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Oförstörande provning – Tjockleksmätning med ultraljud (ISO 16809:2017)

Non-destructive testing – Ultrasonic thickness measurement (ISO 16809:2017)

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Europastandarden EN ISO 16809:2019 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 16809:2019.

Denna standard ersätter SS-EN 14127:2011, utgåva 2

The European Standard EN ISO 16809:2019 has the status of a Swedish Standard. This document contains the official version of EN ISO 16809:2019.

This standard supersedes the SS-EN 14127:2011, edition 2

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Ultraljudsprovning, SIS/TK 125/AG 02.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 16809

June 2019

ICS 19.100

Supersedes EN 14127:2011

English Version

Non-destructive testing - Ultrasonic thickness measurement (ISO 16809:2017)

Essais non destructifs - Mesurage de l'épaisseur par ultrasons (ISO 16809:2017)

Zerstörungsfreie Prüfung - Dickenmessung mit Ultraschall (ISO 16809:2017)

This European Standard was approved by CEN on 8 April 2019.

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.

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

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

Ref. No. EN ISO 16809:2019: E

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European foreword

The text of ISO 16809:2017 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 16809:2019 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 December 2019, and conflicting national standards shall be withdrawn at the latest by December 2019.

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 14127:2011.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 16809:2017 has been approved by CEN as EN ISO 16809:2019 without any modification.

Non-destructive testing — Ultrasonic thickness measurement

1 Scope

This document specifies the principles for ultrasonic thickness measurement of metallic and non-metallic materials by direct contact, based on measurement of 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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5577 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Measurement modes

The thickness of a part or structure 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 with the transit time and dividing by the number of times the pulse transits the material wall.

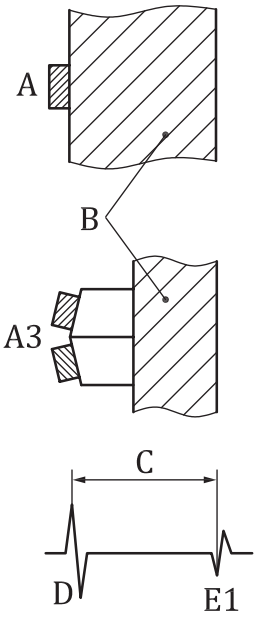
This principle can be accomplished by applying one of the following modes, see Figure 1.

1) **Mode 1:** Measure the transit time from an initial excitation pulse to a first returning echo, minus a zero correction to account for the thickness of the probe's wear plate and the couplant layer (single-echo mode).

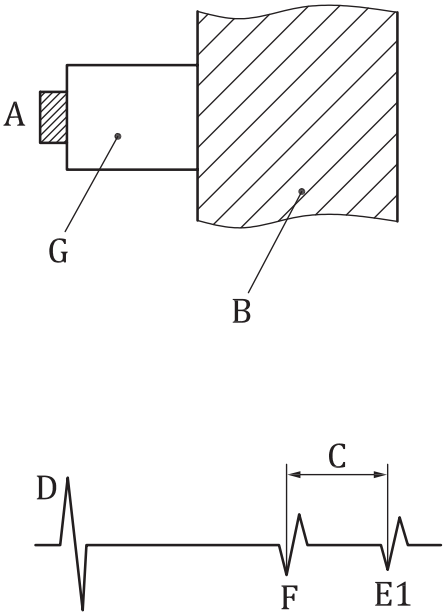
2) **Mode 2:** Measure the transit time from the end of a delay line to the first back wall echo (single-echo delay line mode).

3) **Mode 3:** Measure the transit time between back wall echoes (multiple-echo mode).

4) **Mode 4:** Measure the transit time for a pulse travelling from the transmitter to a receiver in contact with the back wall (through-transmission mode).



Mode 1



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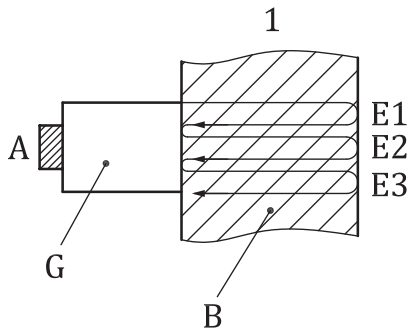

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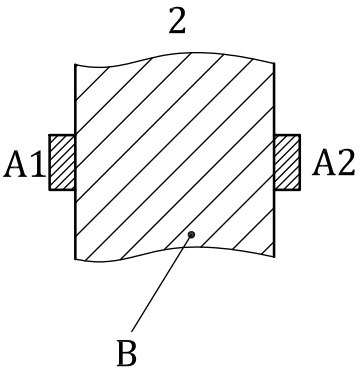

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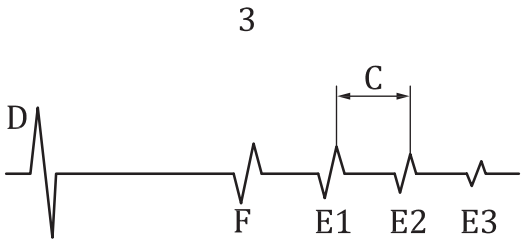

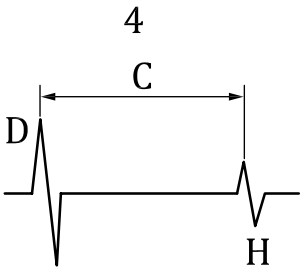

Key

A	transmit/receive probe	D	transmission pulse indication
A1	transmit probe	E1 to E3	back wall echoes
A2	receive probe	F	interface echo
A3	dual-element probe	G	delay path
B	test object	H	received pulse
C	sound path travel time		

Figure 1 — Measurement modes

5 General requirements

5.1 Instruments

The following types of instruments shall be used to achieve thickness measurement:

a) dedicated ultrasonic thickness measurement instruments with numerical display showing the measured value;

b) dedicated ultrasonic thickness measurement instruments with numerical display showing the measured value and A-scan presentation (waveform display);

c) instruments designed primarily for the detection of discontinuities with A-scan presentation of signals. This type of instrument can also include numerical display of thickness values.

See 6.4.

5.2 Probes

The following types of probes shall be used; these are generally longitudinal wave probes:

— dual-element probes;

— single-element probes.

See 6.3.

5.3 Couplant

Acoustic contact between probe (probes) and material shall be provided, normally by application of a fluid or gel.

The couplant shall not have any adverse effect on the test object, the equipment or represent a health hazard to the operator.

For the use of the couplant in special measuring conditions, see 6.6.

The coupling medium should be chosen to suit the surface conditions and the irregularities of the surface to ensure adequate coupling.

5.4 Reference blocks

The measuring system shall be calibrated on one or more samples or reference blocks representative of the object to be measured, i.e. having comparable dimensions, material and structure. The thickness of the blocks or the steps should cover the range of thickness to be measured. Either the thickness or the sound velocity of the reference blocks shall be known.

5.5 Test objects

The object to be measured shall allow for ultrasonic wave propagation.

There shall be free access to each individual area to be measured.

The surface of the area to be measured shall be free of all dirt, grease, lint, scale, welding flux and spatter, oil or other extraneous matter that could interfere with the testing.

If the surface is coated, the coating shall have good adhesion to the material. Otherwise it shall be removed.