
INTERNATIONAL STANDARD



3210

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Anodizing of aluminium and its alloys — Assessment of sealing quality by measurement of the loss of mass after immersion in phosphoric-chromic acid solution

Anodisation de l'aluminium et de ses alliages — Évaluation de la qualité du colmatage par mesurage de la perte de masse après immersion en solution phospho-chromique

First edition — 1974-10-01

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UDC 669.71 — 169.15 : 620.1

Ref. No. ISO 3210-1974 (E)

Descriptors : aluminium, aluminium alloys, surface finishing, anodic coatings, non-metallic coatings, tests, chemical tests, acid resistance tests, mass loss.

Price based on 1 page

FOREWORD

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Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3210 was drawn up by Technical Committee ISO/TC 79, *Light metals and their alloys*, and circulated to the Member Bodies in July 1973.

It has been approved by the Member Bodies of the following countries :

- | | | |
|---------------------|---------|-----------------------|
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The Member Body of the following country expressed disapproval of the document on technical grounds :

- New Zealand

Anodizing of aluminium and its alloys – Assessment of sealing quality by measurement of the loss of mass after immersion in phosphoric-chromic acid solution

1 SCOPE

This International Standard specifies a method for assessing the sealing quality of anodic coatings on aluminium and its alloys by measurement of the loss of mass after immersion in phosphoric-chromic acid solution.

2 FIELD OF APPLICATION

This method is applicable to anodic coatings intended for exposure to the weather, or for protective purposes in corrosive media, and where resistance to staining is important.

The method is not applicable to :

- hard-type anodic coatings which normally are not sealed;
- anodic coatings that have been sealed only in dichromate solutions;
- anodic coatings that have undergone a treatment to render them hydrophobic.

3 PRINCIPLE

The test is based upon the observation that an unsealed coating of aluminium oxide is rapidly dissolved in acid media, whereas a well-sealed coating of aluminium oxide withstands long immersion without appreciable attack.

The method is destructive and may serve as a referee method in case of doubt or dispute regarding the results of the tests of loss of absorptive power (see ISO/R 2143, *Surface treatment of metals – Anodization of aluminium and its alloys – Estimation of the loss of absorptive power by colorant drop test with prior acid treatment*).

4 APPARATUS

- 4.1 Laboratory balance with an accuracy of 1 mg.
- 4.2 Glass vessels.
- 4.3 Means of heating.

5 PROCEDURE

Carry out the test in the following solution :

- phosphoric acid (ρ_{20} 1,7 g/ml) : 35 ml
- crystallized chromium (III) oxide : 20 g
- distilled or deionized water : to make up to 1 l

The test solution may be re-used but shall be discarded after 1 g of anodic coating has been dissolved per litre of solution. Contamination of the solution by metals other than aluminium must be avoided.

Take a non-contaminated test piece of mass not more than 200 g having about 1 dm² of anodized surface to be tested.

Measure the total surface area of the test piece, excluding cut edges or other uncoated surfaces. (The solution does not attack bare metal, hence it is unnecessary to take bare surfaces into account.)

Remove any surface bloom from the test piece by rubbing with a dry cloth. (If the test piece is heavily finger-marked or in any way greasy, wipe it over with a suitable organic solvent.)

Weigh the test piece to the nearest 1 mg.

Immerse the test piece for 15 min in the above-mentioned solution maintained, in a glass vessel, at a temperature of 38 ± 1 °C. Stir the solution throughout the test.

Wash the test piece with distilled or deionized water, dry and reweigh.

6 EXPRESSION OF RESULTS

The loss in mass per unit of surface area, p , expressed in milligrams per square decimetre, is given by the formula :

$$p = \frac{P}{S}$$

where

P is the total loss of mass, in milligrams;

S is the surface area in contact with the solution, excluding the edges, in square decimetres.

The maximum permissible loss in mass for the coating under test shall be subject to agreement between the interested parties.