



SLOVENSKI STANDARD
oSIST prEN 1712:2007

01-september-2007

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Non-destructive testing of welds - Ultrasonic testing of welded joints - Acceptance levels

Zerstörungsfreie Prüfung von Schweißverbindungen - Ultraschallprüfung von Schweißverbindungen - Zulässigkeitsgrenzen

Contrôle non destructif des assemblages soudés - Contrôle par ultrasons des assemblages soudés - Niveaux d'acceptation

Ta slovenski standard je istoveten z: prEN 1712

SIST EN ISO 11666:2011

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ICS:

25.160.40 Varjeni spoji in vari Welded joints

oSIST prEN 1712:2007

en

June 2007

ICS

Will supersede EN 1712:1997

English Version

Non-destructive testing of welds - Ultrasonic testing of welded joints - Acceptance levels

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 121.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN 1712:2007) has been prepared by Technical Committee CEN/TC 121 “Welding”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1712:1997.

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1 Scope

This European Standard specifies ultrasonic acceptance levels, 2 and 3, for full penetration welded joints in ferritic steels, which correspond to the quality levels B and C of EN ISO 5817. Other acceptance levels can be used by specification.

An acceptance level corresponding to level D of EN ISO 5817 has not been included in this standard as ultrasonic testing is generally not requested for this weld quality.

These acceptance levels are applicable to testing carried out in accordance with EN 1714.

The standard is applicable to the examination of full penetration ferritic steel welds, with thicknesses from 8 mm up to 100 mm. It can also be used for other types of welds, materials and thicknesses above 100 mm, provided the examinations have been performed with necessary consideration of the geometry and acoustical properties of the component and an adequate sensitivity can be employed to enable the acceptance levels of this standard to be applied. The nominal frequency of probes used in this European Standard is between 2 MHz and 5 MHz unless attenuation or requirements for higher resolution call for another frequency. The use of these acceptance levels in conjunction with frequencies outside this range needs to be considered carefully.

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.

EN 1713, *Non-destructive testing of welds – Ultrasonic testing – Characterization of indications in welds*

EN 1714, *Non-destructive testing of welds – Ultrasonic testing of welded joints*

EN 12062, *Non-destructive testing of welds – General rules for metallic materials*

EN ISO 5817, *Arc-welded joints in steel – Guidance on quality levels for imperfections (ISO 5817:2003)*

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3 Measurement of indication length

The length of an indication shall be determined by measuring the distance along the length over which the echo amplitude is above the evaluation level, using the fixed amplitude level technique described in Annex B.

4 New levels

The sensitivity setting may be performed by one of the following methods. For sensitivity setting and the subsequent examinations the same technique shall be used:

- Technique 1: Based on 3 mm dia side drilled holes
- Technique 2: Based on the distance-gain-size system (DGS) using flat bottomed holes
- Technique 3: Using a DAC curve of a rectangular notch of 1 mm depth and 1 mm width

This technique is applicable only for beam angles $\geq 70^\circ$ and only for material thickness $t \leq 15$ mm.

- Technique 4: Using the tandem technique with reference to a 6 mm dia flat bottomed hole.

This technique is applicable only for beam angle 45° and thickness $t \geq 15$ mm.

Four levels are defined. All levels are linked to the reference reflectors given in table A.1 and listed above for the technique used:

- Reference level
- Evaluation level
- Recording levels (for two acceptance levels, reference levels is - 4 dB below acceptance level)
- Acceptance level (for two quality levels)

5 Acceptance levels

5.1 General

The relationship between acceptance levels and quality levels is given in EN 12062. Any other relationship between acceptance levels and testing levels shall be defined by specification.

The acceptance levels in this document are valid for all testing levels and for all techniques as defined in EN 1714, including tests with straight beam probes.

If characterisation has been specified in accordance with EN 1713, planar indications are not acceptable. For non-planar indications, the acceptance levels in this document apply.

5.2 Longitudinal indications

Table A.1 gives information on the techniques used for evaluation of indications according to EN 1714 and the related evaluation and acceptance levels. Table A.2 specifies the acceptance levels for technique 2 using transverse waves. Table A.3 specifies the acceptance levels for technique 2 using longitudinal waves.

- Techniques 1 (side drilled holes) and 3 (rectangular notch): see Figures A.1 to A.4

- Techniques 2 (disk-shaped reflectors) and 4 (tandem technique): see Figures A.5 to A.8.

Any indication with an amplitude below the acceptance level but with a length (above evaluation level) exceeding t , for the thickness range of $8 \text{ mm} \leq t < 15 \text{ mm}$, or $t/2$ or 20 mm, whichever is the larger, for all other thickness ranges, shall be subject to further testing. This requires the use of additional probe angle(s), and if specified the tandem technique.

The final evaluation shall be based on the maximum echo amplitude and length measured.

5.3 Transverse indications

When detection of transverse indications is specified, the acceptance levels stated in 4.2 are applicable.

5.4 Linearly aligned and grouped indications

Linearly aligned indications shall be considered as continuous if they are separated by a distance, d_x , of less than twice the length of the longest indication. The total, combined length shall then be assessed against appropriate acceptance levels.

Linearly aligned indications shall satisfy the following :

$$d_y \leq 5 \text{ mm}, d_z \leq 5 \text{ mm}, \text{ see figure 1.}$$

Adjacent indications grouped in this way shall not be used for further grouping with additional indications. Only discrete indications shall be subject to grouping.

After grouping, any recorded and accepted indications in the same cross section and depth position ($d_z \leq 5$ mm) shall be separated by a distance $d_y > 10$ mm. Indications in the same lateral position ($d_y \leq 5$ mm) shall be separated by a distance $d_z > 10$ mm. Adjacent indications with smaller distances d_y and d_z are not acceptable.

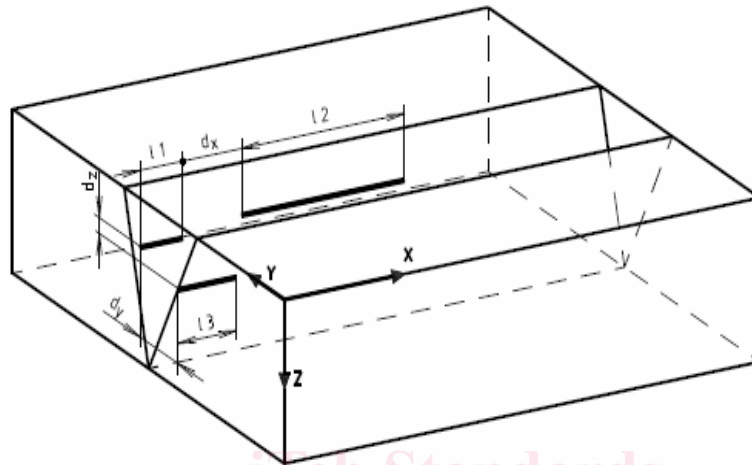


Figure 1 : Geometric configurations for grouped indications

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Two linearly aligned indications above recording level shall be considered as continuous if they are separated by a distance, dx , of less than twice the length of the longest indication. The combined length is : $l_{12} = l_1 + l_2 + dx$

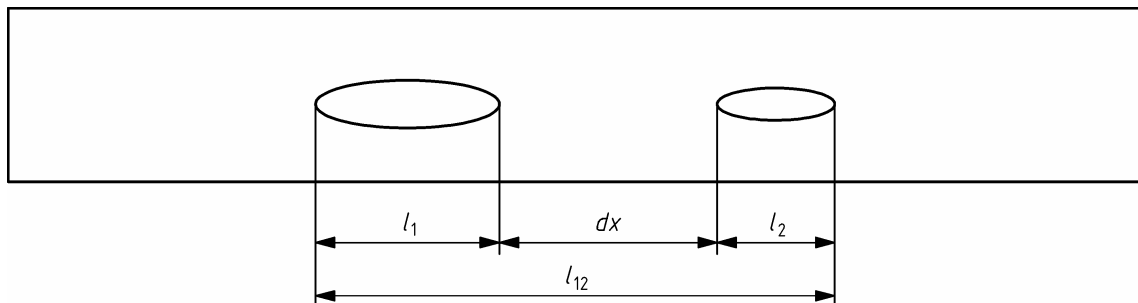


Figure 2 — Length of grouped indications

The combined length l_{12} and the larger maximum amplitude of the two indications shall then be assessed against the applicable acceptance levels given in Table A.1.

Adjacent indications grouped in this way shall not be used for further grouping with additional indications in the x-direction. Only single indications shall be subject to grouping.

5.5 Cumulative length of acceptable indications

The cumulative length of all individually acceptable indications above recording level is given as the sum of lengths of both single indications and linearly aligned indications of combined length within a given section of weld length.

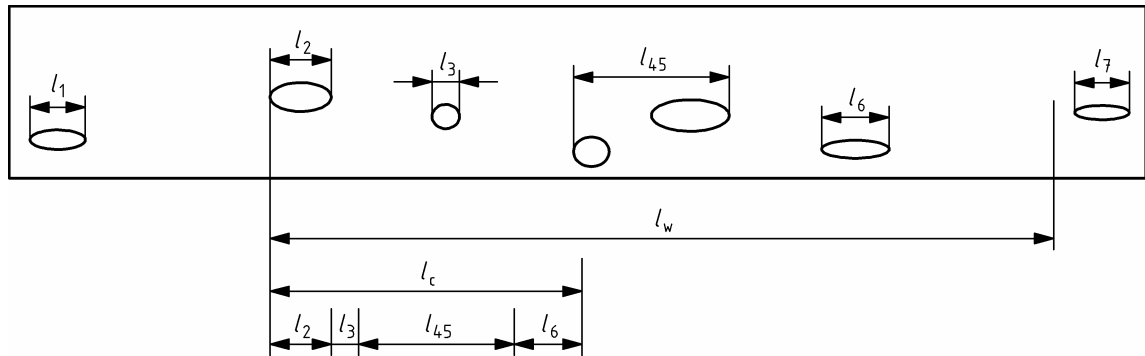


Figure 3 — Cumulative length of indications

Key

$$l_c = l_2 + l_3 + l_4 + l_5$$

For any section of weld length equal to l_w , the maximum cumulative length of all individually acceptable indications above the recording level, shall not exceed 20 % of this length for acceptance level 2, or 30 % of this length for acceptance level 3, where $l_w = 6t$ for $t < 15\text{mm}$ and $l_w = 100\text{mm}$ for $t \geq 15\text{mm}$.

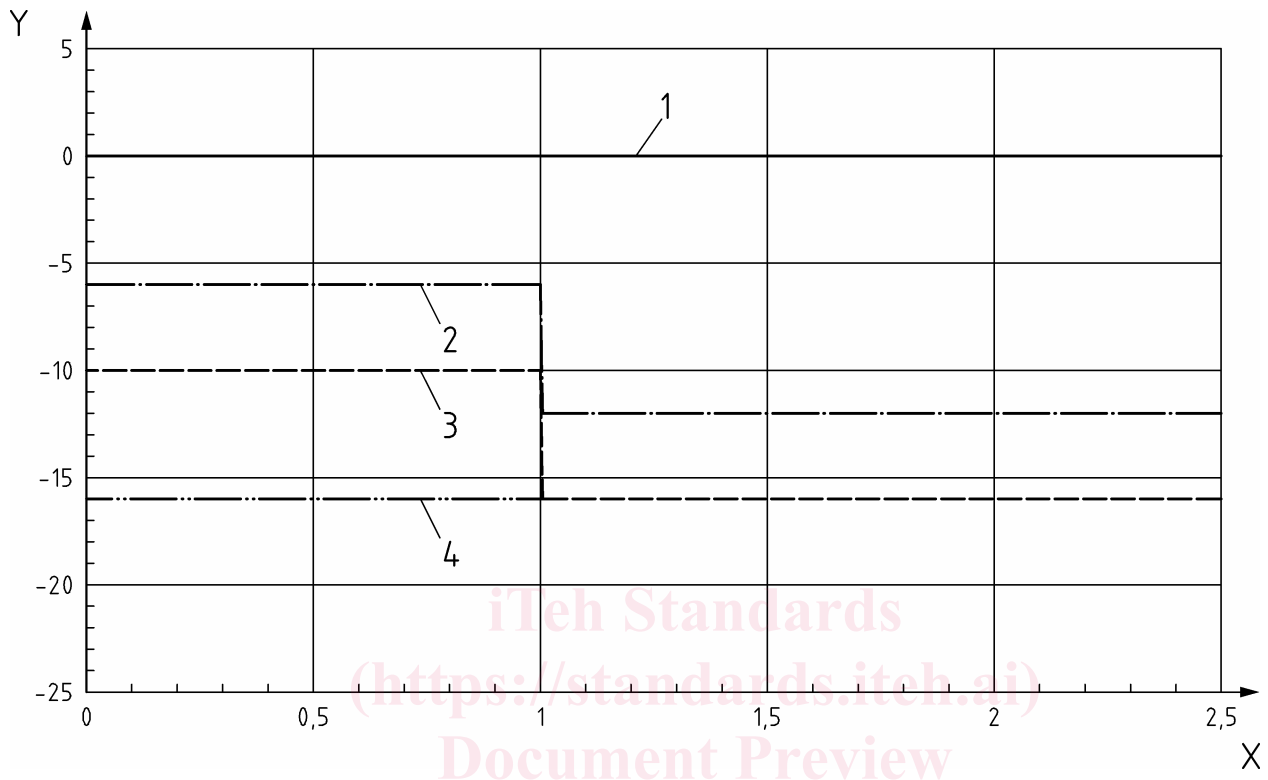
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Annex A (normative)

Levels



Key

- 1 reference level
- 2 acceptance level 2
- 3 recording level
- 4 evaluation level

- X thickness (multiples of t)
- Y relative amplitude in dB

Figure A.1 — Levels for techniques 1 and 3 for thickness 8mm to 15 mm - Acceptance level 2