



NACE SP0108-2008
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Standard Practice

Corrosion Control of Offshore Structures by Protective Coatings

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NACE International
1440 South Creek Drive
Houston, Texas 77084-4906
+1 281-228-6200

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Foreword

Offshore structures represent large capital investments and are being placed worldwide. Moreover, more and more offshore structures are being placed in deeper waters and, therefore, have become larger, more complex, and more expensive. Control of corrosion on offshore structures is necessary to sustain oil and gas production, provide safe working and living areas, and avoid potential harm to the environment. For this standard, *offshore structures* includes metallic offshore structures such as fixed-leg platforms, tension-leg platforms (TLPs), semisubmersibles, spar platforms, and floating production storage and offloading vessels (FPSOs).

This NACE International standard is intended for use by facility owners' corrosion control personnel, coating applicators, and coating manufacturers. It covers coating materials, coating test protocol and acceptance criteria, surface preparation, coating application, quality assurance and control, and repair methods. It also covers generic protective coating systems, flange corrosion control, fastener coatings, pipe support corrosion control, and stainless steel (SS) tubing corrosion control. The purpose is to facilitate more effective corrosion protection of offshore structures by presenting reliable information and providing guidelines for coating manufacturers to develop more durable products.

This standard replaces a portion of NACE Standard RP0176.¹ RP0176 was originally issued in 1976 and revised in 1983 by Task Group (TG) T-1-2 on North Sea Corrosion Problems. It was revised in 1994 by TG T-1-5, and in 2003 by TG 170 on Offshore Steel Platforms—Corrosion Control: Review of NACE Standard RP0176, which is administered by Specific Technology Group (STG) 30 on Oil and Gas Production: Cathodic Protection. All editions of RP0176 prior to 2007 addressed two aspects of corrosion control of steel fixed offshore structures associated with petroleum production: cathodic protection (CP) and protective coatings. In 2007 it was decided to address these two aspects in separate NACE standards. Therefore, SP0176² was issued in 2007 by TG 170 and STG 30 to address the CP aspects. TG 313—Offshore Platforms: Coatings for Corrosion Control of Steel was formed to address the protective coatings aspects from RP0176 and provide expanded information. TG 313 is administered by STG 02—Coatings and Linings, Protective: Atmospheric. This standard is issued by NACE under the auspices of STG 02.

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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Section 1: General

1.1 This standard provides guidelines for establishing minimum requirements for the corrosion protective coatings on steel offshore structures associated with oil and gas production, and on the associated handling equipment. It covers coating materials, coating prequalification test methods and the associated acceptance criteria, surface preparation, coating application, quality assurance and control, and repair methods. It also covers generic protective coating systems, flange corrosion control, fastener coatings, pipe support corrosion control, and SS tubing corrosion control. Offshore structures include metallic offshore and coastal structures such as fixed-leg platforms, TLPs, semisubmersibles, spar platforms, and FPSOs.

1.2 For this standard, corrosion on offshore structures is divided into four zones: atmospheric zone, splash zone,

exterior submerged zone, and ballast water tank (internally immersed). The exterior submerged zone also includes subsea facilities, such as valves and manifolds. Each zone may use different protective coating systems.

1.3 This standard does not include corrosion protective coatings for subsea pipelines, pipeline risers, internal portions of production tubing, drill pipes, and chemical tanks that may be in use on the offshore structure, but does include external protection of the chemical tanks on the offshore structure in the atmospheric zone.

1.4. Passive fire protection (PFP) coatings and nickel-copper alloy (e.g., UNS⁽¹⁾ N04400 [Alloy 400]) splash zone sheathings also are excluded from this standard.

Section 2: Definitions

Amine Blush: Greasy film on the surface of a coating caused by its amine or polyamide curing agent reacting with carbon dioxide (CO₂) and water (H₂O). (It can greatly interfere with intercoat adhesion.)

Atmospheric Zone: The portion of a marine structure that extends upward from the splash zone and is exposed to sun, wind, water spray, and rain.

Cathodic Disbondment: The destruction of adhesion between a coating and the coated surface caused by products of a cathodic reaction.

Coat: One layer of a coating applied to a surface in a single, continuous application to form a uniform film when dry.

Coating System: The complete number and types of coats applied to a substrate in a predetermined order.

(Coating) Test Protocol: A written checklist of coating properties that are evaluated by standard test methods to qualify the coating for the intended service conditions. (It is often refined as more is learned about the behavior of the coating system.)

Crater: A small, rounded depression in a coating generally resulting from foreign matter in or deposited on a wet coating film.

Crevice Corrosion: Localized corrosion of a metal surface at, or immediately adjacent to, an area that is shielded from full exposure to the environment because of close proximity of the metal to the surface of another material.

Dry Film Thickness (DFT): The thickness of a dried film, coating, or membrane.

Edge Retention: The ratio of DFT of the entire multicoat coating system at peak to average DFT on both flat surfaces of a sharp angle bar; used as a measure of a coating's ability to retain its film coverage over sharp corners.

Epoxy: Type of resin formed by the reaction of aliphatic or aromatic polyols (like bisphenol) with epichlorohydrin and characterized by the presence of reactive oxirane end groups.

Fingerprinting: Method of identifying a coating material through laboratory analyses of coating density, solids content, pigment content, etc. (Infrared [IR] spectroscopy is often used in the analyses.)

Fish Eye: A small dimple or crater resembling a fish eye that forms in a wet applied coating.

Hot-Dip Galvanized Coating: A coating of virtually pure zinc applied to steel by immersing it in a bath of molten zinc.

⁽¹⁾ Unified Numbering System for Metals and Alloys (UNS). UNS numbers are listed in *Metals & Alloys in the Unified Numbering System*, latest edition (Warrendale, PA: SAE International [SAE]) and West Conshohocken, PA: ASTM International [ASTM]).