



BSI Standards Publication

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

National foreword

This British Standard is the UK implementation of EN ISO 17640:2017. It supersedes BS EN ISO 17640:2010, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee WEE/46, Non-destructive testing.

A list of organizations represented on this committee can be obtained on request to its secretary.

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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.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 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of an identical text or by endorsement, at the latest by May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.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	30

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).

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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*