SLOVENSKI STANDARD
SIST EN ISO 16827:2014

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Nadomešča:
SIST EN 583-5:2001
SIST EN 583-5:2001/A1:2004

Neporušitvene preiskave - Ultrazvočne preiskave - Karakterizacija in velikosti nezveznosti (ISO 16827:2012)

Non-destructive testing - Ultrasonic testing - Characterization and sizing of discontinuities (ISO 16827:2012)

Zerstörungsfreie Prüfung - Ultraschallprüfung - Beschreibung und Größenbestimmung von Inhomogenitäten (ISO 16827:2012)

Essais non destructifs - Contrôle par ultrasons - Caractérisation et dimensionnement des discontinuités (ISO 16827:2012)

Ta slovenski standard je istoveten z: **EN ISO 16827:2014**

ICS:

19.100	Neporušitveno preskušanje	Non-destructive testing

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Non-destructive testing - Ultrasonic testing - Characterization and sizing of discontinuities (ISO 16827:2012)

Essais non destructifs - Contrôle par ultrasons - Caractérisation et dimensionnement des discontinuités (ISO 16827:2012)

Zerstörungsfreie Prüfung - Ultraschallprüfung - Beschreibung und Größenbestimmung von Inhomogenitäten (ISO 16827:2012)

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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

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Foreword

The text of ISO 16827:2012 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 16827:2014 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of an identical text or by endorsement, at the latest by September 2014, and conflicting national standards shall be withdrawn at the latest by September 2014.

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Endorsement notice

The text of ISO 16827:2012 has been approved by CEN as EN ISO 16827:2014 without any modification.

INTERNATIONAL STANDARD

ISO 16827

First edition
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Non-destructive testing — Ultrasonic testing — Characterization and sizing of discontinuities

Essais non destructifs — Contrôle par ultrasons — Caractérisation et dimensionnement des discontinuités

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 16827 was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 3, *Ultrasonic testing*.

Introduction

This International Standard is based on EN 583-5:2000+A1:2003, *Non-destructive testing — Ultrasonic examination — Part 5: Characterization and sizing of discontinuities*.

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 — Characterization and sizing of discontinuities

1 Scope

This document specifies the general principles and techniques for the characterization and sizing of previously detected discontinuities in order to ensure their evaluation against applicable acceptance criteria. It is applicable, in general terms, to discontinuities in those materials and applications covered by ISO 16810.

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 16810:2012, *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 16828, *Non-destructive testing — Ultrasonic testing — Time-of-flight diffraction technique as a method for detection and sizing of discontinuities*

ISO 23279, *Non-destructive testing of welds — Ultrasonic testing — Characterization of indications in welds*

3 Principles of characterization of discontinuities

3.1 General

Characterization of a discontinuity involves the determination of those features which are necessary for its evaluation with respect to known acceptance criteria.

Characterization of a discontinuity may include:

a) determination of basic ultrasonic parameters (echo height, time of flight);

b) determination of its basic shape and orientation;

c) sizing, which may take the form of either:

   i) the measurement of one or more dimensions (or area/volume), within the limitations of the methods; or

   ii) the measurement of some agreed parameter e.g. echo height, where this is taken as representative of its physical size;

d) location e.g. the proximity to the surface or to other discontinuities;

e) determination of any other parameters or characteristics that may be necessary for complete evaluation;

f) assessment of probable nature, e.g. crack or inclusion, where adequate knowledge of the test object and its manufacturing history makes this feasible.

Where the examination of a test object in accordance with the principles of ISO 16810 yields sufficient data on the discontinuity for its evaluation against the applicable acceptance criteria, no further characterization is necessary.

The techniques used for characterization shall be specified in conjunction with the applicable acceptance criteria.

3.2 Requirements for surface condition

The surface finish and profile shall be such that it permits sizing of discontinuities with the desired accuracy. In general the smoother and flatter the surface the more accurate the results will be.

For most practical purposes a surface finish of Ra = 6,3 µm for machined surfaces and 12,5 µm for shotblasted surfaces are recommended. The gap between the probe and the surface should not exceed 0,5 mm.

The above surface requirements should normally be limited to those areas from which sizing is to be carried out as, in general, they are unnecessary for discontinuity detection.

The method of surface preparation shall not produce a surface that gives rise to a high level of surface noise.

4 Pulse echo techniques

4.1 General

The principal ultrasonic characteristics/parameters of a discontinuity that are most commonly used for evaluation by the pulse echo techniques are described in 4.2 to 4.7 inclusive.

The characteristics/parameters to be determined shall be defined in the applicable standard or any relevant contractual document, and shall meet the requirements of 10.1 of ISO 16810:2012.

4.2 Location of discontinuity

The location of a discontinuity is defined as its position within a test object with respect to an agreed system of reference co-ordinates.

It shall be determined in relation to one or more datum points and with reference to the index point and beam angle of the probe, and measurement of the probe position and beam path length at which the maximum echo height is observed.

Depending on the geometry of the test object under examination, and the type of discontinuity, it may be necessary to confirm the location of the discontinuity from another direction, or with another probe angle, to ensure that the echo is not caused e.g. by a wave mode change at a geometrical feature of the test object.

4.3 Orientation of discontinuity

The orientation of a discontinuity is defined as the direction or plane along which the discontinuity has its major axis (axes) with respect to a datum reference on the test object.

The orientation can be determined by a geometrical reconstruction analogous to that described for location, with the difference that more beam angles and/or scanning directions are generally necessary than for simple location.

The orientation may also be determined from observation of the scanning direction at which the maximum echo height is obtained.

In several applications, the precise determination of the discontinuity orientation in space is not required, only the determination of the projection of the discontinuity onto one or more pre-established planes and/or sections within the test object.

4.4 Assessment of multiple indications

The method for distinguishing between single and multiple discontinuities may be based on either qualitative assessment or quantitative criteria.

The qualitative determination consists of ascertaining, through the observation of the variations of the ultrasonic indications, whether or not such indications correspond to one or more separate discontinuities. Figure 1 shows typical examples of signals from grouped discontinuities in a forging or casting.

Where acceptance criteria are expressed in terms of maximum allowable dimensions, preliminary quantitative measurements shall be made in order to determine whether separate discontinuities are to be evaluated individually or collectively according to pre-established rules governing the evaluation of the group.

Such rules may be based on the concentration of individual discontinuities within the group, expressed in terms of the total of their lengths, areas or volumes in relation to the overall length, area or volume of the group. Alternatively, the rules may specify the minimum distance between individual discontinuities, often as a ratio of the dimensions of the adjacent discontinuities.

Where a more accurate characterization of a group of indications is required, an attempt may be made to determine whether the echoes arise from a series of closely spaced but separate discontinuities, or from a single continuous discontinuity having a number of separate reflecting facets, using the techniques described in Annex A.

4.5 Shape of discontinuity

4.5.1 Simple classification

There are a limited number of basic reflector shapes that may be identified by ultrasonic testing. In many cases evaluation against the applicable acceptance criteria only requires a relatively simple classification, described in B.1. According to this, the discontinuity is classified as either:

1) point, i.e. having no significant extent in any direction;

2) elongated, i.e. having a significant extent in one direction only;

3) complex, i.e. having a significant extent in more than one direction.

   When required, this classification may be sub-divided into:

   a) planar, i.e. having a significant extent in 2 directions only, and

   b) volumetric, i.e., having a significant extent in 3 directions.

Depending upon the requirements of the acceptance standard, either:

a) separate acceptance criteria may apply to each of the above classifications, or

b) the discontinuity, independently of its point, elongated or complex configuration, is projected on one or more pre-established sections, and each projection is conservatively treated as a crack-like planar discontinuity.

Simple classification will normally be limited to the use of those probes and techniques specified in the examination procedure. Additional probes or techniques shall only be used where agreed.