

## **Determination of thickness and chemical composition of zinc and aluminium-based metallic coatings - Routine method**

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## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 10318:2005 sisaldab Euroopa standardi EN 10318:2005 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 15.07.2005 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 10318:2005 consists of the English text of the European standard EN 10318:2005.</p> <p>This document is endorsed on 15.07.2005 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b></p> <p>This European Standard specifies a glow discharge optical emission spectrometric method for the determination of the thickness and chemical composition of metallic surface coatings consisting of zinc and aluminium based alloys. The alloying elements considered are aluminium, nickel, silicon and lead.</p>	<p><b>Scope:</b></p> <p>This European Standard specifies a glow discharge optical emission spectrometric method for the determination of the thickness and chemical composition of metallic surface coatings consisting of zinc and aluminium based alloys. The alloying elements considered are aluminium, nickel, silicon and lead.</p>
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ICS 17.040.20; 25.220.40

English version

## Determination of thickness and chemical composition of zinc- and aluminium-based metallic coatings - Routine method

Détermination de l'épaisseur et de la composition chimique  
des revêtements en zinc et en alliage d'aluminium -  
Méthode de routine

Bestimmung der Dicke und der chemischen  
Zusammensetzung metallischer Überzüge auf Basis von  
Zink und Aluminium - Standard-Verfahren

This European Standard was approved by CEN on 21 March 2005.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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## Foreword

This European Standard (EN 10318:2005) has been prepared by Technical Committee ECISS/TC 20 “Methods of chemical analysis of ferrous products”, the secretariat of which is held by SIS.

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 2005, and conflicting national standards shall be withdrawn at the latest by November 2005.

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

## 1 Scope

This European Standard specifies a glow discharge optical emission spectrometric method for the determination of the thickness and chemical composition of metallic surface coatings consisting of zinc and aluminium based alloys. The alloying elements considered are aluminium, nickel, silicon and lead.

This method is applicable to zinc contents between 40 % (m/m) and 100 % (m/m); aluminium contents between 0,01 % (m/m) and 60 % (m/m); nickel contents between 0,01 % (m/m) and 15 % (m/m); silicon contents between 0,01 % (m/m) and 3 % (m/m); lead contents between 0,005 % (m/m) and 0,1 % (m/m).

## 2 Normative references

Not applicable.

## 3 Principle

The analytical method described here involves the following processes:

- a) Cathodic sputtering of the surface coating in a direct current glow discharge device;
- b) Optical excitation of the analyte atoms in the plasma formed in the glow discharge device;
- c) Spectrometric measurement of characteristic emission spectral lines of the analyte atoms as a function of sputtering time (depth profile); and
- d) Conversion of the depth profile in units of intensity versus time to mass fraction versus depth by means of calibration functions (quantification). Calibration of the system is achieved by measurements on calibration samples of known chemical composition and measured sputtering rate.

## 4 Apparatus

### 4.1 Glow discharge optical emission spectrometer

#### 4.1.1 General

An optical emission spectrometer equipped with a Grimm type (1) or similar direct current glow discharge source and a simultaneous optical spectrometer, incorporating suitable spectral lines for the analyte elements (see Table 1 for recommended lines) shall be used.

The inner diameter of the hollow anode of the glow discharge shall be in the range 2 mm to 8 mm. A cooling device for thin samples, such as a metal block with circulating cooling liquid, is also recommended, but not strictly necessary for implementation of the method.

It is desirable for the instrument to conform to the performance specifications given in 4.1.2 and 4.1.3, to be evaluated in 6.2.6.

#### 4.1.2 Minimum repeatability

Perform 10 measurements of the emission intensity on a homogeneous bulk sample with a content of the analyte exceeding 1 % (m/m). Allow the discharge at least 60 s stabilisation time (often referred to as *preburn*) before each intensity measurement. Each measurement shall be located on a newly prepared surface of the sample. Calculate the standard deviation of the 10 measurements. The standard deviation should not exceed 2 % of the mean intensity of the analyte. If this is the case, repeat the test two more times. If the high standard deviation is