

MITTEPURUSTAV KATSETAMINE. ULTRAHELIGA  
PAKSUSE MÄÄRAMINE

Non-destructive testing - Ultrasonic thickness  
determination (ISO 16809:2025)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 16809:2025 sisaldab Euroopa standardi EN ISO 16809:2025 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 25.06.2025.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN ISO 16809:2025 consists of the English text of the European standard EN ISO 16809:2025.</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 25.06.2025.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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EUROPEAN STANDARD

EN ISO 16809

NORME EUROPÉENNE

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English Version

## Non-destructive testing - Ultrasonic thickness determination (ISO 16809:2025)

Essais non destructifs - Détermination de l'épaisseur  
par ultrasons (ISO 16809:2025)

Zerstörungsfreie Prüfung - Dickenbestimmung mit  
Ultraschall (ISO 16809:2025)

This European Standard was approved by CEN on 14 June 2025.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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

## European foreword

This document (EN ISO 16809:2025) 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of an identical text or by endorsement, at the latest by December 2025, and conflicting national standards shall be withdrawn at the latest by December 2025.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 ISO 16809:2019.

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## Endorsement notice

The text of ISO 16809:2025 has been approved by CEN as EN ISO 16809:2025 without any modification.

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## 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](http://www.iso.org/directives)).

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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 third edition cancels and replaces the second edition (ISO 16809:2017), which has been technically revised.

The main changes are as follows:

- terminology in the document has been modified, changing "measurement" to "determination";
- terminology has been aligned with ISO 16831;
- ultrasonic instruments with A-scan presentation that conform with ISO 22232-1 can be used to determine wall thicknesses;
- all figures have been improved.

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](http://www.iso.org/members.html).

# Non-destructive testing — Ultrasonic thickness determination

## 1 Scope

This document specifies principles for determination of the thickness of metallic and non-metallic materials using the contact technique or immersion technique, based on measurement of the time of flight of ultrasonic pulses only.

## 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 16831, *Non-destructive testing — Ultrasonic testing — Characterization and verification of ultrasonic equipment for the determination of thickness*

ISO 22232-1, *Non-destructive testing — Characterization and verification of ultrasonic test equipment — Part 1: Instruments*

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

## 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 Modes of determination

The thickness of a test object is determined by accurately measuring the time required for a short ultrasonic pulse generated by a transducer to travel through the thickness of the material once, twice or several times.

The material thickness is calculated by multiplying the known sound velocity of the material of the test object with the measured time of flight and dividing by the number of times the pulse transits the material wall.

This principle can be accomplished by applying one of the following modes (see [Figure 1](#)).

- a) Mode 1: measure the time of flight from an initial excitation pulse to a first returning echo, minus a zero-point correction to account for the thickness of the probe's wear plate or delay path and the couplant layer (single-echo mode).
- b) Mode 2: measure the time of flight from the end of a delay line to the first back wall echo (single-echo delay line mode).
- c) Mode 3: measure the time of flight between back wall echoes (multiple-echo mode).