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Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Piping Systems

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ABSTRACT

This standard test method provides descriptions of the measurement techniques and cautionary measures most commonly used on underground and submerged piping other than offshore piping to determine whether a specific criterion has been met at a test site. This standard contains instrumentation and general measurement guidelines. It includes methods for voltage drop considerations when structure-to-electrolyte potential measurements are made and provides guidance to minimize incorrect data from being collected and used. This standard is maintained by Task Group 020.

KEYWORDS

pipelines, test methods, underground piping, submerged piping

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Foreword

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. 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.

This NACE International standard test method provides descriptions of the measurement techniques and cautionary measures most commonly used on underground and submerged piping other than offshore piping to determine whether one or more selected criterion has been met at a representative test site(s) with consideration for special conditions. These methods are also applicable to many other underground or submerged metallic structures. Descriptions of measurement techniques and cautionary measures used on offshore pipelines and structures can be found in NACE SP0115/ISO 15589-2 for offshore pipelines and SP0176 for offshore structures.[1] This standard includes only those measurement techniques that relate to the criteria or special conditions, such as a net protective current and alternating current (AC) corrosion testing.[3] This standard is intended for use by corrosion control personnel concerned with the corrosion of underground or submerged piping systems that transport oil, gas, water, or other fluids.

The measurement techniques described require that the measurements be made in the field. Because the measurements are obtained under widely varying circumstances of field conditions and pipeline design, this standard is not as prescriptive as those NACE standard test methods that use laboratory measurements. Instead, this standard gives the user latitude to make the proper decisions in the field based on the technical facts available.

This standard contains instrumentation and general measurement guidelines. It includes methods for voltage drop considerations when structure-to-electrolyte potential measurements are made and provides guidance to minimize incorrect data from being collected and used.

The measurement techniques provided in this standard were compiled from information submitted by committee members and others with expertise on the subject. Variations or other techniques not included may be equally effective. The complexity and diversity of environmental conditions may require the use of other techniques.

Appendix A (mandatory) contains information on the common types, use, and maintenance of reference electrodes. Appendix B (nonmandatory) contains information for direct current (DC) Cell-to-Cell Surface Potential Gradient Surveys. Appendix C (nonmandatory) contains information regarding the use of coupons to evaluate cathodic protection (CP), Appendix D (nonmandatory) contains information regarding Dynamic Stray Current testing, Appendix E (nonmandatory) contains information regarding AC Corrosion testing and Appendix F (nonmandatory) contains information regarding Evaluation of Potentials Considering Adequacy of Current Interruption. As there is ongoing research into the nonmandatory procedures, the tester is advised to keep abreast of any revisions or improvements.

The test methods in this standard were originally prepared by NACE Task Group (TG) T-10A-3, "Test Methods and Measurement Techniques Related to Cathodic Protection Criteria," a component of Unit Committee T-10A, "Cathodic Protection," in 1994. It was reviewed /revised by TG 020, "Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Piping Systems," which is administered by Specific Technology Group (STG) 35, "Pipelines, Tanks, and Well Casings," and is sponsored by STG 05, "Cathodic/Anodic Protection." It was reaffirmed in 2002 by STG 35 and revised in 2012 and 2018 by TG 020. This standard is issued by NACE under the auspices of STG 35.

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Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Piping Systems

1. General 4
2. Definitions(1) and Acronyms 4
3. Safety Considerations 8
4. Instrumentation and Measurement Guidelines 9
5. Structure-to-Electrolyte Potential Measurements 10
6. Causes of Inaccurate Measurements 15
7. Voltage Drops Other Than Across the Structure Metal/Electrolyte Interface 17
8. Test Method 1—Structure-to-Electrolyte Potential of Metallic Piping with Cathodic Protection Applied 19
9. Test Method 2—Polarized Structure-to-Electrolyte Potential of Metallic Piping 22
10. Test Method 3—Cathodic Polarization of Metallic Piping 24

References 30

Bibliography 30

Appendix A: Reference Electrodes (Mandatory) 31

Appendix B: DC Cell-to-Cell Surface Potential Gradient Surveys (Nonmandatory) 33

Appendix C: Using Coupons to Determine Adequacy of Cathodic Protection (Nonmandatory) 37

Appendix D: Dynamic Stray Current (Nonmandatory) 39

Bibliography 42

Appendix E: AC Corrosion Testing (Nonmandatory) 42

Bibliography 43

Appendix F: Evaluation of Potentials Considering Adequacy of Current Interruption (Nonmandatory) 44

Figures

Figure 1(a): Instrument Connection (Polarity Option 1) Recommended 11

Figure 1(b): Instrument Connection (Polarity Option 2) 12

Figure 2(a) and (b): Structure-to-Electrolyte Potential Correction due to Pipe Current 18

Figure 3: Polarization Decay 25

Figure 4: Polarization Formation 25

Figure B1: Hot Spot Survey 35

Figure B2: Side-Drain Survey 36

Figure F1: Comparison of Potential versus Current Density from Research Studies 45

Tables

Table A1: Common Reference Electrodes and Their Potentials and Temperature Coefficients 32

Table F1: Payer Research 2002 44

Table F2: Husock Research 1980 44

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