

Non-destructive testing - Ultrasonic testing -
Characterization and verification of ultrasonic
equipment for the determination of thickness (ISO
16831:2025)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 16831:2025 sisaldab Euroopa standardi EN ISO 16831:2025 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 28.05.2025.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN ISO 16831:2025 consists of the English text of the European standard EN ISO 16831:2025.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 28.05.2025.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
--	---

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

ICS 19.100

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele. Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis- ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis- ja Akrediteerimiskeskusega: 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 and Accreditation. 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 and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation: Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD

EN ISO 16831

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2025

ICS 19.100

Supersedes EN 15317:2013

English Version

**Non-destructive testing - Ultrasonic testing -
Characterization and verification of ultrasonic equipment
for the determination of thickness (ISO 16831:2025)**

Essais non destructifs - Contrôle par ultrasons -
Caractérisation et vérification des appareils de
contrôle par ultrasons pour la détermination de
l'épaisseur (ISO 16831:2025)

Zerstörungsfreie Prüfung - Ultraschallprüfung -
Charakterisierung und Verifizierung der Ultraschall-
Prüfausrüstung zur Dickenbestimmung (ISO
16831:2025)

This European Standard was approved by CEN on 11 May 2025.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye 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 16831:2025) has been prepared by Technical Committee ISO/TC 135 "Non-destructive testing" in collaboration with Technical Committee CEN/TC 138 "Non-destructive testing" 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 November 2025, and conflicting national standards shall be withdrawn at the latest by November 2025.

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 15317:2013.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Endorsement notice

The text of ISO 16831:2025 has been approved by CEN as EN ISO 16831:2025 without any modification.

Contents

	Page
Foreword	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 General requirements	1
5 Manufacturer's technical specification for ultrasonic equipment for thickness determination	2
5.1 General.....	2
5.2 General attributes.....	2
5.3 Display.....	2
5.4 Transmitter.....	3
5.5 Receiver.....	3
5.6 Other information.....	3
6 Blocks	3
6.1 General.....	3
6.2 Material.....	4
6.3 Shape and size.....	4
6.3.1 Accuracy blocks.....	4
6.3.2 Resolution block.....	5
7 Performance requirements for ultrasonic equipment for thickness determination	5
8 Probes	6
9 Group 1 tests	7
9.1 Equipment required for Group 1 tests.....	7
9.2 Stability against temperature of the instrument.....	7
9.2.1 Procedure.....	7
9.2.2 Acceptance criterion.....	7
9.3 Low-battery warning.....	7
9.3.1 Procedure.....	7
9.3.2 Acceptance criteria.....	8
9.4 Battery operational time.....	8
9.4.1 Procedure.....	8
9.4.2 Acceptance criteria.....	8
9.5 Stability against voltage variation.....	8
9.5.1 Procedure.....	8
9.5.2 Acceptance criterion.....	9
9.6 Operational current range.....	9
9.6.1 Procedure.....	9
9.6.2 Acceptance criterion.....	9
9.7 Extended operational temperature range of the probe.....	9
9.7.1 General.....	9
9.7.2 Procedure.....	9
9.7.3 Acceptance criteria.....	9
9.8 Pulse repetition frequency.....	10
9.8.1 Procedure.....	10
9.8.2 Acceptance criterion.....	10
9.9 Transmitter voltage, pulse rise time and duration.....	10
9.9.1 Procedure.....	10
9.9.2 Acceptance criteria.....	12
9.10 Gain control of the receiver.....	12
9.10.1 General.....	12
9.10.2 Procedure.....	12
9.10.3 Acceptance criteria.....	12

9.11	Frequency response of the receiver	12
9.11.1	General	12
9.11.2	Procedure	12
9.11.3	Acceptance criteria	13
9.12	Setup of the instrument	13
9.12.1	General	13
9.12.2	Procedure	13
9.13	Determination performance and resolution	13
9.13.1	Procedure	13
9.13.2	Acceptance criteria	14
9.14	Display response time	14
9.14.1	Procedure	14
9.14.2	Acceptance criterion	14
10	Group 2 tests	14
10.1	Equipment required for Group 2 tests	14
10.2	General characteristics	14
10.3	General mechanical state and external aspects	14
11	Group 3 tests	15
11.1	General	15
11.2	General mechanical state and external aspects	15
11.3	Performance	15
11.3.1	Procedure	15
11.3.2	Acceptance criterion	15
	Bibliography	16

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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

For an explanation of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 3, *Ultrasonic testing*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 138, *Non-destructive testing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 16831:2012), which has been technically revised.

The main changes are as follows:

- terminology has been revised from "measurement" to "determination"; as only the time of flight of the ultrasonic signal can be measured in relation to traceable references, the thickness and sound velocity can only be determined;
- tests have been adapted to the boundary conditions of digital instruments;
- procedures for Group 2 and Group 3 tests have been simplified;
- Clauses for characterisation of the receiver have been added.

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.

Non-destructive testing — Ultrasonic testing — Characterization and verification of ultrasonic equipment for the determination of thickness

1 Scope

This document specifies test methods and acceptance criteria, within the frequency range of 0,5 MHz to 15 MHz, for assessing the performance of equipment dedicated for determining thickness using pulse-echo ultrasound, e.g. according to ISO 16809.

This document only specifies the verifications required for the determination of thickness.

This document is applicable to instruments with numerical display and instruments with A-scan presentation, each using either single- or dual-transducer probes.

The tests described in this document can be used for verifying equipment covered by ISO 22232-1 and ISO 22232-2 when used for thickness determination.

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 22232-2, *Non-destructive testing — Characterization and verification of ultrasonic test equipment — Part 2: Probes*

EN 10025-2, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5577 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 General requirements

Equipment for the determination of thickness using ultrasound is in accordance with this document if it fulfils all the following requirements:

- a) the equipment shall be in accordance with [Clauses 8, 9, 10](#) and [11](#);
- b) a statement of conformity shall be available;