International Standard

ISO 16823

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

Essais non destructifs — Contrôle par ultrasons — Technique par transmission

Second edition
2025-01

Reference number
ISO 16823:2025(en)

© ISO 2025



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025
All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 NDT personnel **2**
5 Test equipment **2**
5.1 Instrument 2
5.2 Probes 2
5.2.1 General 2
5.2.2 Probe selection 2
5.2.3 Frequency and dimensions of transducer 2
5.2.4 Dead zone 3
5.2.5 Damping 3
5.2.6 Focusing probes 3
5.3 Coupling media 3
5.4 Standard blocks 3
5.5 Reference blocks 4
5.6 Specific test blocks 4
6 Principles of testing **4**
6.1 Basic techniques and setup 4
6.2 Capability of detection of discontinuities 6
6.3 Requirements for geometry and access 6
6.4 Effects of variations in coupling, angulation and alignment of probes 6
7 Test technique **7**
7.1 General 7
7.2 Sensitivity setting 7
7.3 Scanning 7
7.4 Evaluation of discontinuities 7
7.5 Determination of the attenuation coefficient 7
7.5.1 General 7
7.5.2 Comparative technique using a reference block 8
7.5.3 Technique using the test object only 9
Bibliography **12**

© ISO 2025 – All rights reserved

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 16823:2012), which has been technically revised.

The main changes are as follows:

— normative references have been updated;

— figures have been improved;

— 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.

© ISO 2025 – All rights reserved

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 — 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*

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

© ISO 2025 – All rights reserved

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 discontinuities;

— 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, for example:

— where the shape, dimensions or orientation of possible discontinuities 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*[1)]

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

ISO 7963, *Non-destructive testing — Ultrasonic testing — Specification for calibration block No. 2*[1)]

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 apply.

1) It is intended to replace the term “calibration block“ by "standard block“ during the next revision of the standard.

© ISO 2025 – All rights reserved