भारतीय मानक

Indian Standard

IS 11268 : 2024
ISO 2143 : 2017

एल्यूमीनियम और उसके मिश्रधातुओं का एनोडाइजिंग — संयोजन के बाद एनोडिक ऑक्सीकरण लेपन की अवशोषी शक्ति की क्षति का आंकलन — पूर्व अम्ल उपचार के साथ डाई-स्पॉट परीक्षण

(पहला पुनरीक्षण)

Anodizing of Aluminium and Its Alloys — Estimation of Loss of Absorptive Power of Anodic Oxidation Coatings after Sealing — Dye-Spot Test with Prior Acid Treatment

(First Revision)

ICS 25.220.20

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Corrosion Protection and Finishes Sectional Committee, MTD 24

NATIONAL FOREWORD

This Indian Standard (First Revision) is identical to ISO 2143 : 2017 ‘Anodizing of aluminium and its alloys — Estimation of loss of absorptive power of anodic oxidation coatings after sealing — Dye-spot test with prior acid treatment’ issued by the International Organization for Standardization (ISO), was adopted by the Bureau of Indian Standards on the recommendation of Corrosion Protection and Finishes Sectional Committee and approval of the Metallurgical Engineering Division Council.

This standard was first published in 1985. This revision has been brought out to align with the International Standard ISO 2143 : 2017 under dual numbering system.

Former title of the Indian Standard IS 11268 was ‘Estimation of loss of absorptive power of anodic oxide coatings after sealing-dye spot test with prior acid treatment for anodized aluminium and its alloys’ which has been changed to ‘Anodizing of aluminium and its alloys — Estimation of loss of absorptive power of anodic oxidation coatings after sealing — Dye-spot test with prior acid treatment’ as per the title of ISO 2143.

The text of ISO standard has been approved as suitable for publication as in Indian Standard without deviations. Certain terminologies and conventions are, however, not identical with those used in Indian Standard. Attention is especially drawn to the following:

a) Wherever the words ‘International Standard’ appear referring to this standard, it should be read as ‘Indian Standard’; and

b) Comma (,) has been used as a decimal marker while in Indian Standards the current practice is to use a point (.) as the decimal marker.

The Committee responsible for the preparation of this standard has reviewed the provisions of following International Standards referred in these adopted standards and decided their acceptability for use in conjunction with this standard.

International Standard	*Title*
ISO 7583 : 2013	Anodizing of aluminium and its alloys — Terms and definitions

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall he rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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Introduction

The resistance of anodic oxidation coatings to the absorption of dyes gives information on the quality of sealing, the total resistance indicating whether the quality of sealing is good.

The correlation of the results obtained with those of other tests that can assess sealing quality, such as that of ISO 2931, can be affected by the presence of certain agents having been added to the sealing bath. For this reason, the quality is checked from time to time by one of the reference acid-dissolution methods specified in ISO 3210.

Indian Standard

ANODIZING OF ALUMINIUM AND ITS ALLOYS — ESTIMATION OF LOSS OF ABSORPTIVE POWER OF ANODIC OXIDATION COATINGS AFTER SEALING — DYE-SPOT TEST WITH PRIOR ACID TREATMENT

(First Revision)

1 Scope

This document specifies a method of estimating the loss of absorptive power of anodic oxidation coatings that have undergone a sealing treatment, by dye absorption after acid pretreatment.

The method is suitable for use as a production control method and can be applicable to anodic oxidation coatings which may be subjected to weathering or aggressive environments, or where resistance to staining is important.

The method is not applicable to those coatings that

a) are formed on alloys containing more than 2 % copper or 4 % silicon,

b) are sealed by the dichromate process,

c) have been given supplementary processing, e.g. oiling, waxing or lacquering,

d) are coloured in deep shades, and

e) are less than 3 µm thickness.

The method is less appropriate where nickel or cobalt salts, or organic additives, have been added to baths used for hydrothermal sealing.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7583, *Anodizing of aluminium and its alloys — Terms and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7583 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

A degreased area of an anodic oxidation coating is subjected to the action of an acid and the coloration obtained after the subsequent application of a dyestuff is observed.

5 Reagents

Use only reagents of recognized analytical grade and distilled water or deionized water. The acid solutions specified in 5.1.1 and 5.1.2 may be used equally for either dye-spot test, but the acid solution specified in 5.1.1 is preferred for safety reasons.

5.1 Acid solutions

WARNING — These acid solutions contain hydrofluoric acid and should be stored in appropriate containers and handled with great caution and appropriate preventative measures.

5.1.1 Acid solution A

Solution containing 25 ml of sulfuric acid (ρ_{20} = 1,84 g/ml) and 10 g of potassium fluoride per litre.

5.1.2 Acid solution B

Solution containing 25 ml of fluorosilicic acid (H_2SiF_6) (ρ_{20} = 1,29 g/ml) per litre.

5.2 Dye solutions

5.2.1 Dye solution A

Aqueous solution containing 5 g of Sanodye Blue 2LW[1)] formerly Sanodal Blue 2LW (Colour Index Mordant Blue 69) per litre, adjusted, at approximately 23 °C, to a pH of 5,0 ± 0,5 with dilute sulfuric acid solution or with dilute sodium hydroxide solution.

5.2.2 Dye solution B

Aqueous solution containing 10 g of Sanodal Red B3LW[2)] (Colour Index Acid Red 331) per litre, adjusted, at approximately 23 °C, to a pH of 5,7 ± 0,5 with dilute sulfuric acid solution or with dilute sodium hydroxide solution.

6 Test specimens

The test shall be carried out using a significant surface of production articles or test specimen taken from them.

Where it is impossible to test the production articles or test specimen taken from them, a substitute test specimen may be used. However, in this case, the substitute test specimen used shall be one which is representative of the product and it shall be made from the same material and prepared under the same conditions of finishing as those used for the preparation of the product.

The kind and temper of the aluminium alloy and the surface condition before treatment should be the same as those of the product.

Pretreatment and anodizing should be performed in the same bath and under the same conditions as the treatment of the product.

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1) Sanodye Blue 2LW is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

2) Sanodal Red B3LW is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

7 Procedure

WARNING — Where organic solvents are used, carry out, in particular, the degreasing operation in accordance with any applicable requirements for occupational health and safety aiming at protection against solvent vapour.

Clean the surface of the test area, removing any grease with a piece of cotton wool soaked in, for example, acetone or ethanol 96 %.

Apply one drop of acid solution A (5.1.1) or acid solution B (5.1.2), at approximately 23 °C, to the horizontal, clean, dry test area surface and allow it to remain for 1 min.

Remove the drop of acid solution and wash and dry the surface of the test area without applying heat.

Apply one drop of dye solution A (5.2.1) or dye solution B (5.2.2) to the spot treated previously in the test area with acid solution and allow it to remain for 1 min.

Wash off the drop of dye and clean the surface of the test area thoroughly by rubbing with a clean cloth soaked in water and light abrasive, such as magnesia whiting or an equivalent abrasive, for 20 s. Rinse thoroughly and dry.

The test may be carried out by an immersion method instead of the dropping method. In such circumstances, the test specimen is immersed in the acid, dye and washing solutions. An immersion method can be appropriate for products with curved surfaces where drops of solutions do not remain on the surfaces.

Examine the surface of the test area and assess the intensity of the stain by comparison with the examples illustrated in Annex A or assess the colour difference of the test specimen before and after the dying using a colorimeter.

8 Expression of results

Express the loss of absorptive power in accordance with the classification given in Annex A, or as a numerical value of the intensity of the stain in accordance with Annex A or the colour difference.

9 Test report

The test report shall include at least the following information:

a) a reference to this document, i.e. ISO 2143:2017;

b) the type and identification of the product tested;

c) the anodizing specification (where known);

d) the acid treatment used in the test (see 5.1.1 or 5.1.2);

e) the colour of the dye solution used in the test (see 5.2.1 or 5.2.2);

f) whether the dropping method or the immersion method was used;

g) the loss of absorptive power, or the intensity of the stain or the colour difference as a numerical value (see Clause 8);

NOTE Acceptance levels are normally specified in the relevant product specification.

h) any observations concerning the conduct of the test or the nature of the stained area (for example, uneven density of staining);

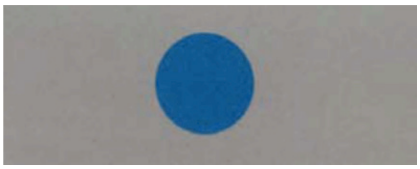
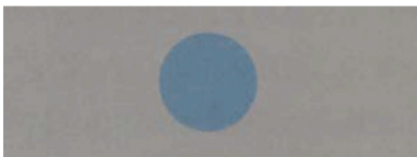
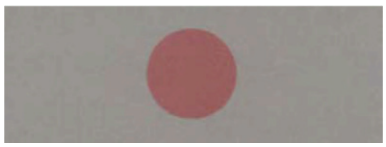
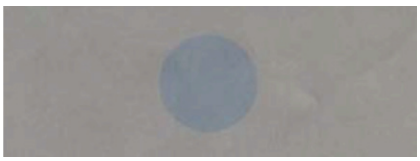
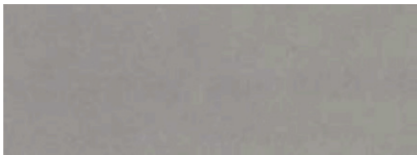
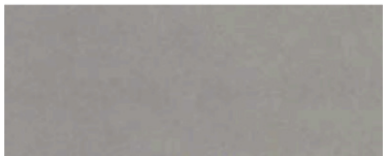
i) any deviation from the procedure;

j) the date of the test.

Annex A
(normative)

Interpretation of the results of the dye-spot test

Table A.1 — Interpretation of the results of the dye-spot test

SANODYE BLUE 2LW	SANODAL RED B3LW	Intensity of the stain	Loss of absorptive power
		5	none
		4	very weak
		3	weak
		2	medium
		1	strong
		0	total

Bibliography

[1] ISO 2931, *Anodizing of aluminium and its alloys — Assessment of quality of sealed anodic oxidation coatings by measurement of admittance*

[2] ISO 3210, *Anodizing of aluminium and its alloys — Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in acid solution(s)*

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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