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Standard
Test Method

Testing of Catalyzed Titanium Anodes for Use in Soils or Natural Waters

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Foreword

This NACE International standard has been prepared to provide users and manufacturers of impressed current cathodic protection (CP) anodes with a test method for evaluating the anode's ability to achieve an expected lifetime. It is applicable to catalyzed titanium anodes intended for use in underground or underwater environments.

This test method is intended to evaluate whether such anode complies with specified specifications of design life expectancy at rated current output. This is not a quality assurance (QA) test, but rather a test method that may be used to develop a QA test.

The appendixes of this test method are provided for guidance and as a supplement to the test method. They outline the logic for developing a QA test based on this test method.

This standard was originally prepared in 2008 by NACE Task Group (TG) 017, "Anodes, Catalyzed Titanium: Testing for Use in Soils and in Waters," and it was revised by TG 017 in 2012. TG 017 is administered by Specific Technology Group (STG) 05 on Cathodic/Anodic Protection. This standard is issued by NACE under the auspices of STG 05.

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 not considered mandatory. The term *may* is used to state something considered optional.

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Contents

Section 1: General

1.1 Test Method for Catalyzed Titanium

This test method is for anodes comprised of a titanium substrate to which a mixed metal oxide (MMO) catalytic coating has been applied. This test method accelerates the time-to-failure by operating the anode at higher current than the application's design requirements.

1.2 The user should not imply that this test method is mandatory for any application of these anode materials.

1.3 Alternatively, the user may elect to use the manufacturer's rating instead of developing the test methodology independently.

1.4 Limitations

1.4.1 Accelerated testing should provide conservative results by stressing the anode more severely than normal applications. See Appendix A (Nonmandatory) for further discussion.

1.4.2 All manufacturers' products may not perform identically. Comparing test samples to a correlation curve established for a different manufacturer's product may lead to erroneous results.

1.4.3 The result for a sample run in the accelerated life test may be used to validate its performance at the design current density only if the correlation curve has been established for that material. See Appendix B (Nonmandatory) for development of the correlation curve using this test method.

1.4.3 This test method is not an acceptance criterion. It may be used to develop a test criterion as shown in Appendix C (Nonmandatory).

1.4.4 This test method outlines the test conditions that must be maintained for effective comparisons.

1.4.5 Varying the test conditions may have a significant effect on the sample lifetime, leading to erroneous results.

1.4.6 The test method as described in this standard should not be interpreted as being the only correct test method that may be used.

Section 2: Definitions

Mixed Metal Oxide (MMO): A mixture of a platinum group metal (Pt, Ir, Ru) oxide and a valve metal (Ti, Ta, Nb, Zr) oxide. The most common mixture used for cathodic protection is iridium oxide and tantalum oxide. Exact compositions may vary.

Section 3: Test Apparatus

3.1 The test equipment is comprised of an anode (test sample), a cathode, a thermometer, a glass vessel, electrolyte agitation device (e.g., magnetic stirrer), rubber stopper for tall glass beaker, a funnel for deionized water addition during the test, vent tubing, and power supply. See Figure 1.