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Metallurgical and Inspection Requirements for Offshore Pipeline Bracelet Anodes

ABSTRACT

Sets minimum physical quality and inspection standards for cast sacrificial anodes for offshore pipeline applications. The standard is applicable to typical half-shell or segmented bracelet-type anodes and is not intended to apply to platform, hull, tank, or extruded-type anodes. The section on physical requirements includes information on samples for chemical analysis; anode identification, weight, dimensions, and straightness; insert dimensions and position; insert material; fabrication of inserts by welding; insert surface preparation; surface irregularities on the anode casting; cracks in cast anodic materials; defects; and more.

KEYWORDS

anodes, fabrication, inspection, offshore platforms, pipelines, sacrificial anodes, TG 505

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Foreword

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.

The purpose of this standard practice is to set minimum physical quality and inspection requirements for cast galvanic anodes for offshore pipeline applications. The objectives are to standardize an industry-wide practice that can be used by consultants, manufacturers, and users to define the physical requirements of anodes and to be sufficiently specific to assist inspection authorities in their task of confirming that anodes comply with the physical requirements. This standard is applicable to typical half-shell or segmented bracelet-type anodes.

This standard was originally prepared in 1992 by Task Group T-7L-9, a component of Unit Committee T-7L on Cathodic Protection. It was reaffirmed by T-7L in 1999, in 2006 by Specific Technology Group (STG) 30 on Oil and Gas Production—Cathodic Protection, and revised in 2016 by Task Group (TG) 525—Review and Revise as Necessary NACE SP0492-2006. This standard is published under the auspices of STG 30.

Metallurgical and Inspection Requirements for Offshore Pipeline Bracelet Anodes

Section 1: General

1.1 This standard defines minimum physical quality and inspection requirements for bracelet galvanic anodes for offshore pipeline applications, including risers and J-tubes.

1.2 This standard is applicable to the majority of bracelet-type anodes used on offshore pipelines, i.e., anodes of half-shell or segmented configurations. For other anode designs, such as semi-cylindrical segments with cast-in longitudinal notches, an experienced corrosion specialist should be responsible for defining the acceptance criteria.

1.3 This standard does not specify particular anode alloy compositions or define short- or long-term performance tests.

1.4 This standard does not specify particular anode or anode insert designs. An experienced corrosion specialist should be responsible for anode and anode insert design.

1.5 Although some aspects of this standard may be relevant to other types of galvanic anodes, it is not intended to apply to platform, hull, tank, or extruded-type anodes.

1.6 This standard does not address electrochemical or other anode performance test procedures. NACE Standard TM0190[1] gives a standardized short-term potential and capacity determination test procedure for quality control purposes in international laboratories.

1.7 The manufacturer is responsible for meeting the quality levels specified in this standard. The purchaser shall determine the extent of inspection to be conducted by the purchasing organization to prove compliance with the quality specified.

1.8 The manufacturer should have a documented quality plan for the manufacture and inspection of cast galvanic anodes, which may be in accordance with ISO[(1)] 10005.[2]

1.9 If required by the purchaser, the manufacturer should provide an Inspection and Test Plan (ITP).

Section 2: Definitions

Batch: A group of anodes produced before, between, or after a significant interruption of the casting sequence of a heat of anodes.

Bracelet Anodes: A galvanic anode with geometry suitable for direct attachment around the circumference of a pipeline. These may be half-shell bracelet consisting of two semicircular sections or a segmented bracelet consisting of a large number of individual sections.

Certificate of Conformity: A written statement from the manufacturer's authorized representative and endorsed by a representative of the purchaser affirming that the anodes listed comply with the requirements of the order.

Cold Lap / Shut: A linear discontinuity with rounded edges at exposed surfaces that is caused by solidification of the meniscus of a partially cast metal or alloy (e.g., an anode

[(1)] International Organization for Standardization (ISO), Chemin de Blandonnet 8. Case Postale 401, 1214 Vermier, Geneva, Switzerland.