Non-destructive testing - Ultrasonic testing - Time-of-flight diffraction technique for detection and sizing of discontinuities (ISO 16828:2025)

EESTI STANDARDIMIS- JA AKREDITEERIMISKESKUS
ESTONIAN CENTRE FOR STANDARDISATION AND ACCREDITATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 16828:2025 sisaldab Euroopa standardi EN ISO 16828:2025 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 16828:2025 consists of the English text of the European standard EN ISO 16828:2025.
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 and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 23.07.2025.	Date of Availability of the European standard is 23.07.2025.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

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

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EUROPEAN STANDARD

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English Version

Non-destructive testing - Ultrasonic testing - Time-of-flight diffraction technique for detection and sizing of discontinuities (ISO 16828:2025)

Essais non destructifs - Contrôle par ultrasons - Technique de diffraction du temps de vol pour la détection et le dimensionnement des discontinuités (ISO 16828:2025)

Zerstörungsfreie Prüfung - Ultraschallprüfung - Beugungslaufzeittechnik zum Auffinden und Ausmessen von Inhomogenitäten (ISO 16828:2025)

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

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

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

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European foreword

This document (EN ISO 16828:2025) 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 January 2026, and conflicting national standards shall be withdrawn at the latest by January 2026.

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 16828:2014.

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 16828:2025 has been approved by CEN as EN ISO 16828:2025 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).

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 16828:2012), which has been technically revised.

The main changes are as follows:

— title revised by removing “as a method”;

— clarifications of abbreviations and symbols;

— figures have been updated;

— formulae have been corrected;

— term "dead zone" replaced by "obscured zone".

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.

Introduction

The following standards on ultrasonic testing developed by ISO/TC 135 are related.

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

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

ISO 16823, *Non-destructive testing — Ultrasonic testing — Through-transmission technique*

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

ISO 16827, *Non-destructive testing — Ultrasonic testing — Characterization and sizing of discontinuities*

Non-destructive testing — Ultrasonic testing — Time-of-flight diffraction technique for detection and sizing of discontinuities

1 Scope

This document specifies the general principles for the application of the time-of-flight diffraction (TOFD) technique for both detection and sizing of discontinuities in low-alloyed carbon steel components.

This document also applies to other types of materials, provided the application of the TOFD technique is performed with necessary consideration of geometry, acoustical properties of the materials, and the test sensitivity.

Although this document is applicable, in general terms, for discontinuities in materials and applications covered by ISO 16810, it contains references to the application on welds. This approach has been chosen for reasons of clarity as to the probe positions and directions of scanning.

Unless otherwise specified in the referencing documents, the minimum requirements specified in this document apply.

Unless explicitly stated otherwise, this document is applicable to the following categories of test objects as specified in ISO 16811:

— category 1, without restrictions;

— categories 2 and 3, specified restrictions apply (see Clause 10);

— categories 4 and 5 require special procedures, which are also addressed (see Clause 10).

NOTE Techniques for the use of TOFD for weld testing are described in ISO 10863 and the related acceptance criteria are given in ISO 15626.

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

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 and the following apply.