TERAS
Mittemetalsete lisandite sisalduse määramine
Mikrograafiline meetod standardkaartide kasutamisega

Steel
Determination of content of nonmetallic inclusions
Micrographic method using standard diagrams
(ISO 4967:2013)

EESTI STANDARDIKESKUS EVS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

See Eesti standard EVS-ISO 4967:2014 „Teras. Mittemetalsete lisandite sisalduse määramine. Mikrograafiline meetod standardkaartide kasutamisega“ sisaldab rahvusvahelise standardi ISO 4967:2013 „Steel – Determination of content of nonmetallic inclusions – Micrographic method using standard diagrams“ identset ingliskeelset teksti.

Ettepaneku rahvusvahelise standardi ümbertrüki meetodil ülevõtuks on esitanud EVS/TK 16, standardi avaldamist on korraldanud Eesti Standardikeskus.

Standard EVS-ISO 4967:2014 on jõustunud sellekohase teate avaldamisega EVS Teataja 2014. aasta septembrikuu numbris.

Standard on kättesaadav Eesti Standardikeskusest.

NATIONAL FOREWORD

This Estonian Standard EVS-ISO 4967:2014 consists of the identical English text of the International Standard ISO 4967:2013 „Steel – Determination of content of nonmetallic inclusions – Micrographic method using standard diagrams“.

Proposal to adopt the International Standard by reprint method has been presented by EVS/TK 16, the Estonian standard has been published by the Estonian Centre for Standardisation.

This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.

The standard is available from Estonian Centre for Standardisation.

Käsitlusala

See standard määratleb standardkaartide abil mittemetalsete lisandite sisalduse määramise meetodi sepistatud ja valtsitud terastoodetes, mille redutseerimisaste on vähemalt 3. Seda meetodit kasutatakse laialdaselt terase sobivuse hindamiseks antud kasutusalal. Kuna aga korratavate tulemuste saavutamine on katse läbiviijast olenevalt keeruline isegi suure hulga teimikute puhul, tuleb meetodi kasutamisel olla tähelepanelik.

MÄRKUS Teatud terasetüüpide puhul (nt tööriistaterased) ei pruugi selles standardis kirjeldatud standardkaardid kohaldatavad olla.

See standard kirjeldab mittemetalsete lisandite sisalduse määramiseks ka kujutiseanalüüsi tehnoloogiaid (vt lisa D).

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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1 Scope

This International Standard specifies a micrographic method of determining the non-metallic inclusions in rolled or forged steel products having a reduction ratio of at least 3 using standard diagrams. This method is widely used to assess the suitability of a steel for a given use. However, since it is difficult to achieve reproducible results owing to the influence of the test operator, even with a large number of specimens, precautions should be taken when using the method.

NOTE For certain types of steel (e.g. free cutting steels), the standardized diagrams described in this International Standard may not be applicable.

This International Standard also provides for the determination of non-metallic inclusions by image analysis technologies (see Annex D).

2 Principle

The method consists of comparing the observed field to the chart diagrams defined in this International Standard and taking in consideration separately each type of inclusion. In the case of image analysis, fields will be rated according to the relationships given in Annex D.

The chart pictures correspond to square fields of view, each with an area of 0,50 mm^2, as obtained with a longitudinal plane-of-polish and as observed at 100 ×.

According to the shape and distribution of the inclusions, the standard diagrams are divided into five main groups, bearing the reference A, B, C, D and DS.

These five groups represent the most commonly observed inclusion types and morphologies:

— **Group A (sulfide type)**: highly malleable, individual grey particles with a wide range of aspect ratios (length/width) and generally rounded ends;

— **Group B (aluminate type)**: numerous non deformable, angular, low aspect ratio (generally < 3), black or bluish particles (at least three) aligned in the deformation direction;

— **Group C (silicate type)**: highly malleable, individual black or dark grey particles with a wide range of aspect ratios (generally > 3) and generally sharp ends;

— **Group D (globular oxide type)**: non deformable, angular or circular, low aspect ratio (generally < 3), black or bluish, randomly distributed particles;

— **Group DS (single globular type)**: circular, or nearly circular, single particle with a diameter > 13 µm.

Non-traditional inclusion types may also be rated based on their morphology compared to the above five types and a statement about their chemical nature. As an example, globular sulfides would be rated as a D type and a descriptive subscript (e.g. D_{sulf}) defined in the test report. D_{cas} would indicate globular calcium sulfides; D_{RES} would indicate globular rare earth sulfides; D_{Dup} would indicate globular duplex inclusions, such as calcium sulfide surrounding an aluminate.