

Method for specifying

Anodic oxidation coatings on aluminium and its alloys

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- Aluminium Federation
- Aluminium Window Association
- Association of Builders' Hardware Manufacturers
- British Anodising Association
- British Lock Manufacturers' Association
- British Metal Finishing Suppliers' Association
- Institute of Metal Finishing
- Institution of Chemical Engineers
- Institution of Corrosion Science and Technology
- Metal Finishing Association
- Metal Window Federation Limited
- Royal Institution of Chartered Surveyors

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Foreword

This British Standard has been prepared under the direction of the Surface Coatings (other than Paints) Standards Committee. It gives a method for specifying requirements for anodic oxidation coatings on aluminium and its alloys. It supersedes the previous edition, BS 1615:1972, which is withdrawn.

As this standard is based on requirements to be agreed between the interested parties this revision has, in accordance with current BSI practice, been published as a method for specifying and not as a specification.

For this reason, it is no longer appropriate for any claim to be made that a coating complies with BS 1615.

Additionally, this revision differs from the previous publication in the following respects:

- a) The clauses relating to coating requirements have been brought up to date, where appropriate.
- b) Recommendations have been included for sampling, based on the procedures given in BS 6001.
- c) Appendices describing test methods are not included. Instead, reference is made to the appropriate test methods in BS 5411, BS 5466 and BS 6161, which deal with tests on metallic and related coatings, corrosion testing of metallic coatings, and tests on anodic oxidation coatings on aluminium and its alloys, respectively. Each of these series of test methods contains international test methods which have been prepared by the International Organization for Standardization (ISO) with the active participation of the UK and which have been implemented without alteration. Those in BS 5411 and BS 5466 have been prepared by subcommittees 2 “Methods of inspection and coordination of test methods” and 7 “Corrosion tests”, respectively, of Technical Committee 107, Metallic and other non-organic coatings. Those in BS 6161 have been prepared by subcommittee 2, Anodized aluminium of Technical Committee 79, Light metals and their alloys.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard describes a method for specifying requirements for anodic oxidation coatings on aluminium and its alloys. It is intended for use by a purchaser who wishes his product to be anodized and it provides a check list of properties which might or might not be relevant. Further guidance in respect of these properties is given in appendices A to K.

This standard is not applicable to:

- a) non-porous anodic oxidation coatings of the barrier-layer type;
- b) coatings produced by chromic acid anodizing;
- c) hard anodic oxidation coatings that are used mainly for engineering purposes, and that have abrasion and wear resistance as their primary characteristics (specified in BS 5599);
- d) anodic oxidation coatings intended merely to prepare a substrate for subsequent application of organic coatings or the electrodeposition of metals.

NOTE 1 The coatings covered by this standard consist mainly of aluminium oxide and are produced by an electrolytic oxidation process during which the aluminium acts as the anode.

NOTE 2 The quality or composition of the aluminium is not specified but that used is assumed to be suitable for anodizing. (See 3.1 c) and appendix A).

NOTE 3 The titles of the publications referred to in this standard are listed on page 12.

2 Definitions

For the purposes of this British Standard the following definitions apply.

2.1

aluminium

aluminium and aluminium-based alloys

2.2

anodized aluminium

aluminium with an anodic oxidation coating, produced by an electrolytic oxidation process in which the surface of aluminium is converted to a coating, generally an oxide, having protective, decorative or functional properties

2.3

clear anodized aluminium

aluminium with a substantially colourless, translucent anodic oxidation coating

NOTE Clear anodized aluminium is also referred to as natural anodized aluminium.

2.4

colour anodized aluminium

anodized aluminium coloured either during anodizing or by subsequent processing

2.5

integral colour anodized aluminium

aluminium that has been anodized using an appropriate (usually organic acid-based) electrolyte which produces a coloured coating during the anodizing process itself

2.6

electrolytically coloured anodized aluminium

aluminium with an anodic oxidation coating that has been coloured by the electrolytic deposition of a metal or metal oxide in the pore structure

2.7

dyed anodized aluminium

aluminium with an anodic oxidation coating coloured by absorption of dyestuffs or pigments into the pore structure

2.8

bright anodized aluminium

anodized aluminium with high specular reflectance as a primary characteristic

2.9

significant surface

the part of the article covered or to be covered by the coating, and for which the coating is essential for serviceability and/or appearance [See BS 5411-1]

2.10

average coating thickness

the mean value of a specified number of local thickness measurements that are evenly distributed over the significant surface of a single anodized piece, or the value obtained using the gravimetric method of thickness determination [See BS 5411-1.]

2.11

minimum local coating thickness

the lowest value of the local thicknesses found on the significant surface of a single anodized piece [See BS 5411-1.]

2.12

sealing

a hydrothermal treatment carried out after anodizing to reduce porosity and absorptivity of the anodic oxidation coating

2.13

impregnation

a treatment carried out after anodizing in order to plug the pores of the anodic oxidation coating, but not involving hydrothermal sealing

3 Information to be supplied by the purchaser to the anodizer

NOTE A summary of the clause references appertaining to this information is given in Table 1.

3.1 Essential information

The information listed in a) to i) shall be supplied by the purchaser to the anodizer, if necessary in consultation with the aluminium supplier and/or anodizer.

- a) The number of this British Standard, i.e. BS 1615.
- b) The intended service use of the article to be anodized.
- c) The composition or specification of the aluminium to be anodized.

NOTE Guidance on the choice of aluminium is given in appendix A.

- d) An indication of the significant surface(s) of the article to be anodized.

NOTE 1 Significant surfaces are indicated preferably by drawings or by suitably marked samples.

NOTE 2 In some cases, there may be different requirements for the finish on different parts of the significant surface(s).

- e) The surface texture to be produced on the aluminium before anodizing.

NOTE 1 The surface texture is indicated preferably by agreed samples.

NOTE 2 Guidance on surface texture is given in appendix B.

- f) The viewing distance for visual inspection after anodizing (see clause 4).

- g) The anodic oxidation coating thickness grade required (see clause 6).

- h) Whether the coating is to be left unsealed or is to be impregnated and, in the case of impregnated coatings, the materials, methods of tests and acceptance criteria to be used for impregnation (see clause 7).

NOTE Sealing tests are not usually applicable in the case of impregnated coatings.

- i) Details of any formal sampling plans required (see clause 5).

3.2 Additional information

The additional information listed in a) to m), as applicable, shall be supplied by the purchaser, if necessary in consultation with the anodizer.

- a) The type of anodizing and the colouring process to be used.

- b) The preferred position and maximum size of contact marks.

- c) Any limits of variation of final surface finish on the significant surface(s).

NOTE Acceptable limits of variation of final surface finish are defined preferably by agreed samples (see clause 4).

- d) The colour of the anodized work and any limits of maximum colour variation.

NOTE Acceptable limits of maximum colour variation are defined preferably by agreed samples (see clause 4).

- e) Any limits for corrosion resistance and the method of test to be used as appropriate to the thickness grade (see clause 8).

- f) Any limits for light fastness and/or ultraviolet light fastness of coloured anodic oxidation coatings (see 9.1 and 9.2).

- g) Whether a test for fastness to heat of coloured anodic oxidation coatings is to be carried out (see 9.3).

- h) Any limits for abrasion resistance, the property to be tested and the measurements required, i.e. wear index, mass wear rate, comparative mass wear rate, and the method of test to be used (see clause 10).

- i) Any limits for total reflectance and/or specular reflectance (see 11.1 and 11.2).

- j) Any limits for image clarity (see 11.3).

- k) Any limits for infra-red reflectance (see clause 12).

- l) Any limits for electrical breakdown potential and the means to be used for expression of results in the test report (see clause 13).

- m) An indication of any critical dimensional tolerances and/or acceptable limits of dimensional change.