



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 16823:2024**  
**01-marec-2024**

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**Neporušitvene preiskave - Ultrazvočne preiskave - Prehodna metoda (ISO/DIS 16823:2024)**

Non-destructive testing - Ultrasonic testing - Through-transmission technique (ISO/DIS 16823:2024)

Zerstörungsfreie Prüfung - Ultraschallprüfung - Durchschallungstechnik (ISO/DIS 16823:2024)

Essais non destructifs - Contrôle par ultrasons - Technique par transmission (ISO/DIS 16823:2024)

**Ta slovenski standard je istoveten z: prEN ISO 16823**

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**ICS:**

19.100      Neporušitveno preskušanje      Non-destructive testing

**oSIST prEN ISO 16823:2024**

**en,fr,de**



# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 16823

ISO/TC 135/SC 3

Secretariat: DIN

Voting begins on:  
2024-01-23Voting terminates on:  
2024-04-16

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## Non-destructive testing — Ultrasonic testing — Through-transmission technique

ICS: 19.100

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Published in Switzerland

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## ISO/DIS 16823:2023(E)

### 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](http://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](http://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 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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 3, *Ultrasonic testing*.

This second edition cancels and replaces the first edition (ISO 16823:2012), which has been technically revised.

The main changes are as follows:

- normative references have been updated;
- figures have been improved;
- the terminology has been aligned throughout the whole document.

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).

## Introduction

The following documents are linked:

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 — 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*

ISO 16828, *Non-destructive testing — Ultrasonic testing — Time-of-flight diffraction technique as a method for detection and sizing of discontinuities*

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# Non-destructive testing — Ultrasonic testing — Through-transmission technique

## 1 Scope

This document specifies the principles of ultrasonic through-transmission techniques.

Through-transmission techniques can be used for:

- detection of imperfections;
- determination of sound attenuation.

The general principles required for the use of ultrasonic testing of industrial products are described in ISO 16810.

The through-transmission technique is used for the testing of flat products, e.g. plates and sheets.

Further, it can be used for tests, e.g.:

- where the shape, dimensions or orientation of possible imperfections are unfavourable for direct reflection;
- of materials with high sound attenuation;
- on thin test objects.

## 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 2400, *Non-destructive testing — Ultrasonic testing — Specification for calibration block No. 1*

ISO 5577, *Non-destructive testing — Ultrasonic testing — Vocabulary*

ISO 7963, *Non-destructive testing — Ultrasonic testing — Specification for calibration block No. 2*

ISO 16810, *Non-destructive testing — Ultrasonic testing — General principles*<sup>1)</sup>

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>

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1) Under revision.

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— IEC Electropedia: available at <https://www.electropedia.org/>

### 4 NDT personnel

For requirements concerning NDT personnel, the requirements given in ISO 16810 shall apply.

## 5 Test equipment

### 5.1 Instrument

The ultrasonic instrument shall fulfil the requirements of ISO 22232-1.

### 5.2 Probes

The probe(s) shall fulfil the requirements of ISO 22232-2.

#### 5.2.1 Probe selection

The choice of the probe depends on the purpose of the testing and the requirements of the referencing standard or specification. It depends on:

- the material thickness, shape and surface condition of the test object;
- the type and metallurgical condition of the material to be tested;
- the type, position and orientation of imperfections to be detected and assessed.

The probe parameters listed in 5.2.2, 5.2.3 and 5.2.4 shall be considered in relation to the characteristics of the test object stated above.

#### 5.2.2 Frequency and dimensions of transducer

The frequency and dimensions of a transducer determine the shape of the sound beam (near field and beam divergence).

a) The selection shall assure that the characteristics of the beam are the optimum for the testing by a compromise between the following:

- 1) the near field length which shall remain, whenever possible, smaller than the thickness of the test object.

NOTE It is possible to detect imperfections in the near field, but their characterization is less accurate and less reproducible as in the far field.

- 2) the beam width, which shall be sufficiently small within the test volume furthest from the probe to maintain an adequate detection level;
- 3) the beam divergence, which shall be sufficiently large to detect planar imperfections that are unfavourably orientated.

b) Apart from the above considerations the selection of frequency shall take into account the sound attenuation in the material and the reflectivity of imperfections.

The higher this frequency, the greater the test resolution, but the sound waves are more attenuated (or the spurious signals due to the structure are greater) than with lower frequencies.

The choice of frequency thus represents a compromise between these two factors.

Most ultrasonic tests are performed at frequencies between 1 MHz and 10 MHz.