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Application of Tape Coatings for External Corrosion Protection of Buried Metal Pipelines

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ABSTRACT

This updated NACE International standard practice provides the most current technology and industry practices for material requirements and the use of tape coatings for external mainline coating, coating repair, coating rehabilitation, and coating weld joints on buried metal pipelines. The standard is applicable to underground metal pipelines in the oil and gas gathering, distribution, and transmission industries, as well as water and wastewater pipelines. This standard is intended for use by corrosion control personnel, design engineers, project managers, purchasing personnel, and construction engineers and managers.

KEYWORDS

Adhesion test, bitumen-based tapes, bituminous tape, blast-cleaned, bond test, cathodic disbondment, cigarette wrap, circumferential wrap, coal tar tape, coating materials, coating systems, cohesive separation, coil-splice welds, cold applied, cutback area, dielectric strength, elongation, field joint area, field welds, flammability, holiday inspection, hot applied, impact resistance, inner layer tape, laminate polymeric tape, liquid adhesive, longitudinal welds, maximum service temperature, mesh-backed polymeric tape, multilayer polymeric tape system, primer, pull tension, rockshield, single-layer tape system, spiral welds, spiral wrap, substrate, tensile strength, TG 251, STG 03, viscoelastic coating, viscoelastic tape, water vapor transmission rate, wrap direction.

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Foreword

This NACE International standard practice provides the most current technology and industry practices for material requirements and the use of tape coatings for external mainline coating, coating repair, coating rehabilitation, and coating weld joints on buried metal pipelines. This standard is intended for use by corrosion control personnel, design engineers, project managers, purchasing personnel, and construction engineers and managers. It is applicable to underground metal pipelines in the oil and gas gathering, distribution, and transmission industries, as well as water and wastewater pipelines.

This standard was prepared in 2009 and revised in 2019 by NACE Task Group (TG) 251, “Coatings, Tape for External Repair, Rehabilitations, and Weld Joints on Pipelines.” This TG is administered by Specific Technology Group (STG) 03, “Coatings and Linings, Protective: Immersion and Buried Service.” It is sponsored by STG 04, “Coatings and Linings, Protective: Surface Preparation,” and STG 35, “Pipelines, Tanks, and Well Casings.” This standard is issued by NACE International under the auspices of STG 03.

In NACE standards, the terms ***shall, must, should,*** and ***may*** are used in accordance with the definitions of these terms in the NACE Publications Style Manual. The terms ***shall*** and ***must*** are used to state a requirement, and are considered mandatory. The term ***should*** is used to state something good and is recommended, but is not considered mandatory. The term ***may*** is used to state something considered optional.

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Application of Tape Coatings for External Corrosion Protection of Buried Metal Pipelines

1. General 4
2. Definitions 4
3. Tape Coating Systems 5
4. Tape Coating Requirements 7
5. Delivery Requirements for Tape Coating System Materials 10
6. Surface Preparation of Pipe 11
7. Tape Coating System Application 12
8. Inspection, Repair, and Handling 14

References 16

Tables

Table 1: Tapes and Application 6
Table 2: Accessory Materials 6
Table 3: Type A (Coal Tar- or Bitumen-Based Tapes) System Requirements 7
Table 4: Type B (Laminate Polymeric Tape) Tape Requirements 8
Table 5: Type C (Mesh-Backed Polymeric Tape) Material Requirements 9
Table 6: Type D (Viscoelastic Tape) Materials Requirements 9
Table 7: Type E Inner-Layer Tape Material Requirements 10
Table 8: Type E Mechanical Outer-Layer Tape Material Requirements 10
Table 9: Type E Total Tape System Material Requirements 14

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Section 1: General

1.1 Scope of standard. This standard practice presents guidelines for establishing the minimum requirements to ensure the proper selection, application, and performance of tape coatings. These coatings are used as the external corrosion protection for new and existing pipe, girth welds, and fittings, and for repair and rehabilitation. The primary function of these tape coating systems is to prevent corrosion of the pipeline when used with or without cathodic protection (CP). This standard provides guidelines for the proper pipeline surface preparation, tape coating system application, inspection, tape coating damage repair, installation, transportation and handling of coated pipe to ensure long-term performance.

1.2 Application of tape coatings. Tape coatings can be applied in a plant or in the field, whether the pipeline is in service, out of service, or segmented.

1.3 Additional application procedures. These tape coatings may also be applied in a fabrication shop or coating plant. The manufacturer should be consulted regarding the correct type of application equipment and procedures.

1.4 Construction and soil conditions. The purchaser shall assess construction and soil conditions that could lead to mechanical damage (e.g., abrasion, impact, soil stress) to the coating. The tape manufacturer should be consulted for the recommendations of tape systems suitable for the construction or in-ground conditions. The tape manufacturer should recommend appropriate products and procedures for ensuring the required in-service performance. Recommendations may include either specific products or precautionary measures, for example, special backfills, rockshield, or other damage prevention techniques. This depends on the conditions encountered.

1.5 Conditions not covered. This standard practice does not cover the additional materials and procedures that may be required for difficult installation conditions. These conditions may include those encountered with submerged lines, casing pipe, river crossings, elevated temperatures, resistance to ultraviolet (UV) degradation, lines that are in rocky areas, where high soil stress conditions exist or where contaminated soils may exist. The manufacturer should be consulted for specific recommendations when these conditions exist.

1.6 Material Compliance. Materials shall be as set forth in this standard. Unless otherwise specified by the purchaser, components not defined shall be selected by the manufacturer or applicator and shall be subject to all applicable provisions of this standard.

1.7 This system shall meet the pipeline coating properties in accordance with NACE SP0169.[1]

Section 2: Definitions

Applicator: The person, company, or organization responsible to the purchaser for the coating application.

Batch or Lot: The quantity of coating material produced during a continuous production run of not more than 24 hours. The quantity of coating material produced from a single batch mixture of coating material.

Brush-off Blast Cleaned Surface: an abrasive blast cleaned steel surface that is free of all visible contaminants and foreign matter but may have some tightly adherent mill scale, rust, or coating. (See NACE No. 4/SSPC[(1)]-SP 7,[2] for detailed specification.)

Coating Materials: Premanufactured tape coating and associated accessory products such as primer, liquid adhesives, filler materials, and coating repair materials.

Coating System: The complete number and types of coats applied to a substrate in a predetermined order. (When used in a broader sense, surface preparation, pretreatments, dry film thickness, and manner of application are included.)

Cohesive Separation: A mode of separation that leaves adhesive on both the pipe surface and the tape backing.

Cold Applied: The application of a coating at ambient temperature. Typically, the use of heat is not applied to the coating itself, but may be required for heating the substrate in cold environments or to raise the steel temperature above dew point. Manufacturer's guidelines should be consulted.

Cutback Area: The area of pipe left uncoated at the coating mill/plant to facilitate welding of adjacent pipe joints.

[(1)] SSPC The Society for Protective Coatings (SSPC), 800 Trumbull Street, PA 15205.

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