International Standard 2135

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Anodizing of aluminium and its alloys — Accelerated test of light fastness of coloured anodic oxide coatings using artificial light

Anodisation de l'aluminium et de ses alliages — Essai accéléré de solidité à la lumière artificielle des couches anodiques colorées

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (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 authorized 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 2135 was developed by Technical Committee ISO/TC 79, *Light metals and their alloys*, and was circulated to the member bodies in September 1982.

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

Australia	India	South Africa, Rep. of
Austria	Iraq	Spain
Canada	Italy	Switzerland
China	Japan	Sweden
Czechoslovakia	Mexico	United Kingdom
Egypt, Arab Rep. of	Netherlands	USA
France	Norway	USSR
Germany, F.R.	Poland	
Hungary	Saudi Arabia	

No member body expressed disapproval of the document.

This second edition cancels and replaces the first edition (ISO 2135-1976).

Anodizing of aluminium and its alloys — Accelerated test of light fastness of coloured anodic oxide coatings using artificial light

1 Scope

This International Standard specifies an accelerated test method for assessing the fastness, using artificial light, of coloured anodic oxide coatings on aluminium and its alloys.

For evaluating light fastness on exterior exposure, only outdoor exposure under conditions comparable to actual service is completely satisfactory.

Accelerated testing is suitable as a quality control test of coloured anodic oxide coatings whose light fastness number has already been established by means of outdoor exposure testing.

2 Field of application

The method is applicable to coloured anodic oxide coatings on aluminium and its alloys produced by any means and for any purpose.

However, the method is not suitable for the measurement of coloured coatings with a light fastness number already established by means of outdoor exposure testing, and of less than 6.

3 References

ISO 105, *Textiles — Tests for colour fastness.*

Section A02, *Grey scale for assessing change in colour.*

Section B01, *Colour fastness to light: Daylight.*

Section B02, *Colour fastness to artificial light: Xenon arc fading lamp test.*

4 Principle

Exposure of anodized samples to artificial light and regular observations of any colour change by comparison with the grey scale (see ISO 105-A02).

The apparatus and light source are first calibrated by exposing parts of coloured cloth samples having a light fastness number of 6 on the European blue scale (see notes 1 and 2 to clause 8 and ISO 105-B01). The time of exposure is determined for these samples to show a colour change corresponding to grade 3 of the grey scale (i.e. about 25 % loss of colour). This length of time is defined as the **exposure cycle** for the apparatus (see note 3 to clause 8).

Coloured anodized specimens of unknown light fastness are then exposed under the same conditions as the standard cloth samples until they also show a colour change corresponding to grade 3 of the grey scale. The number of exposure cycles required to produce this colour deterioration is used to assign the light fastness numbers of the specimens tested (see clause 8).

5 Apparatus

For tests in artificial light, several types of apparatus fulfil the conditions stipulated in this International Standard (see also 7.1).[1)]

Suitable light sources are provided by a xenon arc lamp, or by a carbon arc lamp (either open frame or enclosed).

6 Preparation of specimen

Partly cover the exposed surface of the test specimen by means of an opaque mask.

1) Information on suppliers of apparatus can be obtained on request from ISO Central Secretariat.

7 Procedure

7.1 Exposure conditions

Expose the specimens in such a way that they are equidistant from the light source, around which they revolve slowly in order to ensure an identical distribution of light on each sample.

Throughout the test, ensure that the temperature of a black panel does not exceed 50 °C.

Ensure that any instructions given by the manufacturer of the apparatus are complied with.

7.2 Period of exposure

After calibrating the apparatus (see clause 4), test the specimens for several exposure cycles until they show a colour change corresponding to grade 3 of the grey scale (about 25 % loss of colour). Record the number of exposure cycles required to produce this colour change.

The exposure cycle time for any given apparatus remains constant if

— the emission of light is constant (i.e. constant intensity of radiation);

— the temperature is constant;

— the distance between the light source and the specimens is constant;

— the ambient conditions (humidity, etc.) are constant.

In general these conditions will not hold over a long period of time and it is necessary to redetermine the exposure cycle period from time to time.

8 Expression of results

The light fastness number is a function of the number of exposure cycles required to produce the appropriate colour change corresponding to grade 3 of the grey scale, and is indicated in the table.

Table — Light fastness number as a function of number of exposure cycles

Number of exposure cycles to fade anodized specimen to grade 3 of grey scale	Light fastness number
1	6
2	7
4	8
8	9
16	10

If the specimen has not faded after 16 cycles the light fastness number shall be expressed as "greater than 10".

NOTES

1 The standard 7 cloth samples of the European blue scale are not suitable for use in this test because their rate of fading is not proportional to the time of exposure.

2 In order to avoid differences in the performance of the standard 6 cloth samples from different manufacturers, the standards used should always come from the same manufacturer if possible.

3 Typical exposure cycle times of the standard number 6 cloth sample with apparatus designed for this test are about 300 h with a xenon arc lamp (see ISO 105-B02) and about 150 h with a carbon arc lamp.

9 Test report

The test report shall contain at least the following information:

a) the type and identification of the product tested;

b) a reference to this International Standard;

c) the type of apparatus used (xenon arc lamp or carbon arc lamp);

d) the result of the test (see clause 8);

e) any deviation, by agreement or ortherwise, from the procedure specified;

f) the date(s) of the test.