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

GB/T 38430-2019

**Corrosion of metals and alloys - Test method for
isothermal-exposure oxidation testing under high-temperature
corrosion conditions for metallic materials**

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1 --- gas supply port;

2 ---Gas flow meter;

3 ---valve;

4 --- Humidity regulator;

5 ---hygrometer;

6 --- heating device containing non-equilibrium gas mixture catalyst;

7 --- heating area with heating belt;

8 --- heating device;

9 --- sample room;

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1 --- exfoliated oxide;

Foreword

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

This standard adopts a redrafting method to modify the use of ISO 21608.2012 "Corrosion of metals and alloys. Metal materials are corroded at high temperatures.

Test method for isothermal exposure oxidation under

Compared with ISO 21608.2012, this standard has more structural adjustments. Appendix A shows this standard and ISO 21608.2012.

Correspondence list of chapter number.

There are technical differences between this standard and ISO 21608.2012, and the clauses involved in these differences have been passed on the outer margin

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

This standard was proposed by China Iron and Steel Association.

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

This standard was drafted by. China Aviation Development Institute of Beijing Aeronautical Materials, Metallurgical Industry Information Standardization Institute.

1 Scope

This standard specifies the equipment, gas supply, samples, test process, and isothermal exposure oxidation test of metal materials under high temperature corrosion conditions.

Calculation of quality change, analysis of quality change, evaluation of sample after test, test report, etc.

This standard applies to the continuity of metal materials under high-temperature corrosion conditions with gas (the sample is not cooled during the test, only after the test

Measure the quality of the sample) and discontinuous (cool the sample during a few predetermined points during the test but not necessarily regular, and series

Weigh each sample) isothermal exposure test.

This standard does not apply to the thermal cycle oxidation test of metallic materials under high-temperature corrosion conditions with gas (to accelerate high-temperature corrosion, frequent and frequent

Cool the samples regularly and weigh each sample in series).

2 Normative references

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

Pieces. For the cited documents without date, the latest version (including all amendments) applies to this document.

GB/T 1598 platinum rhodium 10-platinum thermocouple wire, platinum rhodium 13-platinum thermocouple wire, platinum rhodium 30-platinum rhodium 6 thermocouple wire

GB/T 9258.3-2017 Abrasive particle size analysis for coated abrasives Part 3.Determination of particle size composition of fine powder P240~P2500

(ISO 6344-3.2013, MOD)

GB/T 13298 Metal microstructure inspection method

GB/T 16701 Measuring method of thermoelectromotive force of precious metal and cheap metal thermocouple wire

GB/T 18036 Thermoelectric force measurement method of platinum rhodium thermocouple filament

JJG141 precious metal thermocouple for work

ISO 26146 Corrosion of metals and alloys. Metallurgical test method for samples after exposure test in high temperature corrosive environment (Corrosion of

metals and alloys-Method for metallographic examination of samples after exposure to high-temperature corrosive environments)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Oxide scale

The surface oxide film and corrosion products generated on the surface of the sample due to high temperature corrosion.

3.2

Adhering scale adherent scale

The scale attached to the surface of the sample after cooling.

3.3

Peeled scale spalled scale

Scale peeled from the surface of the sample.

3.4

Gross mass change

The change of the sum of the mass of the sample and the collected scale after cooling and the initial mass of the sample before the test.

3.5

Net quality change netmasschange

The change of the sample mass after cooling (not including scale peeling) and the initial mass of the sample before the test.

3.6

High-temperature corrosion

Corrosion above the dew point temperature (at least 100°C) of the liquid phase in the environment.

3.7

Breakaway

The rapid increase in corrosion rate caused by the transition from the formation of protective scales to the formation of non-protective scales.

4.1 Equipment design

4.1.1 The equipment shall include a temperature adjustment device capable of heating the sample uniformly at a constant temperature. The heating device should be equipped with

Test unit (referred to as closed system) with air isolation. A humidity regulator should be used to ensure that the supplied gas can be kept at a specific humidity

Degree, and use a hygrometer to monitor. The gas supply is controlled by a gas flow meter. See the schematic diagram of the basic design of a closed device

figure 1.

Explanation.

9 --- sample room;

10---Sample;

11---sample holder;

12---thermocouple;

13---power/temperature control device;