

Inspection and Assessment of Below Grade and Groundline Corrosion on Weathering Steel on Electrical Transmission and Distribution Structures

This NACE International/IEEE standard represents a consensus of those individual members who have reviewed this document, its scope, and provisions. Its acceptance does not in any respect preclude anyone, whether he or she has adopted the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not in conformance with this standard. Nothing contained in this NACE/IEEE standard is to be construed as granting any right, by implication or otherwise, to manufacture, sell, or use in connection with any method, apparatus, or product covered by letters patent, or as indemnifying or protecting anyone against liability for infringement of letters patent. This standard represents minimum requirements and should in no way be interpreted as a restriction on the use of better procedures or materials. Neither is this standard intended to apply in all cases relating to the subject. Unpredictable circumstances may negate the usefulness of this standard in specific instances. NACE/IEEE assumes no responsibility for the interpretation or use of this standard by other parties and accept responsibility for only those official NACE/IEEE interpretations issued by NACE/IEEE in accordance with its governing procedures and policies which preclude the issuance of interpretations by individual volunteers.

Users of this NACE/IEEE standard are responsible for reviewing appropriate health, safety, environmental, and regulatory documents and for determining their applicability in relation to this standard prior to its use. This NACE/IEEE standard may not necessarily address all potential health and safety problems or environmental hazards associated with the use of materials, equipment, and/or operations detailed or referred to within this standard. Users of this NACE/IEEE standard are also responsible for establishing appropriate health, safety, and environmental protection practices, in consultation with appropriate regulatory authorities if necessary, to achieve compliance with any existing applicable regulatory requirements prior to the use of this standard.

CAUTIONARY NOTICE: NACE/IEEE standards are subject to periodic review, and may be revised or withdrawn at any time in accordance with NACE/IEEE technical committee procedures. NACE/IEEE requires that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of initial publication and subsequently from the date of each reaffirmation or revision. The user is cautioned to obtain the latest edition. Purchasers may receive current information on all standards and other publications by contacting the organizations at the addresses below:

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

Institute of Electrical and Electronics Engineers (IEEE)
Three Park Avenue | New York, NY 10016-5997, USA
+1 212-419-7900

IMPORTANT NOTICE: IEEE documents are made available for use subject to important notices and legal disclaimers. These notices and disclaimers, or a reference to this page, appear in all standards and may be found under the heading "Important Notices and Disclaimers Concerning IEEE Standards Documents." They can also be obtained on request from IEEE or viewed at <https://standards.ieee.org/ipr/disclaimers.html>.

ABSTRACT

The buried or below-grade sections of electric utility steel transmission and distribution structures are often subject to corrosive environments and are not easily accessible for visual inspection. Prior to the publication of this standard, no industry practice existed to help electric utilities determine a prioritized listing of structures to be inspected or that described an inspection and assessment procedure to evaluate below-grade corrosion problems.

This joint NACE/IEEE standard is intended for use by electric utility personnel, contractors, inspectors, and those interested in the impact of corrosion on the below-grade sections of transmission, distribution, and substation steel structures. It provides requirements to: (1) help utilities identify structures that may be at a high risk for below-grade corrosion; (2) excavate and inspect the selected structures; (3) categorize the condition of structures based on corrosion degradation; (4) prioritize structures requiring additional inspection based on those findings; and (5) help identify next steps as required.

This standard is limited to the inspection and assessment of weathering steel transmission towers, poles, substation structures, and other similar structures.

KEYWORDS

Transmission and distribution structure, transmission tower, below-grade, weathering steel, substation structure, field inspection, groundline corrosion, TG 538.

Foreword

There are an estimated 900,000 electric utility steel transmission and distribution structures in North America alone. The majority of these structures were installed between 1950 and 1990. These structures are now an average of about 45 years of age. The age of these structures dictates an inspection and assessment procedure to determine the level of corrosion affecting the buried portions of this important segment of our infrastructure. While the condition of the above-grade portions of these structures is relatively easy to visually assess, the buried or below-grade sections are often subject to a more corrosive environment and are not easily accessible for visual inspection.

Prior to the publication of this standard, no industry practice existed to help electric utilities determine a prioritized listing of structures to be inspected or that described an inspection and assessment procedure to evaluate below-grade corrosion problems.

This standard is intended for use by electric utility personnel, contractors, inspectors, and those interested in the impact of corrosion on the below-grade sections of transmission, distribution, and substation steel structures.

This standard was prepared in 2018-2019 by NACE/IEEE joint Task Group (TG) 538, “Development of a Joint NACE/IEEE Standard for Below-Grade Inspection and Assessment of Below Grade and Groundline Corrosion on Weathering Steel on Electrical Transmission and Distribution Structures,” which is administered by Specific Technology Group (STG) 41, “Electric Utility Generation, Transmission, and Distribution.” The task group included members of IEEE. This standard is published by NACE under the auspices of STG 41, and by IEEE’s Corrosion Working Group 12: Power and Energy Society/Transmission and Distribution (PE/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.

**NACE International and IEEE Joint Standard Practice
(NACE SP21433-2019/IEEE Std 2445-2018)**

Inspection and Assessment of Below Grade and Groundline Corrosion on Weathering Steel on Electrical Transmission and Distribution Structures

1.	General	4
2.	Definitions	4
3.	Data Collection and Prioritization	5
4.	Field Inspections	5
	References	7
	Appendix A: Soil Condition Table—Nonmandatory	8
	Appendix B: Data Collection and Prioritization Report (Sample)—Nonmandatory	8
	Appendix C: Tier I Field Inspection Report (Sample)—Nonmandatory	9
	Appendix D: Tier II Field Inspection Report (Sample)—Nonmandatory	10