

KEEVISÕMBLUSTE MITTEPURUSTAV KATSETAMINE.
ULTRAHELIGA KATSETAMINE. MEETODID,
KATSETASEMED JA HINDAMINE

Non-destructive testing of welds - Ultrasonic testing -
Techniques, testing levels, and assessment (ISO
17640:2017)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 17640:2017 sisaldab Euroopa standardi EN ISO 17640:2017 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 17640:2017 consists of the English text of the European standard EN ISO 17640:2017.
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 29.11.2017.	Date of Availability of the European standard is 29.11.2017.
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.

ICS 25.160.40

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:
Koduleht www.evs.ee; telefon 605 5050; e-post 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:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

Non-destructive testing of welds - Ultrasonic testing -
Techniques, testing levels, and assessment (ISO
17640:2017)

Contrôle non destructif des assemblages soudés -
Contrôle par ultrasons - Techniques, niveaux d'essai et
évaluation (ISO 17640:2017)

Zerstörungsfreie Prüfung von Schweißverbindungen -
Ultraschallprüfung - Techniken, Prüfklassen und
Bewertung (ISO 17640:2017)

This European Standard was approved by CEN on 19 September 2017.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN ISO 17640:2017) has been prepared by Technical Committee ISO/TC 44 “Welding and allied processes” in collaboration with Technical Committee CEN/TC 121 “Welding and allied processes” the secretariat of which is held by DIN.

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 May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

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

This document supersedes EN ISO 17640:2010.

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, 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 17640:2017 has been approved by CEN as EN ISO 17640:2017 without any modification.

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols	2
5 Principle	3
6 Information required prior to testing	3
6.1 Items to be specified	3
6.2 Specific information required before testing	3
6.3 Written test procedure	4
7 Requirements for personnel and equipment	4
7.1 Personnel qualifications	4
7.2 Test equipment	4
7.3 Probe parameters	4
7.3.1 Test frequency	4
7.3.2 Angles of incidence	4
7.3.3 Element size	5
7.3.4 Adaptation of probes to curved scanning surfaces	5
7.3.5 Coupling media	5
8 Testing volume	5
9 Preparation of scanning surfaces	6
10 Parent metal testing	6
11 Range and sensitivity setting	7
11.1 General	7
11.2 Reference for sensitivity setting	8
11.3 Evaluation levels	9
11.4 Transfer correction	9
11.5 Signal-to-noise ratio	9
12 Testing levels	9
13 Testing techniques	10
13.1 General	10
13.2 Manual scan path	10
13.3 Testing for imperfections perpendicular to the testing surface	10
13.4 Location of discontinuities	10
13.5 Evaluation of indications	10
13.5.1 General	10
13.5.2 Maximum echo amplitude	10
13.5.3 Discontinuity length	11
13.5.4 Discontinuity height	11
13.5.5 Characterization of discontinuities	11
14 Test report	11
Annex A (normative) Testing levels for various types of welded joints	13
Bibliography	29

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 44, *Welding and allied processes*, Subcommittee SC 5, *Testing and inspection of welds*.

This third edition cancels and replaces the second edition (ISO 17640:2010), which has been technically revised.

Requests for official interpretations of any aspect of this document should be directed to the Secretariat of ISO/TC 44/SC 5 via your national standards body. A complete listing of these bodies can be found at www.iso.org.

Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels, and assessment

1 Scope

This document specifies techniques for the manual ultrasonic testing of fusion-welded joints in metallic materials of thickness ≥ 8 mm which exhibit low ultrasonic attenuation (especially that due to scatter) at object temperatures from 0 °C to 60 °C. It is primarily intended for use on full penetration welded joints where both the welded and parent material are ferritic.

Where material-dependent ultrasonic values are specified in this document, they are based on steels having an ultrasonic sound velocity of $(5\,920 \pm 50)$ m/s for longitudinal waves and $(3\,255 \pm 30)$ m/s for transverse waves.

This document specifies four testing levels, each corresponding to a different probability of detection of imperfections. Guidance on the selection of testing levels A, B, and C is given in [Annex A](#).

This document specifies that the requirements of testing level D, which is intended for special applications, be in accordance with general requirements. Testing level D can only be used when defined by specification. This includes tests of metals other than ferritic steel, tests on partial penetration welds, tests with automated equipment, and tests at object temperatures outside the range 0 °C to 60 °C.

This document can be used for the assessment of discontinuities, for acceptance purposes, by either of the following techniques:

- a) evaluation based primarily on length and echo amplitude of the discontinuity;
- b) evaluation based on characterization and sizing of the discontinuity by probe movement techniques.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 5577, *Non-destructive testing — Ultrasonic testing — Vocabulary*

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO 11666:2010, *Non-destructive testing of welds — Ultrasonic testing — Acceptance levels*

ISO 16810, *Non-destructive testing — Ultrasonic testing — General principles*

ISO 16811, *Non-destructive testing — Ultrasonic testing — Sensitivity and range setting*

ISO 16826, *Non-destructive testing — Ultrasonic testing — Examination for discontinuities perpendicular to the surface*

ISO 17635, *Non-destructive testing of welds — General rules for metallic materials*

ISO 23279, *Non-destructive testing of welds — Ultrasonic testing — Characterization of discontinuities in welds*

EN 12668 (all parts), *Non-destructive testing — Characterization and verification of ultrasonic examination equipment*