NACE International and IEEE Joint Standard Practice for

Atmospheric (Above Grade) Corrosion Control of Existing Electric Transmission, Distribution, and Substation Structures by Coating Systems

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NACE International
15835 Park Ten Place
Houston, Texas 77084-5145
+1 281-228-6200

IEEE
3 Park Ave., 17th Floor
New York, NY 10016-5997
+1 212-419-7900

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Abstract: This standard was prepared to assist personnel responsible for maintenance painting of above-grade electrical support structures for electric utilities and large industrial facilities. The standard provides procedures to (1) assess structures for atmospheric corrosion; (2) assess the level of risk to the structure in terms of corrosion attack and degradation to the existing coating system; (3) make informed decisions based on those findings as to whether coating repair is needed, and if so, to what extent; and (4) apply repair coatings to the structure if applicable. This standard applies to the repair of above-grade atmospheric coatings and serves as a resource for preparing specifications to achieve the successful coating of utility structures.

Keywords: above grade, acrylics, alkyds, atmospheric, carbon steel, coatings, coating systems, coating repair systems, corrosion, corrosion control, distribution, electric, epoxy esters, galvanized steel, IEEE 1835, long-oil zincs, silicone alkyds, single-component steel, SP0315, substation, transmission

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15835 Park Ten Place
Houston, Texas 77084-5145
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NACE International
15835 Park Ten Place
Houston, Texas 77084-5145
+1 281-228-6200

Secretary, IEEE-SA Standards Board
445 Hoes Lane
Piscataway, NJ 08854
USA

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Foreword

Industries are constantly striving to obtain the maximum use of their infrastructures. The electrical utility industry (utility) is no different. Their transmission, distribution, and substation structures (utility support structures) are often pushed to the limits of their designed service life.

All types of steel, including galvanized, corrode or degrade at some point when exposed to the environment. Utility support structures are coated to protect them from atmospheric corrosion, improve the cosmetic appearance, and to comply with regulatory requirements from the Federal Aviation Administration (FAA),[1] Federal Communication Commission (FCC),[2] U.S. Army Corps of Engineers (The Corps),[3] or other applicable regulations.

Properly engineered and implemented maintenance coating programs can protect from the detrimental effects of corrosion, extending the service life of the structures.

This standard was prepared to assist personnel responsible for maintenance painting of above-grade electrical support structures for electric utilities and large industrial facilities.

This standard was prepared in 2015 by NACE/IEEE Joint Task Group (TG) 395, "Atmospheric (Above-Grade) Corrosion Control of Transmission, Distribution, and Substation Structures by Coating Systems," which is administered by Specific Technology Group (STG) 41, "Electric Utility Generation, Transmission, and Distribution," and is sponsored by STG 03, "Coatings and Linings, Protective—Immersion and Buried Service," and STG 04, "Coatings and Linings, Protective—Surface Preparation." The task group includes members of IEEE. It is published by NACE under the auspices of STG 41, and by IEEE's corrosion working group: Power and Energy Society/Transmission and Distribution (PES/T&D/TPC-corrosion).

In NACE and IEEE standards, the terms *shall, must, should*, and *may* are used in accordance with the definitions of these terms in the *NACE Publications Style Manual* and the *IEEE-SA Standards 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.

[1] Federal Aviation Administration (FAA), 800 Independence Avenue SW, Washington, DC 20591.
[2] Federal Communications Commission (FCC), 445 12th Street SW, Washington, DC 20554.
[3] U.S. Army Corps of Engineers (The Corps), 441 G Street NW, Washington, DC 20314-1000.

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Section 1: Overview

1.1 **Scope:** This standard provides a procedure that shall be used to (1) assess structures for atmospheric corrosion; (2) assess the level of risk to the structure in terms of corrosion attack and degradation to the existing coating system; (3) make informed decisions based on those findings as to whether coating repair is needed, and if so, to what extent; and (4) apply repair coatings to the structure if applicable. This standard applies to the repair of above-grade atmospheric coatings. For the purposes of this standard, the atmospheric area to be coated generally comprises of that portion of the utility support structure above the transition zone, which is that portion of the coating exposed up to 600 mm (24 in) above grade.

1.1.1 This standard is limited to the above-grade and atmospheric portions of utility support structures. It does not address below-grade coating repair within and below the transition zone. This standard does not address foundations or guy anchoring systems. This standard does not cover the coating of aluminum, weathering steel, concrete, or any material other than steel. Likewise, it does not cover the coating of nonsupport structures such as fencing, buildings, transformers, or other miscellaneous components within the transmission, distribution, and substation systems. This standard does not cover new construction, transition zone, below-grade, or water immersion. These areas of concern are addressed specifically in other NACE/IEEE standards. This standard does not address mechanical or structural damage, mechanical or structural repairs, or structural integrity.

1.2 **Purpose:** This standard serves as a resource for preparing specifications to achieve the successful coating of utility structures.

Section 2: General

2.1 Special considerations shall be given to the application of atmospheric coating near the ground line area or where below-grade coatings are present. The atmospheric and below-grade coating systems shall be compatible with each other as they often overlap.

2.1.1 This standard refers to industry standards from ASTM International (ASTM),[4] NACE, and the Society for Protective Coatings (SSPC).[5] In some cases these organizations have developed equivalent standards for a test method specified in this standard. It is not the intention of this standard to specify one organization's standard over another when equivalent standards are available. Where applicable, equivalent standards may be interchanged as deemed appropriate.

2.1.2 This standard is intended for use by owners, qualified applicators, field repair technicians, subcontractors, and inspectors.

2.1.3 This standard is intended to supplement the coating manufacturer's printed instructions and literature.

2.2 Before any of the guidelines of this standard are implemented, the inspection, assessment, and repair process shall be defined and agreed upon in advance by the owner and all parties involved. Acceptance and rejection criteria, in addition to the methods and standards used to make determinations, shall be established before commencement of work.

2.3 A plan of action that identifies priorities, objectives, and expectations for each aspect of the program shall also be developed. Typical considerations vary, but should include topics such as:

2.3.1 Project management

(a) Planning, scheduling, logistics, documentation, and reporting;
(b) Regulations, ordinances, permits, and maintenance of traffic (MOT);
(c) Labor, skills, and qualification of personnel;
(d) Safety, health, and environmental regulations;
(e) Quality control; and
(f) Budgeting.

[4]ASTM International (ASTM), 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.
[5]The Society for Protective Coatings (SSPC), 40 24th Street 6th Floor, Pittsburgh, PA 15222-4656.