



NACE Standard RP0285-2002
Item No. 21030

Standard Recommended Practice

Corrosion Control of Underground Storage Tank Systems by Cathodic Protection

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Foreword

This standard recommended practice presents procedures and practices for effective control of external corrosion on underground storage tank (UST) systems by cathodic protection (CP). It is intended to be used by competent corrosion professionals as a reference for corrosion control of buried metallic underground storage tanks including those used to contain oil, gas, and water using CP. Specifically addressed is CP of:

- (a) Existing bare and coated mild steel tanks;
- (b) New coated mild steel tanks;
- (c) Metallic piping and flexible connectors; and
- (d) Other metallic components.

For accurate and correct application of this standard, this standard must be used in its entirety. Using or referring to only specific paragraphs or sections can lead to misinterpretation and misapplication of the recommendations and practices contained in the standard.

This standard was originally published in 1985 by Task Group T-10A-14 as "Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems." The standard was revised in 1995 by Task Group T-10A-14 on Corrosion Control of Underground Storage Tank Systems, a component of Unit Committee T-10A on Cathodic Protection. It was revised in 2001 by TG 011 on Corrosion Control of Underground Storage Tank Systems by Cathodic Protection. Task Group 011 is administered by Specific Technology Group (STG) 35 on Pipelines, Tanks, and Well Casings and is sponsored by STG 03 on Protective Coating and Linings—Immersion/Buried and STG 05 on Cathodic/Anodic Protection. This standard is issued by NACE International under the auspices of STG 35 on Pipelines, Tanks, and Well Casings.

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*, 4th ed., Paragraph 7.4.1.9. *Shall* and *must* are used to state mandatory requirements. *Should* is used to state that which is considered good and is recommended but is not absolutely mandatory. *May* is used to state that which is considered optional.

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Standard
Recommended Practice**

**Corrosion Control of Underground Storage Tanks Systems
by Cathodic Protection**

Contents

1. General	1
2. Definitions	1
3. Cathodic Protection of New UST Systems	2
4. Cathodic Protection of Existing UST Systems	5
5. Criteria for Cathodic Protection.....	7
6. Cathodic Protection Design	8
7. Installation of Cathodic Protection Systems.....	11
8. Operation and Maintenance.....	13
9. References.....	15
Table 1: Conversion of Voltage Measurements to CSE Equivalents.....	8

Section 1: General

1.1 Introduction

1.1.1 This standard is intended to serve as a guide for establishing minimum requirements for the control of external corrosion on UST systems that are buried, partially buried, or in contact with the soil.

1.1.2 This standard does not designate specific practices for every situation because the complexity of some environmental conditions in which systems are buried precludes standardization of corrosion control practices.

1.1.3 This standard does not include corrosion control methods based on chemical control of the environment, internal linings, or the use of tank construction materials other than mild steel.

1.1.4 This standard does not override applicable safety codes and should not be used to infringe on the

primary requirement of protecting personnel, the environment, and equipment. In any situation, the corrosion protection design for underground structures should incorporate all requirements of any applicable codes, standards, and regulations as determined by authorities having jurisdiction.

1.1.5 The provisions of this standard shall be applied under the responsible direction of competent individuals. Such individuals must either be registered professional engineers, NACE International Certified Corrosion Specialists or CP Specialists, or individuals qualified by professional education and related practical experience. All of the above individuals must be able to demonstrate suitable experience in corrosion control of UST systems.

1.1.6 Deviation from this standard may be warranted in specific situations provided the objectives expressed in this standard have been achieved.

Section 2: Definitions

Anode: The electrode of an electrochemical cell at which oxidation occurs. Electrons flow away from the anode in the external circuit. Corrosion usually occurs and metal ions enter the solution at the anode.

Cathode: The electrode of an electrochemical cell at which reduction is the principal reaction. Electrons flow toward the cathode in the external circuit.

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

Cathodic Polarization: The change of the electrode potential in the active (negative) direction caused by current across the electrode/electrolyte interface. (See *Polarization*.)

Cathodic Protection (CP): A technique to reduce the corrosion of a metal surface by making that surface the cathode of an electrochemical cell.

Continuity Bond: A connection, usually metallic, that provides electrical continuity between structures that can conduct electricity.

Corrosion: The deterioration of a material, usually a metal, that results from a reaction with its environment.

Corrosion Potential (E_{corr}): The potential of a corroding surface in an electrolyte relative to a reference electrode under open-circuit conditions (also known as *rest potential*, *open-circuit potential*, or *freely corroding potential*).

Current Density: The current to or from a unit area of an electrode surface.

Dielectric Coating: A coating that does not conduct electricity.

Electrical Isolation: The condition of being electrically separated from other metallic structures or the environment.

Electrochemical Cell: A system consisting of an anode and a cathode immersed in an electrolyte so as to create an electrical circuit. The anode and cathode may be different metals or dissimilar areas on the same metal surface.

Electrode Potential: The potential of an electrode in an electrolyte as measured against a reference electrode. (The electrode potential does not include any resistance losses in potential in either the solution or the external circuit. It represents the reversible work to move a unit of charge from the electrode surface through the electrolyte to the reference electrode.)