



PROCESS
INDUSTRY
PRACTICES

June 2018

Pipeline Systems

PIP PLE00006
Cathodic Protection Systems for Pipelines

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1. Scope

This document provides guidance for the design and installation of cathodic protection systems to control and minimize external and internal corrosion of metallic pipelines buried or immersed in an electrolyte (e.g. an aqueous or soil environment). Appendix A contains well construction information. Appendix B contains typical installation details.

2. References

Applicable parts of the following industry codes and standards shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles are used herein where appropriate. Code section references below are specific to the code editions in effect at the issuance of this Practice.

Industry Codes and Standards

- Institute of Electrical and Electronics Engineers (IEEE)
 - IEEE 81 - *Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System*
- International Organization for Standardization (ISO)
 - ISO 15589-1 - *Petroleum and Natural Gas Industries – Cathodic Protection of Pipeline Transportation Systems – Part 1: On-land Pipeline*
- National Association of Corrosion Engineers (NACE)
 - NACE RP0169 - *Control of External Corrosion on Underground or Submerged Metallic Piping Systems*
 - NACE SP0286 - *Electrical Isolation of Cathodically Protected Pipelines*

Other References

- A. W. Peabody - *Control of Pipeline Corrosion*

3. Definitions

anode: Electrode through which current flows into the electrochemical cell and through which negatively charged electrons flow to the external circuit. As such, the location at which oxidation or corrosion of the component occurs.

cathode: Electrode of an electrolytic cell at which reduction, the complementary process to oxidation, is the principal reaction. Also, the recipient of negatively charged electrons from the anode.

cathodic protection (CP): (1) Decrease of corrosion rate by shifting the corrosion potential of the electrode toward a less oxidizing potential by applying an external electromotive force; (2) Partial or complete protection of a metal from corrosion by making it a cathode, using either a galvanic anode or a DC impressed current.