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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 39534-2020

Corrosion of metals and alloys Determination of uniform corrosion rate of stainless steel and nickel-based alloys in liquid

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the redrafting method to modify and adopt ISO 18069.2015 "Stainless steel and nickel-based alloys in corrosive liquids of metals and alloys"

Method for measuring uniform corrosion rate".

Compared with ISO 18069.2015, this standard has many structural adjustments. Appendix A lists this standard and ISO 18069.2015.

The structural adjustment checklist

Compared with ISO 18069.2015, there are technical differences between this standard and the clauses related to these differences have been

The set vertical single line (|) is marked, and Appendix B gives a list of the corresponding technical differences and their reasons.

This standard was proposed by the China Iron and Steel Association.

This standard is under the jurisdiction of the National Steel Standardization Technical Committee (SAC/TC183).

Drafting organizations of this standard. Jiangyin Product Quality Supervision and Inspection Institute, Metallurgical Industry Information Standards Institute, National Standard (Beijing) Inspection and Certification

Co., Ltd., An Gong Corrosion Testing Laboratory Technology (Wuxi) Co., Ltd., Jiangsu Shenyuan Group Co., Ltd., China Petroleum Engineering Construction Co., Ltd.

Division Southwest Branch, National Nuclear Zirconium and Hafnium Physical and Chemical Testing Co., Ltd.

Introduction

Stainless steel and nickel-based alloys usually show good corrosion resistance, but they can be uniformly corroded in acid and alkaline solutions. As long as rot

Corrosion environment, such as solution composition, temperature and flow conditions remain constant, uniform corrosion in the solution is usually considered to be a fairly stable process.

Cheng. The uniform corrosion resistance of stainless steel and nickel-based alloys is usually carried out through short-term laboratory sample immersion tests under controlled conditions. Of course

However, in practical applications, some changes in service conditions may cause temporary activation of the surface of stainless steel or nickel-based alloys. Temperature change, air

Or the fluctuation of other oxides entering, contact with non-inert materials, such as low carbon steel or certain cleaning agents, are all factors that cause activation in a certain environment.

An important feature of this method is the ability of the material to passivate after activation, so it includes the activation process of the sample. Pass this test

The obtained corrosion rate can be used as the basis for material selection and to evaluate the life cycle of the material.

Corrosive liquids of metals and alloys, stainless steel and

Method for measuring uniform corrosion rate of nickel-based alloys

Warning. This standard may involve hazardous materials, operations and equipment. This standard does not point out all possible safety issues. Of this standard

It is the user's responsibility to formulate appropriate safety and health measures before use, and to ensure compliance with the conditions stipulated by relevant national laws and regulations.

1 Scope

This standard specifies the uniform corrosion rate of stainless steel and nickel-based alloys in specific liquids and the measurement method of the passivation ability of materials after activation.

This standard is suitable for estimating the uniform corrosion rate of materials in liquids under atmospheric conditions, and it is also suitable for chemistry under special environmental conditions.

Industry, but not as its qualification test. This standard can also be used to determine the iso-corrosion rate diagram and the temperature when the corrosion rate exceeds 0.1mm/a.

This standard does not apply to the determination of excessively high corrosion rates exceeding 1mm/a, because a higher corrosion rate indicates that the stainless steel is not suitable for this application.

This standard does not apply to solutions containing halide, especially chloride, because this type of may cause localized corrosion.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 6682 Analytical laboratory water specifications and test methods (GB/T 6682-2008, ISO 3696.1987, MOD)

GB/T 10123 Basic terms and definitions of corrosion of metals and alloys (GB/T 10123-2001, eqvISO 8044.1999)

GB/T 32550 Corrosion of metals and alloys. Determination of critical pitting temperature under constant potential control (GB/T 32550-2016, ISO 17864.2005, MOD)

3 Terms and definitions

The terms and definitions defined in GB/T 10123 apply to this document.

4 Principle

4.1 When the specific liquid reaches the required temperature, soak the material in it. Soak in the sequence of 3 cycles, namely 24h, 72h and 72h

Weigh before and after.

---Cycle 1.Soak in liquid for 24h. When exposed to acid, the inert layer will change its composition during this period. In addition, this cycle

Contaminants on the sample will be removed. Therefore, the first cycle is usually not counted when evaluating the corrosion rate.

---Cycle 2.Soak in liquid for 72h. This cycle determines the corrosion rate.

---Cycle 3.The activated sample is soaked in liquid for 72h. This period determines the corrosion rate of samples with activated surfaces, and the

Re-passivation ability in specific liquids.

4.2 Measure the mass of the sample before and after each test cycle, calculate the mass loss of each test cycle, and calculate the quality of the second and third cycles