a thin film of Paste S105 shall be applied into the pit followed by a patch of Marine Piling Tape which shall be pressed firmly into the pit to prevent there being a void (see Fig. 2).

Paste S105 can be applied by various means to fill deep pits such as, flexible filling knife, trowel, gloved hand, roller, brush, or other means as agreed.

LARGE WELD BEAD

A large weld bead is defined as a weld bead of 2.0mm height or greater, where there is a risk that the Marine Piling Tape will 'bridge' the weld bead, creating a void.

Paste S105 shall be applied along either side of a weld bead, to prevent there being a void (see Fig. 3).

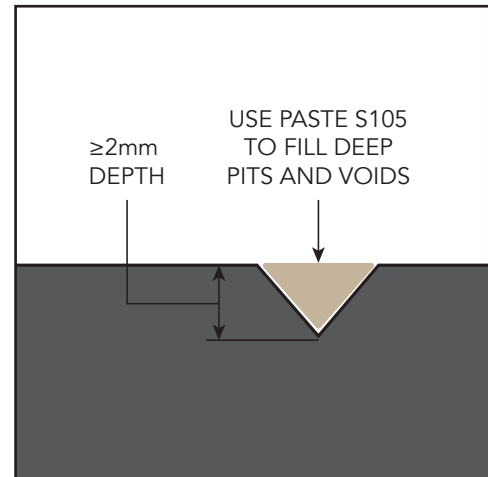


Fig. 1: Filling deep pits of 2.0mm, or greater, depth.

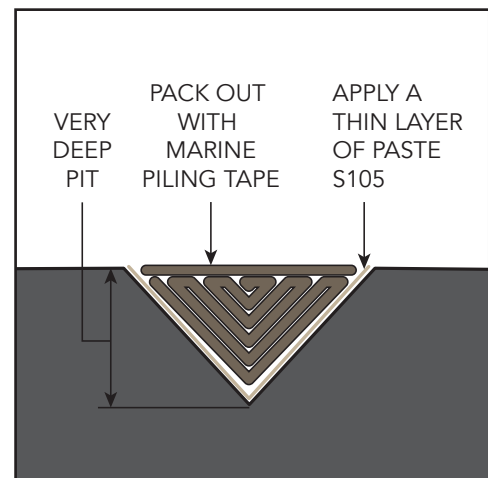


Fig. 2: Filling very deep pits.

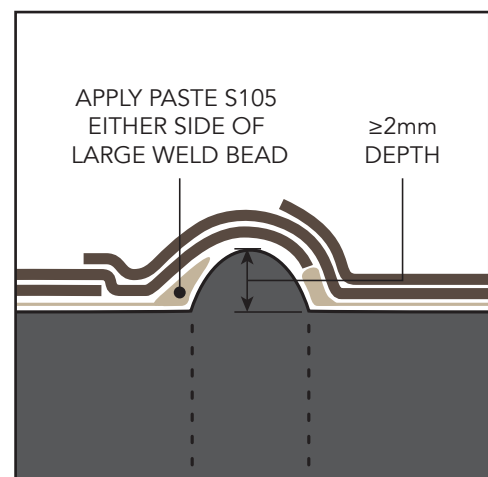


Fig. 3: Large weld beads.

GENERAL PRIMING

Paste S105 shall be used as a general primer on the pipe. A thin layer of Paste S105 shall be applied over the area for protection. Paste S105 can be applied by various means to act as a primer such as, gloved hand, roller, brush, or other means as agreed (see Fig. 4).

Should there be couplings (see Fig. 5) or flanges (see Fig. 6) on the pipeline, a thin layer of Paste S105 shall be applied over their entire surface, including all fasteners.

The purpose of Paste S105 as a primer is to assist with displacement of water from the surface of the pipe. There is no minimum requirement for the thickness of the Paste S105 layer. A thick layer of Paste S105 is not recommended or required.

APPLY A THIN LAYER OF PASTE S105

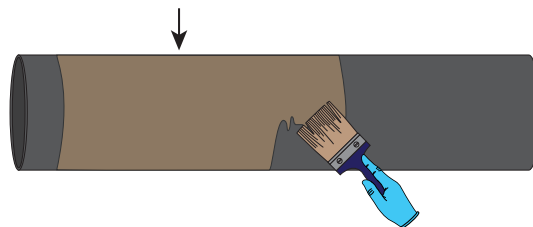


Fig. 4: Apply Paste S105 over the entire area that is to be wrapped with tape.

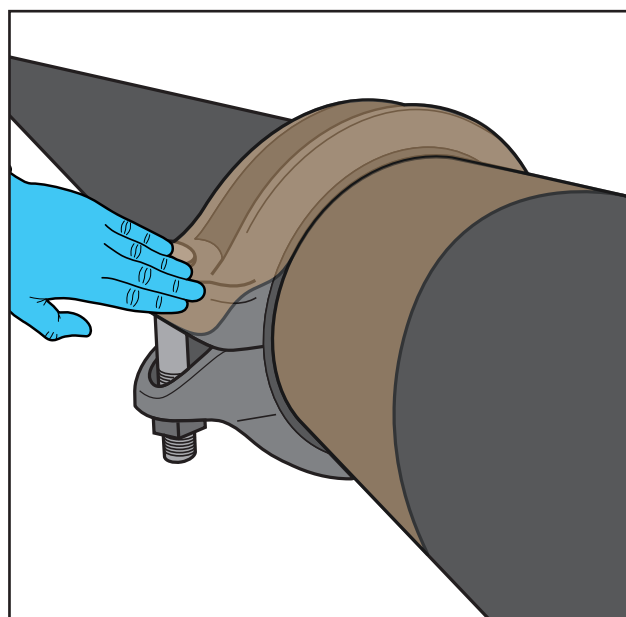


Fig. 5: Apply Paste S105 over all surfaces of the coupling. Ensure that fasteners and exposed voids around fasteners are also coated.

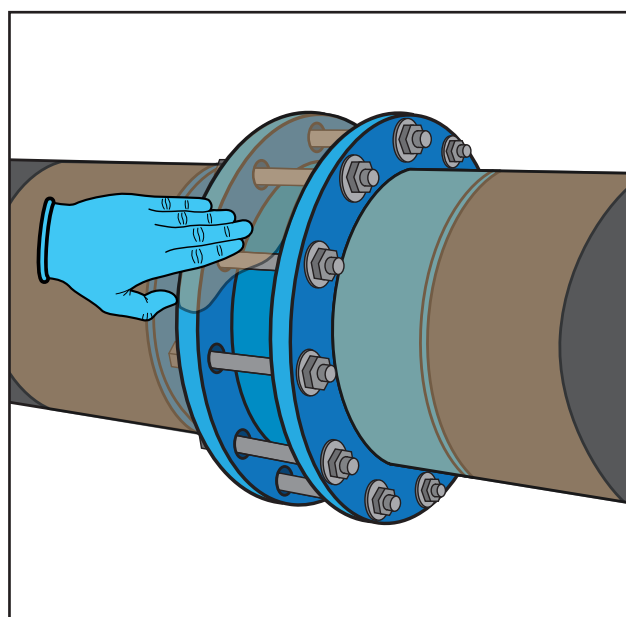


Fig. 6: Apply Paste S105 over all surfaces of the flange. Ensure that fasteners and exposed voids around fasteners are also coated.

MASTIC APPLICATION

Flanges, couplings, or similar pipe joints shall be profiled with Mastic to prevent air gaps under the subsequent tape wrapping (see Fig. 7).

The Mastic shall be applied into all voids and around all fasteners of the pipe joint (see Fig. 8).

The angle shall be less than 45° to provide a shallow angle for tape wrapping.

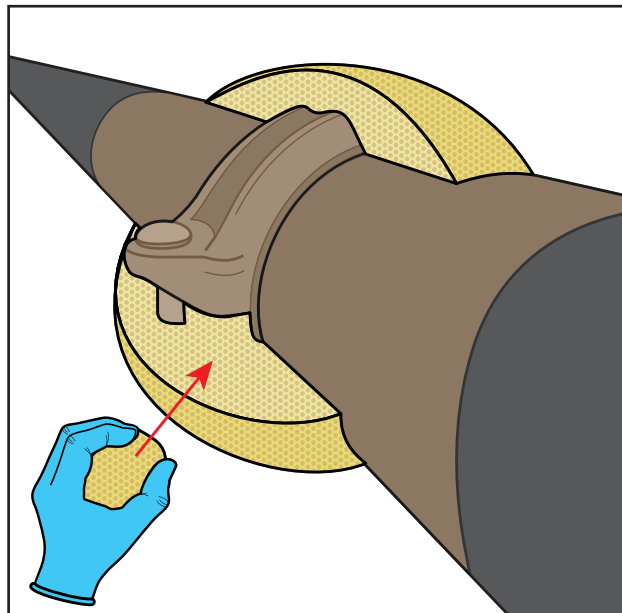


Fig. 7: Sectional view showing mastic application on a pipe joint. Ensure that the mastic is pushed into all voids and that it forms a smooth profile for wrapping.

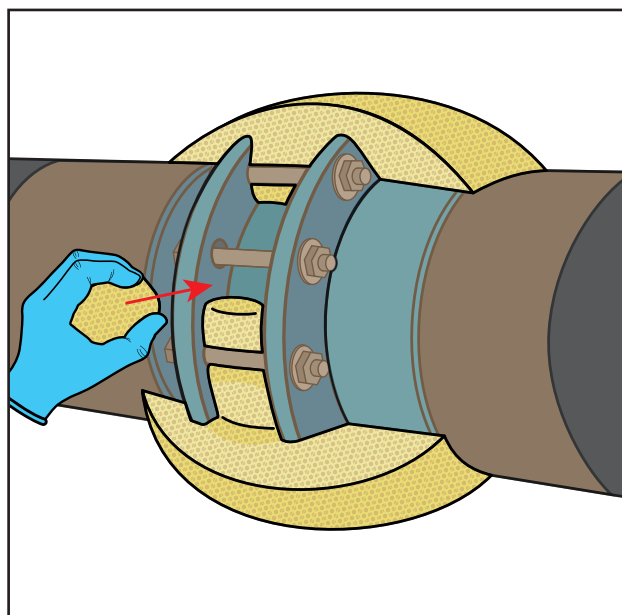


Fig. 8: Sectional view showing mastic application on a flange. Ensure that the mastic is pushed into all voids and that it forms a smooth profile for wrapping.

MARINE PILING TAPE APPLICATION

The Marine Piling Tape shall be applied with the correct side facing the pipe. This will mean that the backing film, which is not removed, is the side that faces away from the pipe surface (see Fig. 9). The Marine Piling Tape, together with the Paste S105 forms the primary corrosion prevention layer. The Marine Piling Tape must be in contact with the surface of the pipe or where required, the Mastic at any point within the area for protection.

The wrapping shall start with 2 full circumferential wraps of the Marine Piling Tape (see Fig. 10). The wrapping shall then proceed spirally at a 55% overlap. The wrapping shall finish with 2 full circumferential wraps of the Marine Piling Tape. There shall be a minimum of 2 layers of Marine Piling Tape at any point in the area for protection.

To ensure continuity of multiple systems, if another SeaShield System shall be applied to the pipe in addition to the SeaShield 70/80 System, the Marine Piling Tape shall extend onto the pipe either:

- Fully, should the other SeaShield System be completely applied within the work shift;

OR

- Partially, to enable additional Marine Piling Tape to overlap a minimum of 100mm onto the existing Marine Piling Tape in a future work shift.

A new roll of Marine Piling Tape shall overlap onto the previous roll by the width of the roll. For example, if the roll is 300mm wide then the overlap shall be 300mm (see Fig. 9).

The Marine Piling Tape shall be smoothed into position as it is wrapped around the pipe.

Flanges, couplings, or similar pipe joints shall be wrapped by the following method.

The Marine Piling Tape shall be positioned centrally on the pipe joint. The Marine Piling Tape shall be spirally wrapped at a 55% overlap over the Mastic towards the pipe body (see Fig. 11). The wrapping shall finish with 2 full circumferential wraps or shall continue along the pipe body as required. There shall be a minimum of 2 layers of Marine Piling Tape at any point over the pipe joint.

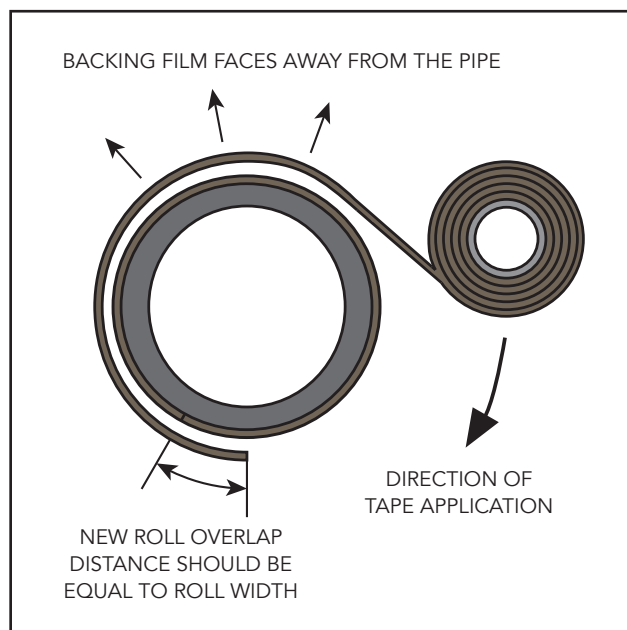


Fig. 9: Correct tape application procedure.

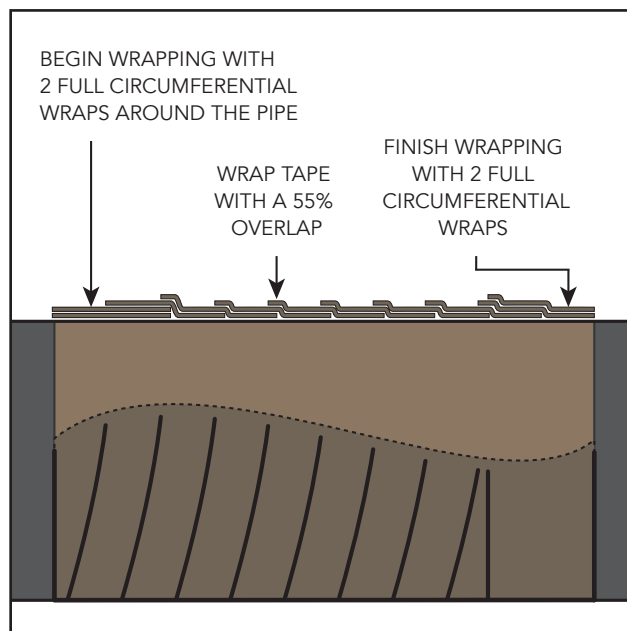
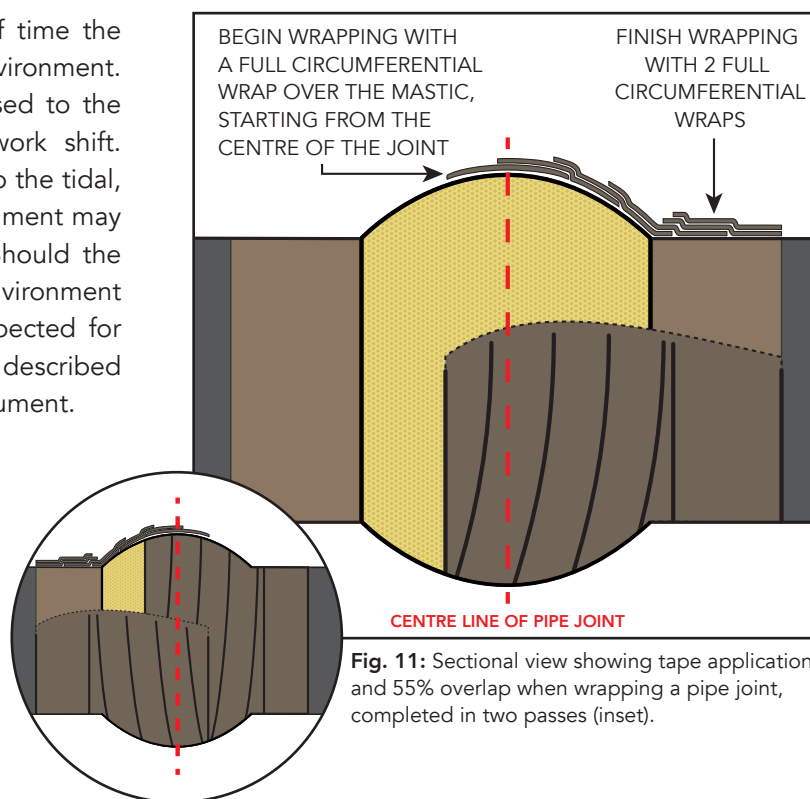


Fig. 10: Sectional view showing tape application and 55% overlap when wrapping a pipe.

CORROSION CONTROL FOR SUBMERGED & SHORELINE PIPELINES
(INCLUDING BEACH OUTFALLS/INTAKES AND PIPELINE LANDFALL)

It is recommended to minimise the amount of time the Marine Piling Tape is exposed to the marine environment. The Marine Piling Tape shall not be left exposed to the marine environment beyond the end of a work shift. Prolonged exposure of the Marine Piling Tape to the tidal, wind and wave conditions of the marine environment may result in damage to the Marine Piling Tape. Should the Marine Piling Tape be exposed to the marine environment for a prolonged length of time it shall be inspected for damage and any damage shall be repaired as described within the relevant Maintenance and Repair document.



BITUMEN OUTERWRAP APPLICATION

The Bitumen Outerwrap may not be required. If it is not specified, then the following instructions can be ignored.

The Bitumen Outerwrap shall extend a minimum of 100mm beyond the ends of the Marine Piling Tape (see Fig. 13), unless the SeaShield 70/80 System is being used in combination with another SeaShield System (see Fig. 20).

The Bitumen Outerwrap is manufactured with an interleaving. This interleaving shall be removed during application (see Fig. 12). The interleaving shall be peeled back to expose approximately 100mm of the bitumen adhesive. The exposed adhesive shall be pressed firmly onto the pipe surface and Marine Piling Tape to secure it in position.

The wrapping shall start with 2 full circumferential wraps of the Bitumen Outerwrap (see Fig. 13). The wrapping shall then proceed spirally at a 55% overlap. The wrapping shall finish with 2 full circumferential wraps of the Bitumen Outerwrap. There shall be a minimum of 2 layers of Bitumen Outerwrap at any point in the area for protection.

A new roll of Bitumen Outerwrap shall overlap onto the previous roll by the width of the roll. For example, if the roll is 300mm wide then the overlap shall be 300mm (see Fig. 12).

During wrapping the Bitumen Outerwrap shall be smoothed by hand to exclude water, air bubbles and wrinkles from under the tape.

Flanges, couplings, or similar pipe joints shall be wrapped by the following method.

The Bitumen Outerwrap shall be positioned centrally on the pipe joint. The Bitumen Outerwrap shall be spirally wrapped at a 55% overlap over the Marine Piling Tape towards the pipe body (see Fig. 14). The wrapping shall finish with 2 full circumferential wraps or shall continue along the pipe body as required. There shall be a minimum of 2 layers of Bitumen Outerwrap at any point over the pipe joint.

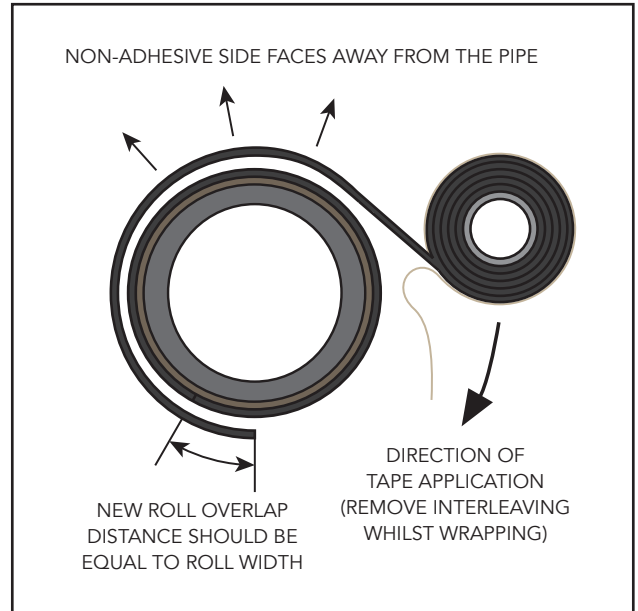


Fig. 12: Correct tape application procedure.

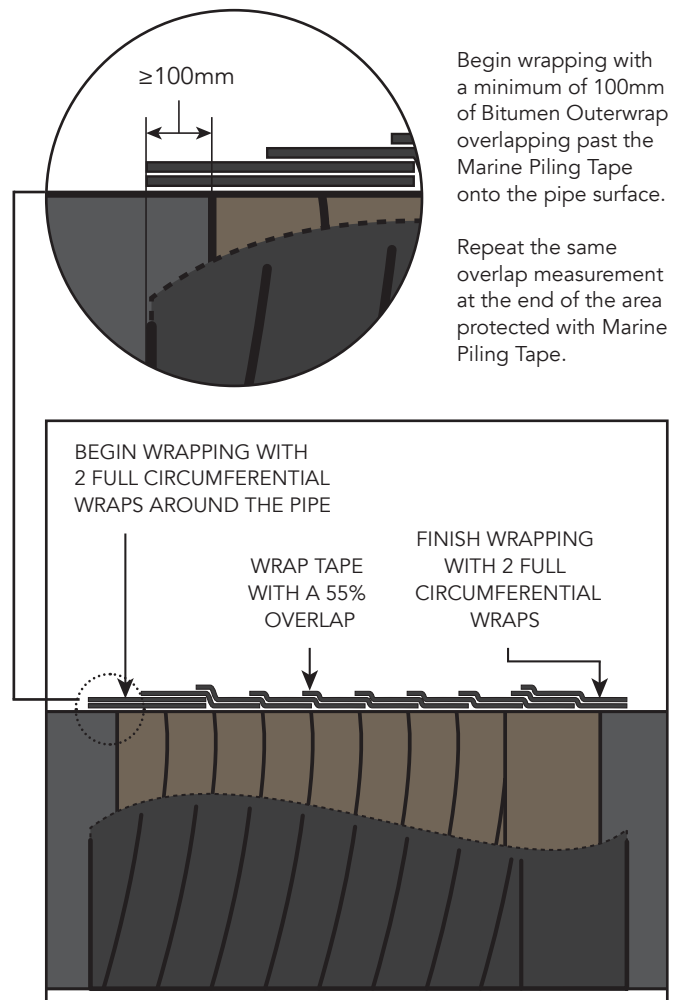


Fig. 13: Sectional view showing tape application and 55% overlap when wrapping a pipe.

CORROSION CONTROL FOR SUBMERGED & SHORELINE PIPELINES
(INCLUDING BEACH OUTFALLS/INTAKES AND PIPELINE LANDFALL)

The Bitumen Outerwrap shall be inspected to ensure it has been wrapped with the specified 55% overlap, that large air bubbles (greater than 25mm across) are excluded from under the Bitumen Outerwrap and that all overlaps are sealed together.

Secure the end of the Bitumen Outerwrap by applying 4 circumferential wraps of PVC Self-Adhesive Tape (see Fig. 15). If the Bitumen Outerwrap shall be overwrapped with Glass Outerwrap (GOW) then it is not required to secure the ends of the Bitumen Outerwrap with PVC Self-Adhesive Tape.

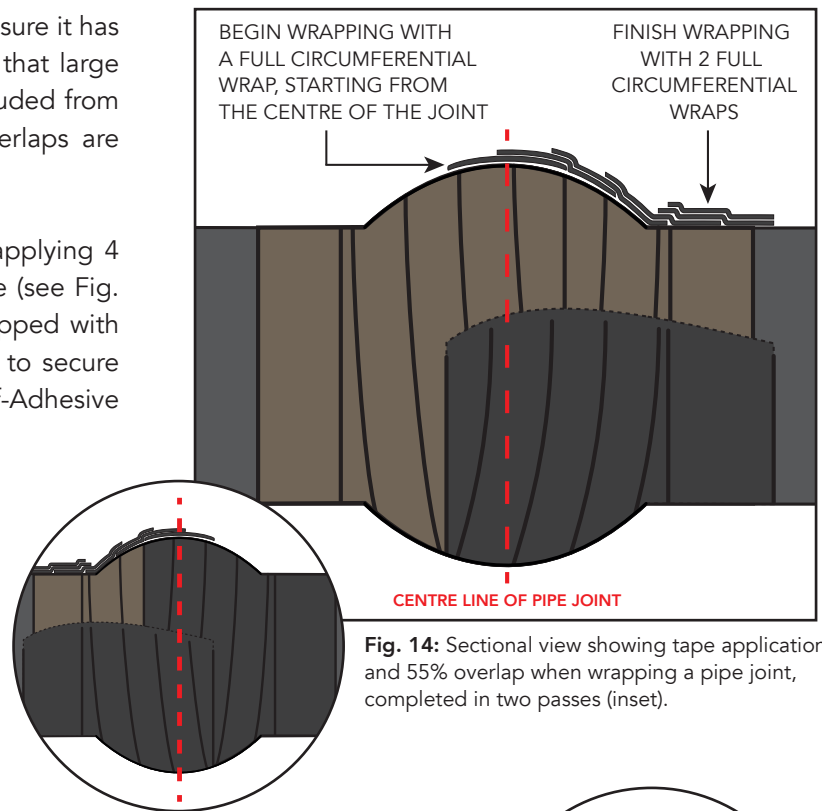


Fig. 14: Sectional view showing tape application and 55% overlap when wrapping a pipe joint, completed in two passes (inset).

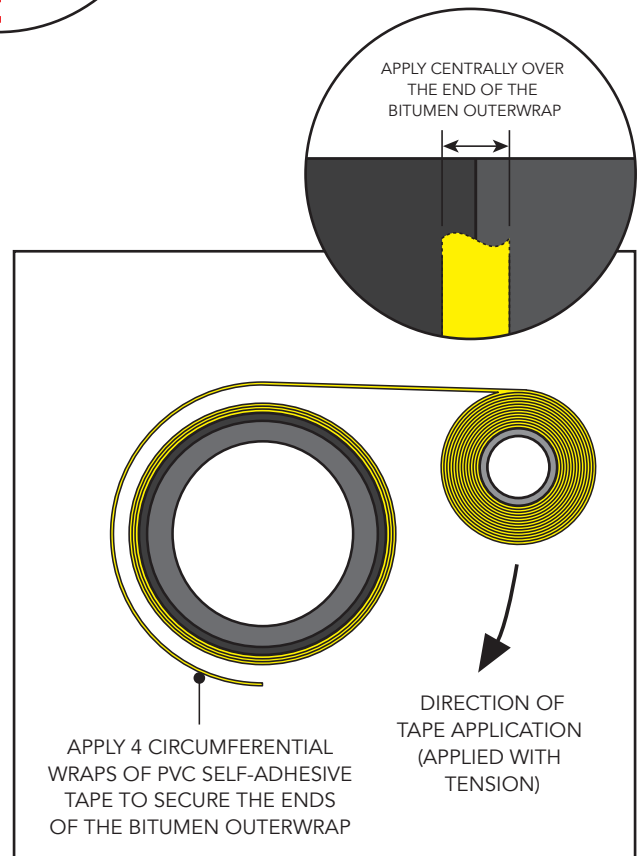


Fig. 15: Correct Self-Adhesive Tape application procedure. The tape should be aligned central to the end of the Bitumen Outerwrap (inset).

GLASS OUTERWRAP (GOW) APPLICATION

The Glass Outerwrap (GOW) may not be required. If it is not specified, then the following instructions can be ignored.

The GOW shall extend a minimum of 100mm beyond the ends of the Marine Piling Tape or Bitumen Outerwrap (see Fig. 17), unless the SeaShield 70/80 System is being used in combination with another SeaShield System (see Fig 20).

The GOW is packaged in a foil pouch to protect it from moisture. Moisture will initiate the curing process so the foil pouch shall not be opened until the GOW is to be applied. Before application, the foil pouch containing the GOW shall be manipulated by hand to ensure that the resin is evenly distributed through the carrier cloth.

The foil pouch shall be opened by hand or using a bladed tool. The GOW roll shall be immersed in clean water (sea water is acceptable) for up to 1 minute to initiate the curing process. The curing process will be shortened at higher temperatures and this should be considered when determining the amount of time the roll is immersed in water.

The wrapping shall start with 2 full circumferential wraps of the GOW (see Fig. 17). The wrapping shall then proceed spirally at a 55% overlap. The wrapping shall finish with 2 full circumferential wraps of the GOW. There shall be a minimum of 2 layers of GOW at any point in the area for protection.

A new roll of GOW shall overlap onto the previous roll by the width of the roll. For example, if the roll is 300mm wide then the overlap shall be 300mm (see Fig. 16).

During wrapping the GOW shall be smoothed by hand to exclude water, air bubbles and wrinkles from under the tape.

Flanges, couplings, or similar pipe joints shall be wrapped by the following method.

The GOW shall be positioned centrally on the pipe joint. The GOW shall be spirally wrapped at a 55% overlap over the Marine Piling Tape or Bitumen Outerwrap towards the pipe body (see Fig. 18). The wrapping shall finish with 2 full circumferential wraps or shall continue along the pipe body as required. There shall be a minimum of 2 layers of GOW at any point over the pipe joint.

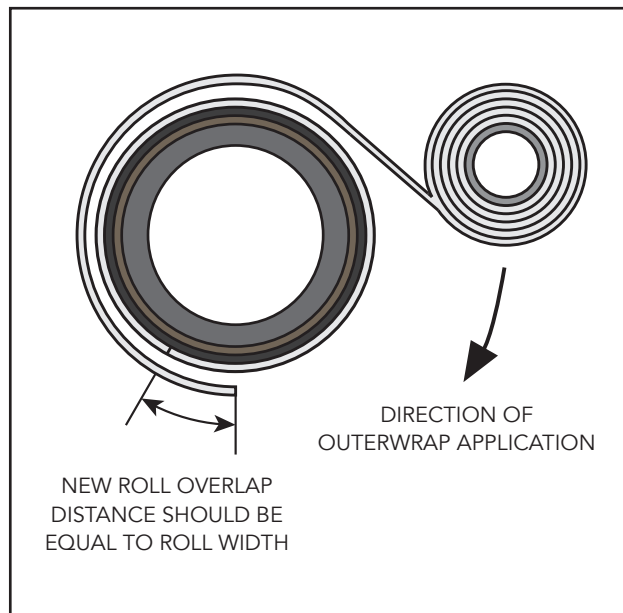


Fig. 16: Correct GOW application procedure.

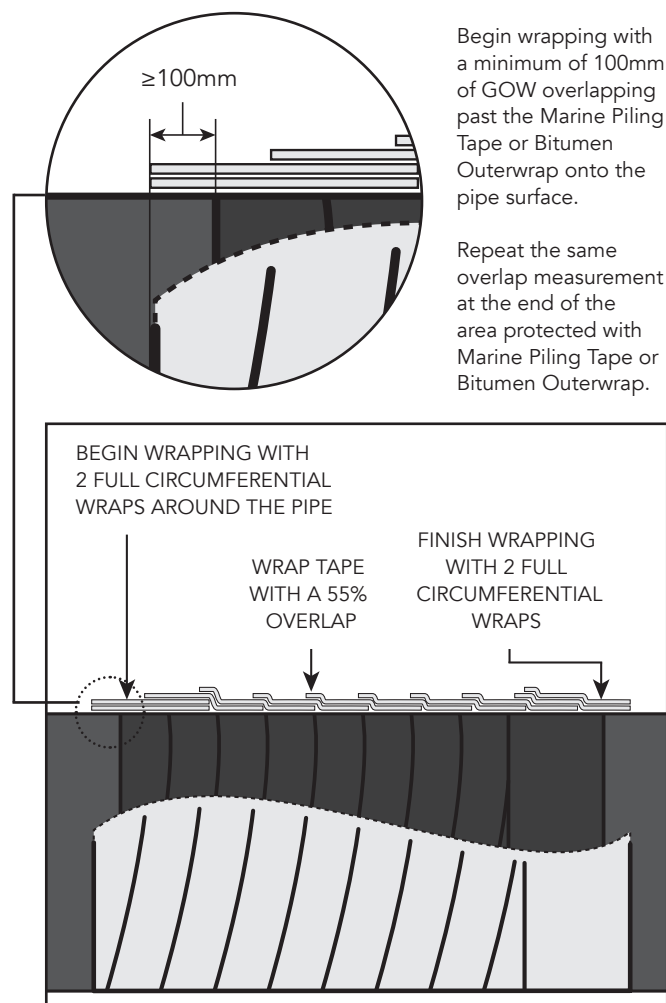


Fig. 17: Sectional view showing outerwrap application and overlap when wrapping a pipe.

The GOW shall be compressed during the curing process using one of the following methods.

Several layers of Clear Outerwrap shall be applied with tension over the GOW (see Fig. 19). If required, these layers of Clear Outerwrap may be perforated using the Perforation Tool which can accelerate the cure of the GOW. Once the GOW has cured (approximately 30 minutes at 25°C) the Clear Outerwrap can be removed by hand. This method shall be used if the pipeline will be exposed to UV during service.

Alternatively, several layers of PVC Self-Adhesive Tape shall be applied with tension over the GOW (see Fig. 21). These layers of PVC Self-Adhesive Tape do not need to be perforated, nor do they need to be removed once the GOW has cured. This method may be used if the pipeline will not be exposed to UV during service, for example if it is constantly submerged. In this instance the PVC Self-Adhesive Tape can remain in place to minimise the length of time that divers are required to work at depth.

The GOW shall be inspected to ensure it has been wrapped with the specified 55% overlap, that large air bubbles (greater than 25mm across) are excluded from under the GOW and that all overlaps are sealed together.

If the SeaShield 70/80 System is applied in conjunction (on the same pipe) with another SeaShield System, the SeaShield 70/80 System shall be overlapped onto the other SeaShield System or the other SeaShield System onto the SeaShield 70/80 System by 50mm (see Fig. 20).

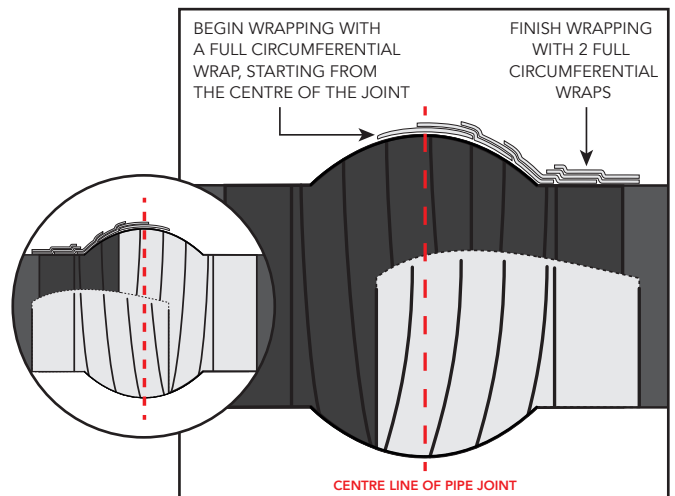


Fig. 18: Sectional view showing tape application and 55% overlap when wrapping a pipe joint, completed in two passes (inset).

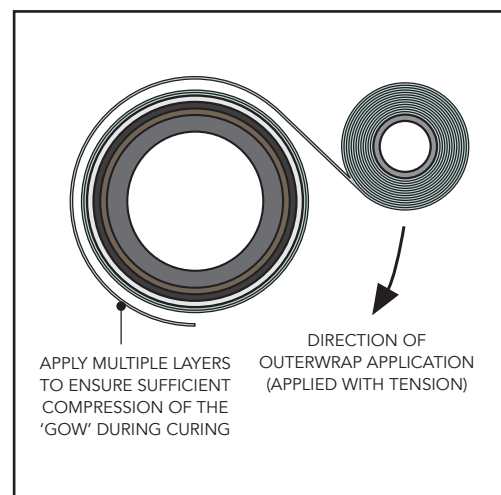


Fig. 19: Correct Clear Outerwrap application procedure.

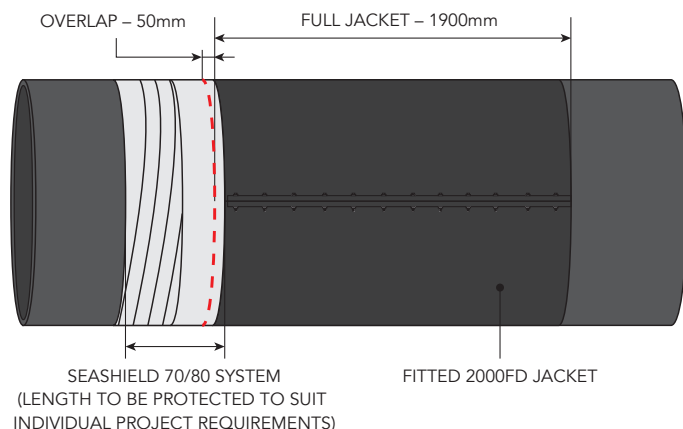


Fig. 20: SeaShield 70/80 System and SeaShield 2000FD System applied to the same pipe.

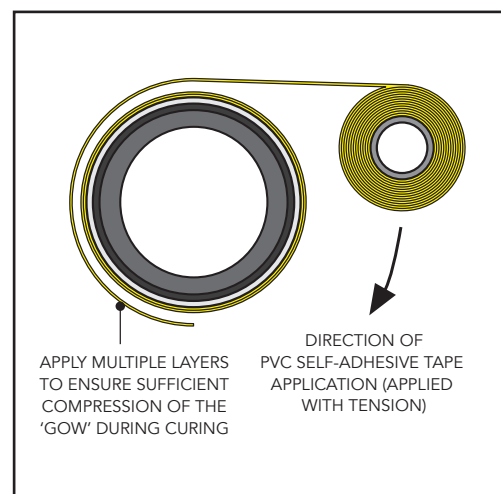


Fig. 21: Correct Self-Adhesive Tape application procedure.