NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB/T 36174-2018

Corrosion of metals and alloys -- Determination of resistance to intergranular corrosion of solution heat-treatable aluminium alloys

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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 translation method equivalent to ISO 11846.1995 "Corrosion-resistant solid solution heat treatment of metal and alloy aluminum alloy resistant to intergranular corrosion

Determination of erosiveness.

The documents of our country that have a consistent correspondence with the international documents referenced in this standard are as follows.

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

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

GB/T 16545-2015 Corrosion of metals and alloys Corrosion of corrosion products on

specimens (ISO 8407.2009, IDT)

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).

This standard was drafted. Institute of Metal Research, Chinese Academy of Sciences, Institute of Metallurgical Industry Information Standards.

1 Scope

1.1 This standard specifies the test method for the resistance to intergranular corrosion of solid solution heat treated aluminum alloy without protective layer. Solution heat treatment aluminum alloy pair

The sensitivity of intergranular corrosion is related to the chemical composition of the alloy, the production method, the solution heat treatment, the quenching treatment and the precipitation hardening (aging) process.

The function of change. Under natural aging conditions, the sensitivity of intergranular corrosion of solid solution heat treated aluminum alloy is mainly quenched in the critical temperature range.

A function of the cooling rate in the process.

1.2 This standard applies to cast and forged heat treated aluminum alloys for castings, forgings, slabs, sheets, profiles and semi-finished or finished parts. suitable

Used for grade evaluation of alloys of different grades and thicknesses based on different chemical compositions and other factors and quality of heat treatment of materials.

The test results give information on determining the material's resistance to intergranular corrosion and heat treatment.

1.3 The test results are not absolute as they do not apply to all service environments. These test results are more suitable for comparing different

The intergranular corrosion resistance of the solution heat treated aluminum alloy at the heat treatment temperature.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

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

ISO 3696 Analytical Laboratory Water Specification and Test Method (Waterforanalyticallaboratoryuse; Specification

Andtestmethods)

ISO 8044 Basic terms and definitions for corrosion of metals and alloys (Corrosionofmetalsandaloys-Basicterms

Anddefinitions)

ISO 8407 corrosion of corrosive corrosion products on metals and alloys (Corrosionofmetalsandaloys-Re-

Movalofcorrosionproductsfromcorrosiontestspecimens)

3 Terms and definitions

The terms and definitions defined in ISO 8044 apply to this document.

4.1 Sampling

The sample should be selected from the most typical areas of the material or the part being tested.

When controlling the solution heat treatment, the sample is taken from the semi-finished product where the quenching cooling rate is the smallest. When quenching small parts in the basket, the sample

Taken from the center of the basket. When quenching on a shelf, the sample is taken from the top or bottom of the shelf. If the pipe, sheet, thick

When semi-finished products such as plates are subjected to vertical quenching, the samples are selected from the bottom up. If there is no difference in the cooling method, the sample is randomly selected.

The sample should be taken from each solution treatment process.

The location of the sampling should be determined by both the supplier and the buyer.

4.2 Size, shape, quantity and surface requirements of the sample

The sample may be of any shape and size and should be consistent throughout each test. The surface area of the sample should be 20cm2~40cm2

between.

The flat specimen should be cut so that the longer side is parallel to the metal working direction.

The surface of the sample should be kept in the initial state of the material or finished part,

or it should be machined to a surface roughness Ra <= 2.5 μm.

Specimens with surface defects (metallurgical or mechanical defects) are not suitable for testing.

Samples with an aluminum-clad layer shall be tested after removing the surface-coated aluminum layer. The aluminum layer on the upper and lower sides is treated by mechanical or chemical etching.

Except, the etch is a full chemical etch performed in solution or see 5.2. In order to ensure that the aluminum layer is removed, the thickness should be greater than the thickness of the aluminum layer.

At least 0.1mm.

Note. The temperature of the sample should not exceed 60 °C during processing.

Each test should have at least 3 parallel specimens of the same structure, size and surface condition.

5 surface treatment

5.1 Before the test, the surface of the sample is degreased with an organic solvent (gasoline or acetone).

5.2 The sample is then processed according to any of the methods described below.

--- Soak the sample in a NaOH solution (mass fraction 5%~10%) from 50 °C to 60 °C for 2 min~5 min and then use it.

Rinse with water, soak in concentrated HNO3 solution (rho=1.4g/mL) for 2min, rinse with tap water, and finally rinse with distilled water.

Wash and dry.

--- Soak the sample at 50 °H +/- 3 ° C per liter containing 50 mL HNO3 (rho = 1.4 g/mL) and 5 mL HF (rho =

1.15g/mL) solution for 1min, then rinse with tap water, then concentrated HNO3 solution at room temperature (rho=

Immerse for 2 minutes in 1.4g/mL), rinse with tap water, and finally rinse with distilled water and blow dry.

6 test

6.1 Naturally aged alloys are tested after 24 h of quenching, while artificially aged alloys