Cathodic Protection of Aboveground Petroleum Storage Tanks

API RECOMMENDED PRACTICE 651
THIRD EDITION, JANUARY 2007

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Downstream Segment

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Persons planning to construct an aboveground storage facility, replace existing aboveground storage tanks and associated piping systems, or cathodically protect existing aboveground storage tanks and associated piping should refer to applicable local, state, and federal fire, safety, and environmental regulations as well as the most recent edition of the following publications:

a. API Std 650;
b. API RP 652;
c. API Std 653;
d. API Spec 12B;
e. API Spec 12D;
f. API Spec 12F;
g. API Std 2610;
h. NACE RP0193;
i. NACE RP0285;
j. NFPA 30;
k. NFPA 70; and
l. PEI RP200.

The appropriate government authority having jurisdiction should be consulted for regulations that apply to the area of installation prior to taking any action suggested in this recommended practice.

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1 Scope

1.1 The purpose of this recommended practice is to present procedures and practices for achieving effective corrosion control on aboveground storage tank bottoms through the use of cathodic protection. It contains provisions for the application of cathodic protection to existing and new storage tanks. Corrosion control methods based on chemical control of the environment or the use of protective coatings are not covered in detail.

1.2 When cathodic protection is used for aboveground storage tank applications, it is the intent of this recommended practice to provide information and guidance specific to aboveground steel storage tanks in hydrocarbon service. Certain practices recommended herein may also be applicable to tanks in other services. It is intended to serve only as a guide to persons interested in cathodic protection. Specific cathodic protection designs are not provided. Such designs should be developed by a person thoroughly familiar with cathodic protection practices.

1.3 This recommended practice does not designate specific practices for every situation because the varied conditions in which tank bottoms are installed preclude standardization of cathodic protection practices.

2 References

2.1 STANDARDS, CODES, PUBLICATIONS, AND SPECIFICATIONS

Unless otherwise specified, the most recent editions or revisions of the following standards, codes, and specifications shall, to the extent specified herein, form a part of this standard.

API

Spec 12B	*Bolted Tanks for Storage of Production Liquids*
Spec 12D	*Field Welded Tanks for Storage of Production Liquids*
Spec 12F	*Shop Welded Tanks for Storage of Production Liquids*
RP 500	*Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities*
RP 575	*Inspection of Atmospheric and Low Pressure Storage Tanks*
Std 620	*Design and Construction of Large, Welded, Low-pressure Storage Tanks*
Std 650	*Welded Steel Tanks for Oil Storage*
RP 652	*Lining of Aboveground Petroleum Storage Tank Bottoms*
Std 653	*Tank Inspection, Repair, Alteration, and Reconstruction*
RP 1615	*Installation of Underground Petroleum Product Storage Systems*
RP 1621	*Bulk Liquid Stock Control at Retail Outlets*
RP 1632	*Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems*
RP 2003	*Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents*

ASTM[1]

C 144	*Standard Specification for Aggregate for Masonry Mortar*
C 778	*Standard Specification for Standard Sand*
D 512	*Standard Test Methods for Chloride Ion in Water*
D 516	*Standard Test Method for Sulfate Ion in Water*
D 1557	*Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))*
G 51	*Standard Test Method for Measuring pH of Soil for Use in Corrosion Testing*
G 57	*Method for Field Measurement of Soil Resistivity Using the Wenner Four Electrode Method*

EPA[2]

0376.1	*Test Method for Sulfide—Titrimetric Iodine*

[1]ASTM International, 100 Bar Harbor Drive, West Conshohocken, Pennsylvania 19428, www.astm.org.
[2]U.S. Environmental Protection Agency, Ariel Rios Building, 1200 Pennsylvania Avenue, N.W., Washington, D.C. 20460, www.epa.gov.