



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

GB/T 40338-2021

**Corrosion of metals and alloys - Exfoliation corrosion testing of
aluminium alloys**

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules of Standardization Documents"

Drafting.

This document uses the redrafting method to modify and adopt ISO 11881.1999 "Corrosion of metals and alloys, aluminum alloy exfoliation corrosion test".

Compared with ISO 11881.1999, this document has structural adjustments.

a) In Chapter 1, adjust the "Warning" to the front of the text, merge 1.1 and 1.2, merge 1.4 and 1.5, and at the same time

Change to paragraph;

b) In Chapter 6, 6.8 was deleted, and the original 6.9 was adjusted to 6.8;

c) Add the number and title "10.1.1 Overview" to the suspended paragraph in Chapter 10, and adjust the original order of 10.1.1 and 10.1.2 to

10.1.2, 10.1.3;

d) Adjust the corrosion types and corrosion levels given in 10.1.2 "Procedure A" to Table 3;

e) Add the number and title "10.1.2.1 Corrosion Type and Grade" to the suspension section in 10.1.2, and adjust the order of 10.1.1.1 and 10.1.1.2

The whole number is 10.1.2.2, 10.1.2.3;

f) Add the number "10.1.2.3.1" to the 10.1.2.3 suspension section, and adjust the order of the original 10.1.1.2.1~10.1.1.2.3 to 10.1.2.3.2~

10.1.2.3.4;

g) Adjust the corrosion topography in Figure 2 to Figure 6 from side layout to horizontal layout;

h) Add "Note 2" to the detailed description of different pitting corrosion (level P) degrees in 10.1.2.2;

i) Adjust the peeling grade of 10.2 "Procedure B" from Table 3 to Table 4 of this document; adjust "Note 5" in Table 3 to the positive value before Table 4.

In the text, the original Note 6 and Note 7 are adjusted to Note 5 and Note 6;

j) Delete "d) Sampling procedure and parallel sample quantity information" in Chapter 12, and adjust the serial numbers e)~h) to d)~g) in turn;

k) Appendix A (informative) "Technical differences between this document and ISO 11881.1999 and their reasons" has been added. Adjust the original Appendix A

The whole is Appendix B.

Compared with ISO 11881.1999, this document has technical differences.

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

This document is incorporated into the technical amendment ISO 11881.1999/Cor.1.1999(E) issued by the ISO /TC156 Technical Committee.

The terms involved in these amendments have been marked by a vertical double line (||) on the outer margins.

1 Scope

This document specifies the test principle, effectiveness, interference, and test of the full-immersion accelerated spalling corrosion of aluminum alloys in the process of R&D and quality control.

Sample, test solution, test device, test procedure, result evaluation, factors affecting reproducibility and test report.

This document applies to rolling semi-finished deformed aluminum alloys, parts produced by conventional casting metallurgical processes and powder metallurgy processes, and mechanical bonding.

Test of aluminum-based composite materials produced by Jinhua.

This document is also applicable to aluminum ingots and cast aluminum alloys with oriented structures such as columnar grains or strip segregation. Use this document to obtain

The obtained test results are mainly suitable for studying the tendency of exfoliation corrosion in alloy research and development, and are not suitable for the absolute criterion of exfoliation corrosion resistance.

When the test is used for the production control of spalling corrosion-resistant materials, the relevant parties shall negotiate on the qualified performance indicators.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations

Only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to

This document.

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

GB/T 36174-2018 Corrosion of metals and alloys Determination of intergranular corrosion resistance of solution heat treatment aluminum alloys (ISO 11846.

1995, IDT)

ISO 8044 Corrosion of metals and alloys (Corrosion of metals and alloys-Vocabulary)

3 Terms and definitions

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

3.1

Exfoliation corrosion

Products rolled from a deformed alloy with a highly oriented grain structure are susceptible to sub-layer stress corrosion to form delamination, accompanied by the material body

The delamination is separated, cracks are formed, and finally lead to complete interlayer separation of the metal.

Note. The spalling usually develops along the grain boundary, but after tempering in some alloys, it may develop along the trans-crystalline path or along the grain/trans-crystalline mixed path.

4 Principle

4.1 The sample is fully immersed in an aqueous solution of the specified composition and temperature, suitable for short-period tests determined according to the alloy type and corrosion solution.

4.2 Use visual inspection to qualitatively assess the relative sensitivity to spalling corrosion, and at the same time refer to the standard map or spalling level to determine the

performance level.

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