

This is a preview of "ISO 643:2019". [Click here to purchase the full version from the ANSI store.](#)

Fourth edition
2019-12

Corrected version
2020-03

Steels — Micrographic determination of the apparent grain size

*Aciers — Détermination micrographique de la grosseur de grain
apparente*



Reference number
ISO 643:2019(E)

© ISO 2019

This is a preview of "ISO 643:2019". Click here to purchase the full version from the ANSI store.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

This is a preview of "ISO 643:2019". Click here to purchase the full version from the ANSI store.

Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
3.1 Grains.....	1
3.2 General.....	2
4 Symbols	2
5 Principle	3
6 Selection and preparation of the specimen	4
6.1 Test location.....	4
6.2 Revealing ferritic grain boundaries.....	5
6.3 Revealing austenitic and prior-austenitic grain boundaries.....	5
6.3.1 General.....	5
6.3.2 "Bechet-Beaujard" method by etching with aqueous saturated picric acid solution.....	5
6.3.3 "Kohn" method by controlled oxidation.....	6
6.3.4 "McQuaid-Ehn" method by carburization at 925 °C.....	7
6.3.5 Proeutectoid ferrite method.....	8
6.3.6 Bainite or gradient-quench method.....	9
6.3.7 Sensitization of austenitic stainless and manganese steels.....	9
6.3.8 Other methods for revealing prior-austenitic grain boundaries.....	9
7 Characterization of grain size	10
7.1 Characterization by an index.....	10
7.1.1 Formulae.....	10
7.1.2 Assessment by comparison with standard grain size charts.....	10
7.1.3 Planimetric method.....	11
7.1.4 Estimation of the index.....	11
7.2 Characterization by the intercept method.....	11
7.2.1 Linear intercept segment method.....	11
7.2.2 Circular intercept segment method.....	12
7.2.3 Assessment of results.....	13
8 Test report	14
Annex A (informative) Summary of methods for revealing ferritic, austenitic or prior-austenitic grain boundaries in steels	15
Annex B (normative) Evaluation method	16
Bibliography	21

This is a preview of "ISO 643:2019". Click here to purchase the full version from the ANSI store.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 7, *Methods of testing (other than mechanical tests and chemical analysis)*.

This fourth edition cancels and replaces the third edition (ISO 643:2012), which has been technically revised. The main changes compared to the previous edition are as follows:

- [7.1.2](#) has been modified;
- the original [Annex B](#) has been deleted and the original Annex C has been renumbered as [Annex B](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This corrected version of ISO 643:2019 incorporates the following corrections:

- minus sign replaced with plus sign between the values in [Formula B.9](#).