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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 24196-2009

**Corrosion of metals and alloys -- Electrochemical test methods
-- Guidelines for conducting potentiostatic and
potentiodynamic polarization measurements**

金属和合金的腐蚀 电化学试验方法 恒电位和动电位极化测量导则

(English Translation)

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Table of Contents

Foreword
Introduction
1 Scope
2 Normative reference documents
3 Principle

Foreword

This standard is equivalent to ISO 17475.:2005 "Corrosion electrochemical test methods for metals and alloys Constant potential and potential polarization Volume guide "(English version).

For ease of use, this standard has been modified as follows.

- the word "international standard" is changed to "this standard";
- replace the comma as a decimal point with a decimal point. " - the preamble and references to international standards were removed;
- normative reference documents according to the corresponding national standards have been changed;
- re-arrange the location of the picture.

Appendix A and Appendix B of this standard are informative.

This standard is proposed by China Iron and Steel Industry Association.

This standard by the National Steel Standardization Technical Committee.

The drafting of this standard unit. Baoshan Iron and Steel Co., Ltd., Metallurgical Industry Information Standards Institute.

Introduction

Corrosion of metals and alloys in aqueous solutions is usually caused by electrochemical mechanisms. So people can use a variety of electrochemical techniques to measure or Analysis of corrosion. This national standard defines the basic guidelines for potentiostatic, potentiodynamic polarization measurements to characterize the electrochemical properties of the anode and cathode reactions Learning dynamics.

GB/T 24196-2009/ISO 17475.:2005 Corrosion electrochemical test methods for metals and

alloys Guidance for the measurement of potential and potential polarization

1 Scope

This standard specifies the corrosion of metals and alloys, the implementation of constant potential and potential polarization measurement method.

This standard applies to characterization of the electrochemical kinetics of the anode and cathode reactions, local corrosion initiation and metal re-passivation.

2 Normative reference documents

The terms of the following documents are hereby incorporated by reference into this standard. Whichever is the date of the reference file, which is followed by all (Excluding corrigenda) or revisions do not apply to this standard, however, encourage the parties to reach an agreement under this standard Whether you can use the latest version of these files. For undated references, the latest edition applies to this standard.

GB/T 10123 Corrosion of metals and alloys Basic terms and definitions (GB/T 10123-2001, eqv ISO 8044.:1999) GB/T 15260 Test method for intergranular corrosion of nickel-based alloys (GB/T 15260-1994, eqv ISO 9400.:1990) GB/T 16545 Corrosion of metals and alloys Corrosion of corrosion products on test specimens (GB/T 16545-1996, ISO 8407.

1991, IDT)

GB/T 18590 Corrosion pitting assessment of metals and alloys (GB/T 18590-2001, ISO 11463.:1995, IDT) Corrosion - Resistant heat treatment of metals and alloys - Determination of intergranular corrosion resistance of aluminum alloys

3 Principle

3.1

The metal is immersed in the solution, and the anode reaction rate and the cathodic reaction rate are balanced at the open potential (from the corrosion potential, E_{cor}).

If the electrode potential deviates from the open-circuit potential value, the measured actual current represents the difference between the anode reaction current and the cathode reaction current. If electricity the bit shift is large enough that the electrostatic current is substantially equal to the anode or cathode reaction kinetic current, depending on whether the applied potential is greater than the open circuit the value of the value is corrected or more negative, as shown in Figure 1, Figure 1a) in the acidic solution where the metal is in an activated state, or Figure 1b) Liquid.

3.2

In some state where the metal is in contact with the environment, the metal may be in a passivated state (Figure 2). If there are some invasive anions (For example, pitting, crevice, or intergranular corrosion) with respect to the open-circuit potential, Will lead to an increase in the current (Figure 2), the current corresponding to the potential can be used as a measure of the local corrosion resistance of metal scale.

3.3

If the reverse potential (becomes more negative) is applied after local corrosion occurs, when the actual current returns to near the passivation current value, the corresponding potential is the passivation potential, which can be used to represent the resistance of the metal to local corrosion development; the greater the potential, the greater the resistance.

3.4

According to the application and purpose of the test at a selected special potential, the displacement of the potential can be stepped and has a potential step Long quantity and time size. This type of test is called the potentiostatic method.

3.5

If the potential is moved in a continuous manner under the control of the scanning (offset) speed, this test is called the potentiometer method.

3.6

The electrochemical kinetics that occur on the surface may depend on time, for example due to the formation of a thin film on the surface, or in the potential scan speed of the potentiostatic test, the time at which the potential is maintained at a particular potential value may be a critical time. For example, the potential Too fast to change may result in excessive evaluation of the breakdown rate of localized corrosion. Therefore, the interpretation of polarized data should be carefully considered, in particular is applied when the service conditions.

3.7

The measured electrode potential may be affected by the solution ohm drop. The solution with low conductivity should be modified.

GB/T 24196-2009/ISO 17475.:2005