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1.0 SCOPE

This specification shall govern the materials, application, inspection and repair of pipe coatings offshore. The work includes the furnishing of all labor, materials, tools and equipment and the performance of all operations and incidental necessary for the repairs.

As used in this specification, the following definitions shall apply:

COMPANY:

CONTRACTOR: The firm responsible by contract for the installation of the pipeline system.

CONTRACT: Signed work agreement between COMPANY and CONTRACTOR.

The CONTRACTOR shall obtain COMPANY’s written approval for any deviations from the requirements of this specification or specifications, standards and drawings referenced herein or elsewhere in the CONTRACT. In case of conflict between documents, the order of precedence given in the CONTRACT shall govern.

This document is not intended to be all inclusive, and the use of the requirements set forth does not relieve the CONTRACTOR of his responsibility to supply a product capable of performing its intended service.

2.0 REFERENCE DOCUMENTS

The coating repairs shall be applied in accordance with the latest editions and addenda of the following codes and standards.

National Association of Corrosion Engineers

RP-02-74 Recommended Practice, High Voltage Electrical Inspection of Pipeline Coatings Prior to Installation

COMPANY Specifications

Corrosion Prevention Coating – Coal Tar Enamel
Pipeline Field Joint Materials
Field Joint Installation
Corrosion Prevention Coating - Neoprene

3.0 MATERIALS

3.1 General

All repair material shall be furnished by the CONTRACTOR and shall conform to the specifications referenced herein and the requirements of this specification.

The repair materials shall be stored and used so as to prevent damage or deterioration. Repair materials which have become contaminated with foreign matter or have deteriorated shall not be used.

3.2 Above Water Repair Materials

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3.3 Underwater Repair Materials
For underwater repair work, the repair system and materials shall be proposed by the CONTRACTOR. The repair system shall provide performance equal to the design coating in all respects. These include but are not limited to corrosion prevention, impact protection and pipe stability. Complete details of such repair system and materials shall be submitted to the COMPANY for approval before they are used by the CONTRACTOR.

For Corrosion Prevention Coating repairs made underwater, a polyamide cured epoxy such as Dimet 410T or other COMPANY approved equivalent solvent free epoxy suitable for underwater application shall be used. Complete details and manufacturer’s literature shall be submitted by CONTRACTOR to COMPANY for approval prior to repairs being made.

4.0 EQUIPMENT AND LABOR

4.1 Condition of Equipment

CONTRACTOR shall furnish all necessary equipment and tools. All equipment and tools shall be of good quality, maintained in good operating condition and suitable for use to apply materials required by this specification. All equipment shall be subject to approval by the COMPANY.

4.2 Holiday Detector

The electrical equipment used to test the coating shall be portable, low-amperage, adjustable voltage, pulse-type holiday detector employing an audible signaling device. The holiday detector shall be furnished with a coil spring electrode or a suitable brush-type electrode.

4.3 Labor

The CONTRACTOR shall provide supervision and adequately skilled labor for repair operation. The CONTRACTOR shall provide necessary facilities for COMPANY supervision and inspection of all the work.

5.0 INSPECTION

Coatings shall be inspected offshore as and when required by the applicable specifications. During laying operations, the CONTRACTOR shall visually check all coated pipe for damage to the coating before lowering the pipe into the water. The coating shall also be inspected following an abandonment and recovery procedure. Epoxy coated pipe shall be inspected with a coil spring type holiday detector as per NACE RP-02-74 in conjunction with the visual inspections.

For concrete coated pipe, if cracking of the concrete in the overbend is sufficiently severe as to indicate that concrete may be falling away from the submerged pipe (on the stinger or in the suspended span), an inspection of the submerged portion of the pipe shall be made as soon as reasonably practicable. If during the inspection it is apparent that concrete is falling away from the submerged portion of the pipe, laying shall be stopped immediately and the damaged joints of pipe shall be removed or repaired in accordance with the COMPANY’s instructions.

6.0 REPAIRS

Repairs methods shall be outlined for the respective coatings below. Repairs shall use materials compatible with the material being repaired as given in Section 3.2.

6.1 Three Layer Polypropylene Coating

For holidays and damaged areas greater than 2 square inches repairs shall be made with shrink sleeves. Pipe cleaning and shrink sleeve application shall be governed by relevant portions of COMPANY Specification 2136600-SP-022, Field Joint Installation.
For holidays and damaged areas less than 2 square inches the pipe cleaning and coating repair of fusion bonded epoxy may be performed using a hot melt patch stick instead of the shrink sleeves. The hot melt patch compound shall be compatible with the parent coating and approved by the COMPANY. The area to be repaired shall be cleaned and heated according to manufacturer’s instructions. The adjacent coating area shall also be roughened to provide a key for the repair. Any dust shall be wiped off. The compound shall be applied to a minimum thickness of 16 mils using manufacturer’s recommended procedure. Repair shall be reinspected as described for the epoxy coating above.

6.2 Coal Tar Enamel Coating

Pipe cleaning and coating repair for coal-tar enamel shall be as per COMPANY Specification 2136600-SP-018, Corrosion Prevention Coating - Coal-Tar Enamel. In cases where it is possible to apply shrink sleeves entirely around the pipe, shrink sleeves may be used. Pipe cleaning and application of shrink sleeves shall be as per the relevant portions of COMPANY Specification 2136600-SP-022, Field Joint Installation.

6.3 Concrete Coating

Repairs to the damaged concrete coating shall be made as follows:

(a) Damage of less than 1 square foot (where the remaining coating is sound and the reinforcement is not exposed) will be acceptable without repairs.

(b) Should the damaged area be more than 1 square foot and less than 3 square feet, the concrete remaining in place over the area shall be removed to expose the reinforcing steel mesh throughout the damaged area. Edges of sound concrete coating shall be undercut to provide locking for the hot mastic replacement material. No more than two such repairs may be made on any joint, and no more than three consecutive joints may contain such repairs. In the event that more than three consecutive joints require repair, then the CONTRACTOR must immediately adjust his laying procedures to prevent further damage.

(c) Should the damaged area be more than 3 square feet and affect a length of pipe no longer than 3 feet, the coating containing the damage shall be removed around the entire circumference of the pipe. Repairs shall be made by satisfactorily restoring or replacing the reinforcing before applying the hot mastic. A hot mastic filler shall be placed in the sheet metal form such that the repaired surface is flush with the adjacent concrete coating. The width of the sheet metal form shall be such that when filled with mastic the weight of the mastic will not cause the form to sag more than 1" and result in an uneven contour of the coated/repaired surface.

In no case shall the sheet or reinforcement metal touch anodes.

Only one such procedure may be performed on any one joint of pipe. Not more than two joints in any ten consecutive joints may be repaired in this manner.

(d) In cases where damaged areas are greater than those specified in the above paragraph, the joint containing the damage shall be removed and disposed of according to COMPANY’s instructions. Before resuming laying operations, the CONTRACTOR shall reassess his laying procedures and equipment, and make whatever corrections are necessary to ensure that excessive damage to the concrete coating does not occur again.
(e) Where concrete is removed to a depth which exposes the pipeline corrosion coating, and visual inspection indicates that there may be damage to the corrosion coating, the wire reinforcement shall be removed and the CONTRACTOR shall inspect the corrosion coating with a holiday detector as per NACE RP-02-74. Should there be any damage done to the corrosion coating, the CONTRACTOR shall repair it and retest it as per Section 6.2 above.

6.4 Neoprene Coating

Pipe cleaning and coating repair of neoprene coating shall be performed as per Project Specification 17001-INSTL-SPL/Ospl-6103, Field Joint Installation. If coating damage is too great to be repaired with the neoprene material in one split sleeve the joint shall be rejected. For small holidays or damaged areas, a patch may be cut from the split sleeve to fit the cleaned area rather than removing a strip around the entire circumference of the pipe. All repairs must be covered completely with a shrink sleeve. Adequate time shall be allowed for epoxy bond material to cure to a degree suitable for handling before passing the repair over barge shoes. Additional heating of the shrink sleeve may be employed to accelerate curing, however temperatures shall be kept within manufacturer's recommended limits for all components.

6.5 Field Joint Coating

Pipe cleaning and field joint repairs shall be performed as per COMPANY Specification 2136600-SP-022, Field Joint Installation.

6.6 Underwater Repairs

For underwater repair of damaged coatings, repair procedures shall be submitted by CONTRACTOR to COMPANY for approval before use by CONTRACTOR. For repair of corrosion coating underwater, pipe cleaning procedures shall be given detailed consideration.