



# SLOVENSKI STANDARD SIST EN 12373-19:2002

01-februar-2002

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Aluminium and aluminium alloys - Anodizing - Part 19: Rating system for the evaluation of pitting corrosion - Grid method

Aluminium und Aluminiumlegierungen - Anodisieren - Teil 19: Bewertungssystem für Lochkorrosion - Rasterzählmethode

Aluminium et alliages d'aluminium - Anodisation - Partie 19: Systeme de cotation de la corrosion par piqures - Méthode par quadrillage

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Ta slovenski standard je istoveten z: EN 12373-19:2001

## ICS:

|           |                                 |                                |
|-----------|---------------------------------|--------------------------------|
| 25.220.20 | Površinska obdelava             | Surface treatment              |
| 77.120.10 | Aluminij in aluminijeve zlitine | Aluminium and aluminium alloys |

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 12373-19**

May 2001

ICS 25.220.20; 77.120.10

English version

## Aluminium and aluminium alloys - Anodizing - Part 19: Rating system for the evaluation of pitting corrosion - Grid method

Aluminium et alliages d'aluminium - Anodisation - Partie 19:  
Système de cotation de la corrosion par piqûres - Méthode  
par quadrillage

Aluminium und Aluminiumlegierungen - Anodisieren - Teil  
19: Bewertungssystem für Lochkorrosion -  
Rasterzählmethode

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.

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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.

It is based on ISO 8994 : 1989.

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 in 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 in 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°

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- 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.

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## 1 Scope

This Part of this European Standard specifies a grid rating system that provides a means of defining levels of performance of anodic oxidation coatings on aluminium and its alloys that have been subjected to corrosion tests.

This rating system is applicable to pitting corrosion resulting from

- accelerated tests;
- exposure to corrosive environments;
- practical service tests.

It takes into account only pitting corrosion of the basis metal resulting from penetration of the protective anodic oxidation coating.

NOTE 1 A related standard, EN 12373-18:2001, describes a similar rating system based on chart scales.

NOTE 2 The grid rating system is frequently used for rating the results of short term corrosion tests on relatively thin anodic oxidation coatings such as those used in the automotive industry.

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## 2 Terms and definitions

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For the purposes of this standard, the following terms and definitions apply.

### 2.1

#### **significant surface**

part of the surface of an article that is essential to its appearance or serviceability and which is covered by the anodic oxidation coating

NOTE The edges of an article are not normally included in the significant surface.

### 2.2

#### **corrosion pit**

surface corrosion defect at which the anodic oxidation coating is penetrated

NOTE Discolouration or other surface defects which do not penetrate the coating do not count as corrosion pits.

### 3 Procedure for rating

#### 3.1 Sample preparation

A sample area of more than 5 000 mm<sup>2</sup> is required.

Use one of the following methods to remove corrosion products or deposits on the surface so that corrosion pits may be clearly discerned:

- a) wipe with a slurry of fine pumice to abrade away corrosion products and dirt, then rinse in clean water and air dry;
- or
- b) dip for 5 min to 10 min in 30 % (*m/m*) nitric acid, prepared by diluting 1 volume of concentrated nitric acid ( $\rho_{20} = 1,40$  g/ml) with 1 volume of water at 20 °C to 25 °C; rinse and dry as indicated in a);
- or
- c) dissolve the anodic oxidation coating in a hot phosphoric acid/chromic acid mixture; rinse and dry as indicated in a) so that pitting in the aluminium substrate may be discerned.

NOTE 1 EN 12373-2 describes the preparation and use of this reagent for the purposes of dissolution of the anodic oxidation coating.

NOTE 2 This method is particularly useful for dark-coloured anodic oxidation coatings.

#### 3.2 Determination of grid rating

Place a preprinted transparent grid with an area of at least 5 000 mm<sup>2</sup>, and with grid squares of 5 mm × 5 mm, over a selected area of the significant surface of the prepared test specimen. Count the number of grid squares occupied by one or more pits, disregarding effects on the edges of samples. Calculate the percentage of defective squares, i.e. grid squares containing pits, using the formula:

$$\frac{N}{N_t} \times 100 \quad (1)$$

where:

$N$  is the number of defective squares;

$N_t$  is the total number of squares.

Determine the grid rating from table 1.



**Table 1 - Conversion of percentage of defective squares to grid rating**

| Frequency of defective squares (%)  | Defective squares $N$ of 200 squares $N_t$ | Rating number |
|---|--|---------------|
| 0   | 0  | 0             |
| $\leq 0,5$  | 1  | 1             |
| $> 0,5$ to 1  | 2  | 2             |
| $> 1$ to 2  | 3 or 4                                     | 3             |
| $> 2$ to 4  | 5 to 8                                     | 6             |
| $> 4$ to 8  | 9 to 16                                    | 12            |
| $> 8$ to 16   | 17 to 32                                   | 25            |
| $> 16$ to 32  | 33 to 64                                   | 50            |
| $> 32$ to 64  | 65 to 128                                  | 100           |
| $> 64$  | $> 128$                                    | 200           |
| NOTE The greater the number of squares, the more discriminating is the performance level. |  |               |

#### 4 Expression of results

Express the result of the examination as the grid rating and/or the percentage of defective squares, as appropriate.

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#### 5 Test report

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The test report shall include at least the following information:

- the type and identification of the product tested and, where appropriate, the anodizing, exposure and corrosion test procedures;
- a reference to this European Standard;
- the method of sample preparation used (see 3.1);
- the grid rating and/or the percentage of defective squares (see clause 4);

NOTE The acceptable grid rating will normally be specified in the relevant corrosion test or product specification.

- the date of the test.