SLOVENSKI STANDARD
SIST EN 12373-1:2002

01-februar-2002

Aluminij in aluminijeve zlitine - Anodizacija - 1. del: Metoda za opis dekorativne in zaġļ itne anodizirane plasti na aluminiju

Aluminium and aluminium alloys - Anodizing - Part 1: Method for specifying decorative and protective anodic oxidation coatings on aluminium

Aluminium und Aluminiumlegierungen - Anodisieren - Teil 1: Methode zur Spezifizierung dekorativer und schützender anodisch erzeugter Oxidschichten auf Aluminium

Aluminium et alliages d'aluminium - Anodisation - Partie 1: Méthode de spécification des caractéristiques des revetements décoratifs et protecteurs obtenus par oxydation anodique sur aluminium

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77.120.10	Aluminij in aluminijeve zlitine	Aluminium and aluminium alloys

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Aluminium and aluminium alloys - Anodizing - Part 1: Method for specifying decorative and protective anodic oxidation coatings on aluminium

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This European Standard was approved by CEN on 20 April 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 132 “Aluminium and aluminium alloys”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2001, and conflicting national standards shall be withdrawn at the latest by November 2001.

In this standard, annex C is normative and annexes A, B, D and E are informative.

EN 12373, Aluminium and aluminium alloys – Anodizing, comprises the following parts:

Part 1: Method for specifying decorative and protective anodic oxidation coatings on aluminium
Part 2: Determination of mass per unit area (surface density) of anodic oxidation coatings – Gravimetric method
Part 3: Determination of thickness of anodic oxidation coatings – Non-destructive measurement by split beam microscope
Part 4: Estimation of loss of absorptive power of anodic oxidation coatings after sealing by dye spot test with prior acid treatment
Part 5: Assessment of quality of sealed anodic oxidation coatings by measurement of admittance
Part 6: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution without prior acid treatment
Part 7: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution with prior acid treatment
Part 8: Determination of the comparative fastness to ultra-violet light and heat of coloured anodic oxidation coatings
Part 9: Measurement of wear resistance and wear index of anodic oxidation coatings using an abrasive wheel wear test apparatus
Part 10: Measurement of mean specific abrasion resistance of anodic oxidation coatings using an abrasive jet test apparatus
Part 11: Measurement of specular reflectance and specular gloss of anodic oxidation coatings at angles of 20°, 45°, 60° or 85°
Part 12: Measurement of reflectance characteristics of aluminium surfaces using integrating-sphere instruments
Part 13: Measurement of reflectivity characteristics of aluminium surfaces using a goniophotometer or an abridged goniophotometer
Part 14: Visual determination of image clarity of anodic oxidation coatings – Chart scale method
Part 15: Assessment of resistance of anodic oxidation coatings to cracking by deformation

Part 16: Check for continuity of thin anodic oxidation coatings – Copper sulfate test
Part 17: Determination of electric breakdown potential
Part 18: Rating system for the evaluation of pitting corrosion – Chart method
Part 19: Rating system for the evaluation of pitting corrosion – Grid method

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This part of this European Standard describes a method for specifying decorative and protective anodic oxidation coatings on aluminium.

It is applicable to the specification of coatings, mainly of aluminium oxide, which are formed on aluminium by an electrolytic oxidation process in which the aluminium acts as the anode.

It is not applicable to the specification of:

a) non-porous oxide coatings of the barrier layer type;

b) coatings produced by chromic acid or phosphoric acid anodizing;

c) oxide coatings intended merely to prepare the substrate for subsequent application of organic coatings or electrodeposition of metals;

d) “hard anodized” coatings, used mainly for engineering purposes, for which abrasion and wear resistance are the primary characteristics (see ISO 10074).

WARNING This standard is intended for use by purchasers requiring a product to be anodized and provides a checklist of properties which might or might not be relevant. It contains requirements to be agreed between the interested parties and is presented as a method for specifying and not as a specification; it is therefore not appropriate to claim that an anodic oxidation coating conforms to this standard.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to, or revisions of, any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

EN 12373-2	Aluminium and aluminium alloys — Anodizing — Part 2: Determination of mass per unit area (surface density) of anodic oxidation coatings — Gravimetric method
EN 12373-3	Aluminium and aluminium alloys — Anodizing — Part 3: Determination of thickness of anodic oxidation coatings — Non-destructive measurement by split beam microscope
EN 12373-4	Aluminium and aluminium alloys — Anodizing – Part 4: Estimation of loss of absorptive power of anodic oxidation coatings after sealing by dye spot test with prior acid treatment
EN 12373-5	Aluminium and aluminium alloys — Anodizing – Part 5: Assessment of quality of sealed anodic oxidation coatings by measurement of admittance

EN 12373-6	Aluminium and aluminium alloys — Anodizing – Part 6: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution without prior acid treatment
EN 12373-7	Aluminium and aluminium alloys — Anodizing — Part 7: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss in mass after immersion in phosphoric acid/chromic acid solution with prior acid treatment
EN 12373-8	Aluminium and aluminium alloys – Anodizing – Part 8: Determination of the comparative fastness to ultra-violet light and heat of coloured anodic oxidation coatings
EN 12373-9	Aluminium and aluminium alloys — Anodizing — Part 9: Measurement of wear resistance and wear index of anodic oxidation coatings using an abrasive wheel wear test apparatus
EN 12373-10	Aluminium and aluminium alloys — Anodizing — Part 10: Measurement of mean specific abrasion resistance of anodic oxidation coatings using an abrasive jet test apparatus
EN 12373-11	Aluminium and aluminium alloys – Anodizing – Measurement of specular reflectance and specular gloss of anodic oxidation coatings at angles of 20°, 45°, 60° or 85°
EN 12373-12	Aluminium and aluminium alloys – Anodizing – Measurement of reflectance characteristics of aluminium surfaces using integrating-sphere instruments
EN 12373-13	Aluminium and aluminium alloys – Anodizing – Measurement of reflectivity characteristics of aluminium surfaces using a goniophotometer or an abridged goniophotometer
EN 12373-14	Aluminium and aluminium alloys – Anodizing – Visual determination of image clarity of anodic oxidation coatings – Chart scale method
EN 12373-15	Aluminium and aluminium alloys — Anodizing — Part 15: Assessment of resistance of anodic oxidation coatings to cracking by deformation
EN 12373-16:2001	Aluminium and aluminium alloys — Anodizing — Part 16: Check for continuity of thin anodic oxidation coatings — Copper sulfate test
EN 12373-17:2001	Aluminium and aluminium alloys — Anodizing — Part 17: Determination of electric breakdown potential
EN ISO 1463	Metallic and oxide coatings — Measurement of coating thickness — Microscopical method (ISO 1463:1982)
EN ISO 2360	Non-conductive coatings on non-magnetic basis metals — Measurement of coating thickness — Eddy current method (ISO 2360:1982)

NOTE Informative references to documents used in the preparation of this standard, and cited at the appropriate places in the text, are listed in the bibliography.

3 Terms and definitions

For the purposes of this European Standard the following terms and definitions apply.

NOTE Definitions identified by an asterisk are taken from EN ISO 2064.

3.1
aluminium
aluminium and aluminium-based alloys

3.2
anodized aluminium
aluminium with an anodic coating, produced by an electrolytic oxidation process in which the surface of the aluminium is converted to a mainly oxide coating having protective, decorative or functional properties

3.3
clear anodized aluminium
anodized aluminium with a substantially colourless, translucent anodic oxidation coating

3.4
colour anodized aluminium
anodized aluminium coloured either during anodizing or by subsequent colouring processes

3.5
integral colour anodized aluminium
anodized aluminium that has been anodized using an appropriate (usually organic acid based) electrolyte which produces a coloured coating during the anodizing process itself

3.6
electrolytically coloured anodized aluminium
anodized aluminium with an anodic oxidation coating that has been coloured by the electrolytic deposition of a metal or metal oxide into the pore structure

3.7
dyed anodized aluminium
anodized aluminium with an anodic oxidation coating coloured by absorption of dye-stuff or pigments into the pore structure

3.8
combination colour anodized aluminium
anodized aluminium with an anodic oxidation coating that has been coloured by electrolytic colouring, or produced by integral colour anodizing, followed by absorption dyeing

3.9
interference colour anodized aluminium
anodized aluminium with an anodic oxidation coating coloured by means of optical interference effects

3.10
bright anodized aluminium
anodized aluminium with a high specular reflectance as the primary characteristic

3.11
protective anodizing
anodizing where protection against corrosion or wear is the primary characteristic and appearance is of secondary or no importance

3.12
decorative anodizing
anodizing where a decorative finish with a uniform or aesthetically pleasing appearance is the primary characteristic

3.13
sealing
treatment of anodic oxidation coatings on aluminium to reduce porosity and the absorption capacity of the coating by hydrothermal processes carried out after anodizing

3.14
cold impregnation
cold sealing
treatment of anodic oxidation coatings on aluminium to plug the pores and reduce the absorption capacity of the coating by chemical processes carried out at low temperatures after anodizing

3.15
significant surface*
part of the article covered or to be covered by the coating and for which the coating is essential for serviceability and/or appearance

3.16
measuring area
area of the significant surface over which a single measurement is made

NOTE The measuring area is the point at which a single measurement is made for the microscopical method, and is the probe area, or area influencing the reading, for non-destructive methods.

3.17
reference area*
area within which a specified number of single measurements is required to be made

3.18
local thickness*
mean of the thickness measurements of which a specified number is made within a reference area

3.19
minimum local thickness*
lowest value of the local thickness found on the significant surface of a single article

3.20
maximum local thickness*
highest value of the local thickness found on the significant surface of a single article

3.21
average thickness
mean value of a specified number of local thickness measurements that are evenly distributed over the significant surface of a single anodized piece

4 Information to be supplied by the purchaser to the anodizer

4.1 General

Information which the anodizer requires from the purchaser in order to anodize the product correctly is given in 4.2 and 4.3; 4.2 specifies information that is essential whenever a product is to be anodized, and 4.3 identifies additional information which will be required for particular product applications. A summary of the subclause references relating to this information is given in table 1.

NOTE Certain properties (for example high specular reflectance) are only obtainable by the use of special alloys, and some properties can be incompatible with others.

4.2 Essential information

The following information shall be supplied by the purchaser to the anodizer, if necessary in consultation with the aluminium supplier and/or anodizer:

a) reference to this European Standard;

b) the intended service use of the article to be anodized;

c) the specification of the aluminium to be anodized;

NOTE 1 Guidance on the choice of aluminium is given in annex A.

d) an indication of the significant surface(s) of the article to be anodized;

NOTE 2 Significant surfaces are indicated preferably by drawings or by suitably marked samples; in some cases, there can be different requirements for the finish on different parts of the significant surface(s).

e) the surface preparation to be used on the aluminium before anodizing;

NOTE 3 The surface preparation is indicated preferably by agreed samples; guidance on surface preparation is given in annex B.

f) the anodic oxidation coating thickness required;

g) whether a clear or coloured anodized finish is required;