



SLOVENSKI STANDARD
SIST EN 1713:1999

01-december-1999

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Non-destructive examination of welds - Ultrasonic examination - Characterization of indications in welds

Zerstörungsfreie Prüfung von Schweißverbindungen - Ultraschallprüfung - Charakterisierung von Anzeigen in Schweißnähten

Contrôle non destructif des assemblages soudés - Contrôle par ultrasons - Caractérisation des indications dans les assemblages soudés

<https://standards.iteh.ai/catalog/standards/sist/bb05171e-329f-4196-93e8-f91928728d93/sist-en-1713-1999>

Ta slovenski standard je istoveten z: EN 1713:1998

ICS:

25.160.40 Varjeni spoji in vari Welded joints

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1713

May 1998

ICS 25.160.40

Descriptors: welded joints, non-destructive tests, quality control, weld defects, ultrasonic tests, characteristics, classifications

English version

Non-destructive examination of welds - Ultrasonic examination - Characterization of indications in welds

Contrôle non destructif des assemblages soudés - Contrôle
par ultrasons - Caractérisation des indications dans les
assemblages soudés

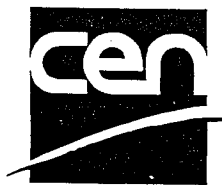
Zerstörungsfreie Prüfung von Schweißverbindungen -
Ultraschallprüfung - Charakterisierung von Anzeigen in
Schweißnähten

This European Standard was approved by CEN on 1 May 1998.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS.

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 November 1998, and conflicting national standards shall be withdrawn at the latest by November 1998.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

Classification of indications as planar or non-planar is based on several parameters :

- welding techniques ;
- geometrical position of the indication ;
- maximum echo height ;
- directional reflectivity ;
- echostatic pattern (i.e. A-Scan) ;
- echodynamic pattern.

The process of classification involves examining each of the parameters against all the others in order to arrive at an accurate conclusion.

For guidance, the flowchart in annex A gives the classification of internal weld indications suitable for general applications. This flowchart should be applied in conjunction with the two first parameters listed above and not taken in isolation.

Such classification should only be carried out, in accordance with EN 1712, if agreed between the contracting parties.

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1 Scope <https://standards.iteh.ai/catalog/standards/sist/bb05171e-329f-4196-93e8-f91928728d93/sist-en-1713-1999>

This standard defines a flowchart procedure, see annex A, which is devoted to the classification of internal indications as planar or non-planar.

This standard is only suitable for indications located at least 5 mm below the unground surface of the joint, see figure 1.

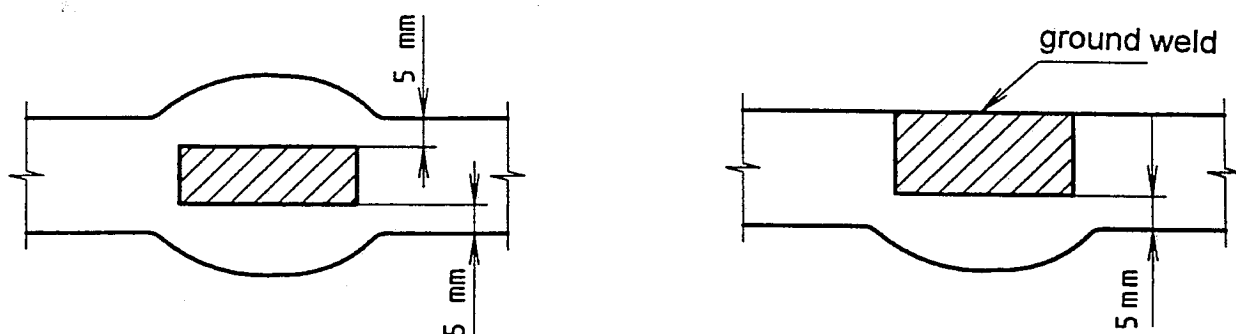


Figure 1: Location of indications

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 1712 Non destructive examination of welds - Ultrasonic examination of welded joints - Acceptance levels

3 Description

3.1 General

The classification is carried out by the successive application of several discriminatory criteria namely :

- echo amplitude ;
- directional reflectivity ;
- echostatic pattern (A-SCAN) ;
- echodynamic pattern.

The flowchart procedure is stopped as soon as one of the above criteria is fulfilled.

The probes used for the classification are, as a general rule, the same as those specified for the detection.

The flowchart procedure standardizes a quality control system of classification. Several levels are defined in decibels (dB) by a comparison with the distance amplitude curve (DAC) or by a comparison between the maximum echo heights from the discontinuity when tested at different angles of incidence.

Proposed dB levels for the different stages in the flowchart procedure are given in table 1.

Table 1: Different stages in the flowchart procedure

S1	S2	S3	S4
DAC - 10 dB	DAC + 6 dB	DAC - 6 dB	9 dB/15 dB

The flowchart procedure calls for five stages, each of them having a precise aim :

- 1st stage: to avoid the classification of indications with very low echo amplitudes ;
- 2nd stage: to classify all indications with high echo amplitude as planar ;
- 3rd stage: primarily to classify lack of fusion ;

- 4th stage: primarily to classify inclusions ;
- 5th stage: primarily to classify cracks.

NOTE: The "hybrid" indications resulting from the association of an inclusion and lack of fusion are classified as planar by the flowchart procedure. An example of this type of flaw is given in figure A.3.

3.2 Conventions used

The reference echoes shall be obtained on 3 mm side drilled holes.

By convention:

- a negative level value means that the indication has a lower echo amplitude than the reference ;
- a positive level value means that the indication has a higher echo amplitude than the reference.

3.3 Echo height criteria

3.3.1 Low amplitudes (stage 1)

It is accepted that an indication with a lower echo amplitude than level S1 (DAC - 10 dB) is not significant.

For special applications this value S1 should be lowered if agreed between the contracting parties

3.3.2 High amplitudes (stage 2)

It is assumed that an echo height that is at least equal to the level S2 (DAC + 6dB) comes from a planar indication.

3.4 Directional reflectivity criteria (stage 3)

This stage of the flowchart procedure shall be applicable either to all indications or, if agreed between the contracting parties, only to those indications exceeding a specified length. For the range of thicknesses $8 \text{ mm} \leq t < 15 \text{ mm}$, this length is t and for thicknesses over 15 mm, this length is $t/2$ or 20 mm, whichever is the larger. For indications not exceeding the specified length proceed to stage 4.

For the criteria below, the angle of incidence of examination which gives the highest echo amplitude, relative to a DAC curve, is taken as reference (H_{dmax}). The minimum echo amplitude, relative to a DAC curve, obtained from the other angles of incidence (H_{dmin}), is compared with H_{dmax} .

To satisfy the directional reflectivity, the two following conditions shall be simultaneously fulfilled :

1) The reflectivity of the indication, for at least one of the angles of incidence is higher than, or equal to, S3 (DAC - 6 dB).

2) There is a high directional reflectivity, namely either:

a) Imbalance of, at least, 9 dB between two angles of incidence of examination, if the examination is carried out with shear waves.

$$|H_{dmax} - H_{dmin}| \geq 9 \text{ dB.}$$

b) Imbalance of, at least, 15 dB between two angles of incidence of examination, where one of them is carried out with shear waves, the other with longitudinal waves.

$$|H_{dmax} - H_{dmin}| \geq 15 \text{ dB.}$$

The incidence of examination results from the association of a refraction angle and examination conditions (half skip, full skip). Some examples are given in annex B.

An example of the application of these criteria is given in figure A.2.

The attenuation of the weld could be taken into account.

Application conditions :

- a) normally the wave length of the different angles of incidence of examination shall be almost the same (example: 4 MHz for longitudinal waves and 2 MHz for shear waves) ;
- b) in all cases, the differences between the compared angles of incidence is equal to or greater than 10° (the nominal refraction angles are taken into account) ;
- c) the comparison of reflectivities shall be made at the position on the indication which exhibits the highest reflectivity ;
- d) such comparisons make sense only if it is certain that the compared echoes come from the same reflectors ;
- e) it shall be certain before the application of these criteria, that :
 - there is no segregation in the base metal ;
 - there is no corrosion, and the two sides are parallel if full skip is used ;
 - the materials are isotropic.

3.5 Echostatic pattern criteria (stage 4)

At this stage, the echostatic pattern (i.e. A-Scan) is considered.