

**Terased. Tera näivsuuruse mikrograafiline määramine  
(ISO 643:2012)**

**Steels - Micrographic determination of the apparent  
grain size (ISO 643:2012)**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 643:2012 sisaldab Euroopa standardi EN ISO 643:2012 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 643:2012 consists of the English text of the European standard EN ISO 643:2012.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 19.12.2012.	Date of Availability of the European standard is 19.12.2012.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

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

ICS 77.040.99

### Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:  
Aru 10, 10317 Tallinn, Eesti; [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

### The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:  
Aru 10, 10317 Tallinn, Estonia; [www.evs.ee](http://www.evs.ee); phone 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

English Version

Steels - Micrographic determination of the apparent grain size  
(ISO 643:2012)

Aciers - Détermination micrographique de la grosseur de  
grain apparente (ISO 643:2012)

Stahl - Mikrophotographische Bestimmung der scheinbaren  
Korngröße (ISO 643:2012)

This European Standard was approved by CEN on 10 December 2012.

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-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

## Foreword

This document (EN ISO 643:2012) has been prepared by Technical Committee ISO/TC 17 "Steel" in collaboration with Technical Committee ECISS/TC 101 "Test methods for steel (other than chemical analysis)" 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 June 2013, and conflicting national standards shall be withdrawn at the latest by June 2013.

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 EN ISO 643:2003.

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

### Endorsement notice

The text of ISO 643:2012 has been approved by CEN as a EN ISO 643:2012 without any modification.

# Contents

Page

Foreword .....	iv
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms and definitions .....</b>	<b>1</b>
<b>4 Symbols and abbreviated terms .....</b>	<b>2</b>
<b>5 Principle.....</b>	<b>2</b>
<b>6 Selection and preparation of the specimen.....</b>	<b>4</b>
6.1 Test location .....	4
6.2 Revealing ferritic grain boundaries .....	5
6.3 Revealing austenitic and prior-austenitic grain boundaries.....	5
<b>7 Characterization of grain size .....</b>	<b>9</b>
7.1 Characterization by an index .....	9
7.2 Characterization by the intercept method .....	11
<b>8 Test report.....</b>	<b>14</b>
<b>Annex A (informative) Summary of methods for revealing ferritic, austenitic or prior-austenitic grain boundaries in steels .....</b>	<b>15</b>
<b>Annex B (normative) Determination of grain size — Standard charts taken from ASTM E112.....</b>	<b>16</b>
<b>Annex C (normative) Evaluation method .....</b>	<b>31</b>

# Steels — Micrographic determination of the apparent grain size

## 1 Scope

This International Standard specifies a micrographic method of determining apparent ferritic or austenitic grain size in steels. It describes the methods of revealing grain boundaries and of estimating the mean grain size of specimens with unimodal size distribution. Although grains are three-dimensional in shape, the metallographic sectioning plane can cut through a grain at any point from a grain corner, to the maximum diameter of the grain, thus producing a range of apparent grain sizes on the two-dimensional plane, even in a sample with a perfectly consistent grain size.

## 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.

ISO 3785, *Steel — Designation of test piece axes*

ISO 14250, *Steel — Metallographic characterization of duplex grain size and distributions*

ASTM E112, *Standard Test Methods for Determining Average Grain Size*

## 3 Terms and definitions

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

### 3.1

#### **grain**

closed polygonal shape with more or less curved sides, which can be revealed on a flat cross-section through the sample, polished and prepared for micrographic examination

A distinction is made between:

#### **3.1.1**

##### **austenitic grain**

crystal with a face-centered cubic crystal structure which may, or may not, contain annealing twins

#### **3.1.2**

##### **ferritic grain**

crystal with a body-centered cubic crystal structure which never contains annealing twins<sup>1)</sup>

1) Ferritic grain size is generally estimated for non-alloy steels with a carbon content of 0,25 % or less. If pearlite islands of identical dimensions to those of the ferrite grains are present, the islands are then counted as ferrite grains.