

**Non-destructive testing - Ultrasonic testing - Sensitivity
and range setting (ISO 16811:2012)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 16811:2014 sisaldab Euroopa standardi EN ISO 16811:2014 inglisekeelset teksti.	This Estonian standard EVS-EN ISO 16811:2014 consists of the English text of the European standard EN ISO 16811:2014.
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.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 05.03.2014.	Date of Availability of the European standard is 05.03.2014.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

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 Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Aru 10, 10317 Tallinn, Eesti; 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

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.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:
Aru 10, 10317 Tallinn, Estonia; www.evs.ee; phone 605 5050; e-mail info@evs.ee

English Version

Non-destructive testing - Ultrasonic testing - Sensitivity and
range setting (ISO 16811:2012)

Essais non destructifs - Contrôle par ultrasons - Réglage de
la sensibilité et de la base de temps (ISO 16811:2012)

Zerstörungsfreie Prüfung - Ultraschallprüfung -
Empfindlichkeits- und Entfernungsjustierung (ISO
16811:2012)

This European Standard was approved by CEN on 9 February 2014.

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



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of ISO 16811:2012 has been prepared by Technical Committee ISO/TC 135 “Non-destructive testing” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 16811:2014 by 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 September 2014, and conflicting national standards shall be withdrawn at the latest by September 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 583-2:2001.

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

Endorsement notice

The text of ISO 16811:2012 has been approved by CEN as EN ISO 16811:2014 without any modification.

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 General	1
3.1 Quantities and symbols	1
3.2 Test objects, reference blocks and reference reflectors	1
3.3 Categories of test objects	1
3.4 Contouring of probes	2
3.4.1 Longitudinally curved probes	3
3.4.2 Transversely curved probes	3
3.4.3 Concave scanning surface	4
4 Determination of probe index and beam angle	4
4.1 General	4
4.2 Flat probes	4
4.2.1 Calibration block technique	4
4.2.2 Reference block technique	4
4.3 Probes curved longitudinally	4
4.3.1 Mechanical determination	4
4.3.2 Reference Block Technique	6
4.4 Probes curved transversely	6
4.4.1 Mechanical determination	6
4.4.2 Reference block technique	7
4.5 Probes curved in two directions	8
4.6 Probes for use on materials other than non-alloy steel	9
5 Time base setting	9
5.1 General	9
5.2 Reference blocks and reference reflectors	9
5.3 Straight beam probes	10
5.3.1 Single reflector technique	10
5.3.2 Multiple reflector technique	10
5.4 Angle beam probes	10
5.4.1 Radius technique	10
5.4.2 Straight beam probe technique	10
5.4.3 Reference block technique	10
5.4.4 Contoured probes	10
5.5 Alternative range settings for angle beam probes	11
5.5.1 Flat surfaces	11
5.5.2 Curved surfaces	11
6 Sensitivity setting and echo height evaluation	13
6.1 General	13
6.2 Angle of impingement	13
6.3 Distance Amplitude Curve (DAC) technique	13
6.3.1 Reference blocks	13
6.3.2 Preparation of a Distance Amplitude Curve	14
6.3.3 Evaluation of signals using a Distance Amplitude Curve	15
6.3.4 Evaluation of signals using a reference height	15
6.4 Distance Gain Size (DGS) technique	16
6.4.1 General	16
6.4.2 Reference blocks	18
6.4.3 Use of DGS diagrams	18
6.4.4 Restrictions on use of the DGS technique due to geometry	20

6.5	Transfer correction	20
6.5.1	General.....	20
6.5.2	Fixed path length technique	20
6.5.3	Comparative technique	21
6.5.4	Compensation for local variations in transfer correction	22
Annex A	(normative) Quantities and symbols	23
Annex B	(normative) Reference blocks and reference reflectors	26
Annex C	(normative) Determination of sound path distance and impingement angle in concentrically curved objects	29
C.1	Impingement angle	29
C.2	Sound path when scanning from the outer (convex) surface:	29
C.2.1	Full skip	30
C.2.2	Half skip	30
C.3	Soundpath when scanning from the inner (concave) surface:.....	31
C.3.1	Full skip	31
C.3.2	Half skip	32
Annex D	(informative) General DGS diagram	33
D.1	Distance	33
D.2	Gain	33
D.3	Size.....	34
Annex E	(informative) Determination of contact transfer correction factors.....	35
E.1	General.....	35
E.2	Measurement.....	35
E.3	Evaluation.....	35
Bibliography		38

Introduction

This International Standard is based on EN 583-2:2001, *Non-destructive testing — Ultrasonic examination — Part 2: Sensitivity and range setting*.

The following International Standards 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 — Examination 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*

Non-destructive testing — Ultrasonic testing — Sensitivity and range setting

1 Scope

This International Standard specifies the general rules for setting the timebase range and sensitivity (i. e. gain adjustment) of a manually operated ultrasonic flaw detector with A-scan display in order that reproducible measurements may be made of the location and echo height of a reflector.

It is applicable to techniques employing a single contact probe with either a single or twin transducers, but excludes the immersion technique and techniques employing more than one probe.

2 Normative references

The following referenced documents are indispensable for the application 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 7963, *Non-destructive testing — Ultrasonic testing — Specification for calibration block No. 2*

EN 12668-3, *Non-destructive testing — Characterization and verification of ultrasonic examination equipment — Part 3: Combined equipment*

3 General

3.1 Quantities and symbols

A full list of the quantities and symbols used throughout this International Standard is given in Annex A.

3.2 Test objects, reference blocks and reference reflectors

Requirements for geometrical features of test objects, reference blocks and reference reflectors in general are contained in Annex B.

3.3 Categories of test objects

The requirements for range and sensitivity setting will depend on the geometrical form of the test object. Five categories of test objects are defined in Table 1.