



## **Anodizing of aluminium and its alloys — Estimation of loss of absorptive power of anodic oxide coatings after sealing — Dye spot test with prior acid treatment**

*Anodisation de l'aluminium et de ses alliages — Appréciation de la perte du pouvoir absorbant des couches d'oxydes anodiques après colmatage — Essai à la goutte de colorant avec action acide préalable*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

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 2143 was developed by Technical Committee ISO/TC 79, *Light metals and their alloys*, and was circulated to the member bodies in June 1979.

It has been approved by the member bodies of the following countries :

|                     |             |                       |
|---------------------|-------------|-----------------------|
| Australia           | Hungary     | South Africa, Rep. of |
| Bulgaria            | India       | Spain                 |
| Canada              | Japan       | Sweden                |
| Czechoslovakia      | Norway      | Switzerland           |
| Egypt, Arab Rep. of | Philippines | United Kingdom        |
| France              | Poland      | USSR                  |
| Germany, F. R.      | Romania     |                       |

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Netherlands  
USA

This International Standard cancels and replaces ISO Recommendation R 2143-1971, of which it constitutes a technical revision.

# Anodizing of aluminium and its alloys — Estimation of loss of absorptive power of anodic oxide coatings after sealing — Dye spot test with prior acid treatment

## 0 Introduction

The resistance of anodic oxide coatings to absorption of dyes may give information on the quality of sealing, total resistance indicating that the quality of sealing is good. Slight loss of resistance to absorption, however, does not necessarily mean that the sealing of the coating is poor; it may be a consequence of certain agents having been added to the sealing bath. In cases of doubt, the quality of sealing can be established using a referee method such as that described in ISO 2932 or ISO 3210.

## 1 Scope

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

## 2 Field of application

The method is applicable to anodic oxide coatings to be subjected to weathering or to aggressive environments and, in all cases, where resistance to staining is important.

The method is not applicable to coatings

- a) formed on alloys containing more than 2 % copper or 4 % silicon;
- b) sealed by the dichromate process;
- c) that have been given any supplementary processing, for example oiling, waxing or lacquering;
- d) that are coloured in deep shades;
- e) that are less than 3  $\mu\text{m}$  thick.

The method is less significant if nickel or cobalt salts, or organic additives, have been added to the sealing bath.

## 3 Principle

Action of an acid on a degreased area of the sample. Observation of the coloration obtained after the application of a dyestuff.

## 4 Reagents

Use only reagents of recognized analytical grade and distilled water or water of equivalent purity. The acid solutions specified in 4.1.1 and 4.1.2 may be equally used for either dye spot test, but that specified in 4.1.2 is preferred for safety reasons.

### 4.1 Acid solutions

Store these solutions in containers made of material resistant to fluorosilicic acid and handle with care.

#### 4.1.1 Acid solution A

Prepare a solution containing 25 ml of sulphuric acid ( $\rho_{20} = 1,84 \text{ g/ml}$ ) and 10 g of potassium fluoride per litre.

#### 4.1.2 Acid solution B

Prepare a solution containing 25 ml of fluorosilicic acid ( $\text{H}_2\text{SiF}_6$ ) ( $\rho_{20} = 1,29 \text{ g/ml}$ ) per litre.

### 4.2 Dye solutions

#### 4.2.1 Dye solution A

Prepare an aqueous solution containing 5 g of Aluminium Blue 2LW (Colour Index Mordant Blue 69) per litre, adjusted, at approximately 23 °C, to a pH of  $5,0 \pm 0,5$  with dilute sulphuric acid solution or with dilute sodium hydroxide solution.

#### 4.2.2 Dye solution B

Prepare an aqueous solution containing 10 g of Sanodal Red B3LW (Colour Index Acid Red 331) per litre, adjusted, at approximately 23 °C, to a pH of  $5,7 \pm 0,5$  with dilute sulphuric acid solution or dilute sodium hydroxide solution.

## 5 Test specimens

The test shall normally be carried out using production articles. The use of specially prepared test specimens, processed at the same time and in the same manner as production articles, can lead to erroneous results.

## 6 Procedure

Clean the surface to be tested and remove any grease with a piece of cotton wool soaked in acetone.

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

Remove the drop of acid and wash and dry the test surface.

Apply one drop of dye solution A or dye solution B (4.1.1 or 4.1.2) to the spot treated with the acid solution and allow it to remain for 1 min.

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

Examine the test area and assess the intensity of the stain by comparison with the examples illustrated in the annex.

## 7 Expression of results

Express the loss of absorptive power in accordance with the

classification in the annex. Alternatively, report the intensity of the stain, as a numerical value, in accordance with the annex.

## 8 Test report

The test report shall include the following information :

- a) a reference to this International Standard;
- b) the type of test specimen used;
- c) the anodizing specification (where possible);
- d) the acid treatment used in the test;
- e) the colour of the dye solution used in the test;
- f) the loss of absorptive power, or the intensity of the stain as a numerical value, in accordance with the annex;

NOTE — Acceptance levels will normally be specified in the relevant product specification.

- g) any other observations concerning the conduct of the test or of the nature of the stained area (for example uneven density of staining).