EESTI STANDARD EVS-EN 10247:2007

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Teraste mittemetalliliste lisandite mikrograafiline kontroll standardsete mikrofilmide kasutamisega

Micrographic examination of the non-metallic inclusion content of steels using standard pictures

EESTI STANDARDIKESKUS

EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 10247:2007 sisaldab Euroopa standardi EN 10247:2007 ingliskeelset teksti. Käesolev dokument on jõustatud 31.05.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 10247:2007 consists of the English text of the European standard EN 10247:2007. This document is endorsed on 31.05.2007 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This European Standard defines a method of microscopic non-metallic inclusion assessment using picture charts. The method does not apply to particles of a length less than 3,0 µm or a width smaller than 2,0 µm. Defined by a product standard or agreement between the involved parties for certain special products, inclusions with a width below 2,0 µm can only be evaluated according to their length. Elongated inclusions with a length above 1 410 µm are counted separately and are beyond the upper application limit of this standard. Globular inclusions with a diameter of 3,0 µm and above are included in the assessment.	**Scope:** This European Standard defines a method of microscopic non-metallic inclusion assessment using picture charts. The method does not apply to particles of a length less than 3,0 µm or a width smaller than 2,0 µm. Defined by a product standard or agreement between the involved parties for certain special products, inclusions with a width below 2,0 µm can only be evaluated according to their length. Elongated inclusions with a length above 1 410 µm are counted separately and are beyond the upper application limit of this standard. Globular inclusions with a diameter of 3,0 µm and above are included in the assessment.

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Võtmesõnad: dimensioonimine, kujutised, lisandid, mikroskoopiline analüüs, mittemetallilised lisandid, sisalduse määramine, terased, võrdlemine

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Micrographic examination of the non-metallic inclusion content of steels using standard pictures

Détermination micrographique de la teneur en inclusions non-métalliques des aciers à l'aide d'images-types

Metallographische Prüfung des Gehaltes nichtmetallischer Einschlüsse in Stählen mit Bildreihen

This European Standard was approved by CEN on 13 January 2007.

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 CEN Management Centre or to any CEN member.

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Foreword

This document (EN 10247:2007) has been prepared by Technical Committee ECISS/TC 2 “Steel - Physico-chemical and non-destructive testing”, 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 October 2007, and conflicting national standards shall be withdrawn at the latest by October 2007.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes ENV 10247:1998.

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

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Introduction

This document establishes procedures for the assessment of inclusions in steels, based on their morphology using standard pictures.

These procedures include principles that are coherent with physical results obtained from inclusion measurements.

The results are in physical units: length in µm/ mm^2, number/ mm^2, areas in μm^2/ mm^2. In comparison to other inclusion rating standards, in this standard the order of the classification begins with the length (row index q).These results can be transposed into other standard's ratings for comparison purposes.

The conditions of assessments, for instance the rules to scan fields on the specimen, are defined such that there is an optimization between magnification and the number of fields to be assessed. The same precision level is achieved by using the same method in manual evaluation and computer controlled measurements.

The chart of standard pictures is derived from mathematical principles.

The results and their precision may be directly computed from field assessments.

1 Scope

This European Standard defines a method of microscopic non-metallic inclusion assessment using picture charts.

The method does not apply to particles of a length less than 3,0 µm or a width smaller than 2,0 µm. Defined by a product standard or agreement between the involved parties for certain special products, inclusions with a width below 2,0 µm can only be evaluated according to their length. Elongated inclusions with a length above 1 410 µm are counted separately and are beyond the upper application limit of this standard. Globular inclusions with a diameter of 3,0 µm and above are included in the assessment.

It is assumed, if particles are elongated or if there are stringers of particles, that they are parallel to each other. Other arrangements are not covered by this standard. This European Standard applies to samples with a microscopic precipitation approaching random distribution.

From the data of measurements obtained by this method, evaluation according to other standards can be established.

This European Standard does not apply to free cutting steels.

NOTE The basic principle of this European Standard allows the determination of non-metallic inclusion content by image analysis techniques.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)*

3 Principles

This method consists of a comparison between inclusions observed in a field of view with chart pictures. The chart pictures defined by this European Standard are based on the shape of inclusions and for each shape on length, width and area, for columns 1 to 10 and number for column 11.

This standard employs an ellipse as a basic shape with the circle as a special case of an ellipse (see Figure 1a). Inclusions with a shape like a rectangle or square are treated as ellipses or circles as their areas are not significantly different for the purpose of this method.

The pictures are arranged in rows and columns. The length changes from row to row, the shape factor changes from column to column. This standard is principally concerned with the morphology and arrangement of inclusions. It does not provide information relevant to crystal structure or chemical constitution of measured inclusions.

General practice usually requires a differentiation between inclusions of different chemical composition. The definition of the types should be defined by the product standards. Should no standard be available, then the definition of characteristic morphologies shall be, by agreement, between the involved parties.

To make description easier, a tree of specific terms is given in Annex A, Figure A.1.

The chart pictures represent the upper limits of classes. The length L_x is classified in row q if:

$$L_{q-1} < L_x \leq L_q \text{ µm} \quad (1)$$

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