SLOVENSKI STANDARD
SIST EN 15617:2009

01-maj-2009

Neporuġitvene preiskave zvarov - Metoda ultrazvoļ ne difrakcije za odkrivanje in ugotavljanje velikosti nepopolnosti (TOFD) - Stopnje sprejemljivosti

Non-destructive testing of welds - Time-of-flight diffraction technique (TOFD) - Acceptance levels

Zerstörungsfreie Prüfung von Schweißverbindungen - Beugungslaufzeittechnik (TOFD) - Zulässigkeitsgrenzen

Essais non destructifs des assemblages soudés - Technique de diffraction des temps de vol (méthode TOFD) - Niveaux d'acceptation

Ta slovenski standard je istoveten z: **EN 15617:2009**

ICS:

25.160.40	Varjeni spoji in vari	Welded joints

SIST EN 15617:2009 **en,fr**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15617

March 2009

ICS 25.160.40

English Version

Non-destructive testing of welds - Time-of-flight diffraction technique (TOFD) - Acceptance levels

Essais non destructifs des assemblages soudés - Technique de diffraction des temps de vol (méthode TOFD) - Niveaux d'acceptation

Zerstörungsfreie Prüfung von Schweißverbindungen - Beugungslaufzeittechnik (TOFD) - Zulässigkeitsgrenzen

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Ref. No. EN 15617:2009: E

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Foreword

This document (EN 15617:2009) has been prepared by Technical Committee CEN/TC 121 “Welding”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by September 2009.

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1 Scope

This European standard specifies acceptance levels for the time-of-flight diffraction technique (TOFD) of full penetration welds in ferritic steels from 6 mm up to 300 mm thickness which correspond to the quality levels of EN ISO 5817.

These acceptance levels are applicable to indications classified in accordance with CEN/TS 14751.

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.

CEN/TS 14751, *Welding — Use of time-of-flight diffraction technique (TOFD) for examination of welds*

EN ISO 5817, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections (ISO 5817:2003, corrected version:2005, including Technical Corrigendum 1:2006)*

3 Symbols, terms and definitions

3.1 Symbols

h height of an indication (see Figures 1, 2 and 3)

l length of an indication (see Figures 1, 2 and 3)

t nominal wall thickness in accordance with construction drawing or dimension table (see Figures 1, 2 and 3)

3.2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.2.1
embedded discontinuity
discontinuity within the volume of the material, separated from the surfaces

3.2.2
surface-breaking discontinuity
discontinuity connected to the near (contact) surface or far (reflecting) surface

4 Relation between quality levels and acceptance levels

Three different acceptance levels are defined. The relation between these acceptance levels and the quality levels as mentioned in EN ISO 5817 are given in Table 1.

Table 1 — Acceptance levels

Quality level according to EN ISO 5817	Examination level in accordance with CEN/TS 14751	Acceptance level
B (Stringent)	C	1
C (Intermediate)	at least B	2
D (Moderate)	at least A	3

5 Definition and determination of length and height

5.1 General

The size of a discontinuity is described by the length and height of its indication.

Length is defined by the difference of the x-coordinates of the indication.

The height is defined as the maximum difference of the z-coordinates at any given x-position.

5.2 Determination of length

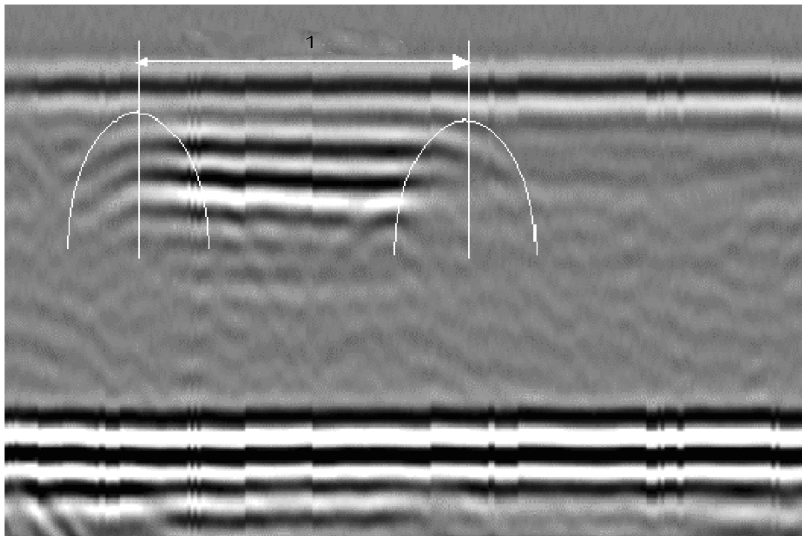
5.2.1 General

Dependent upon the type of indication, one of the techniques for length sizing according to 5.2.2 or 5.2.3 shall be applied:

5.2.2 Length sizing of elongated straight indications

This type of indication does not change significantly in the through-wall direction.

A hyperbolic cursor is fitted to the indication. Assuming the discontinuity is elongated and has a finite length, this will only be possible at each end. The distance moved between acceptable fits at each end of the indication is taken to represent the length of the discontinuity (see Figure 1).



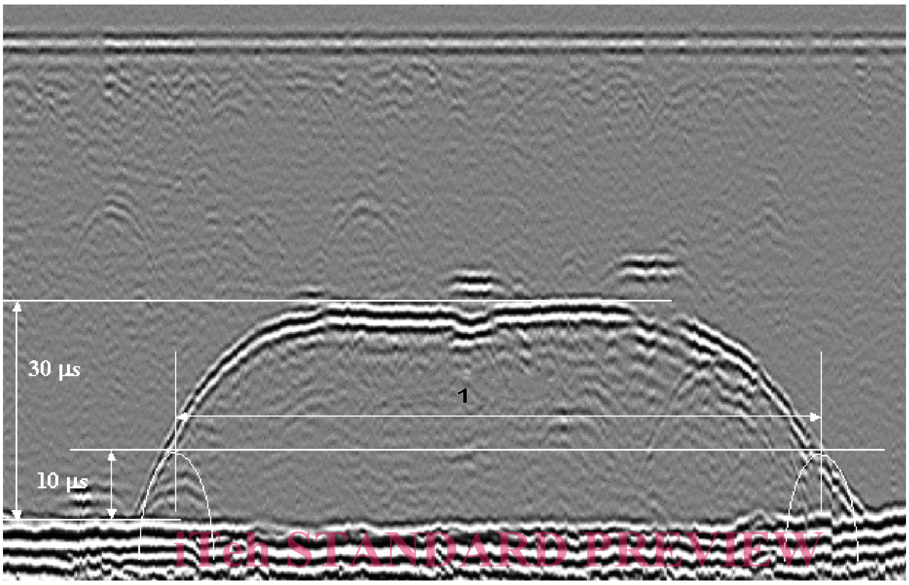
Key
1 Length of indication

Figure 1 — Length sizing by fitting arc-shaped cursors

5.2.3 Length sizing of elongated curved indications

This type of indication does change significantly in the through-wall direction.

A hyperbolic cursor is positioned at either end of the indication at a time delay of one third of the indication penetration. The distance moved between the cursor positions at each end of the indication is taken to represent the length of the discontinuity (see Figure 2).



Key

1 Length of indication

Figure 2 — Length sizing of elongated curved indication

5.3 Determination of height

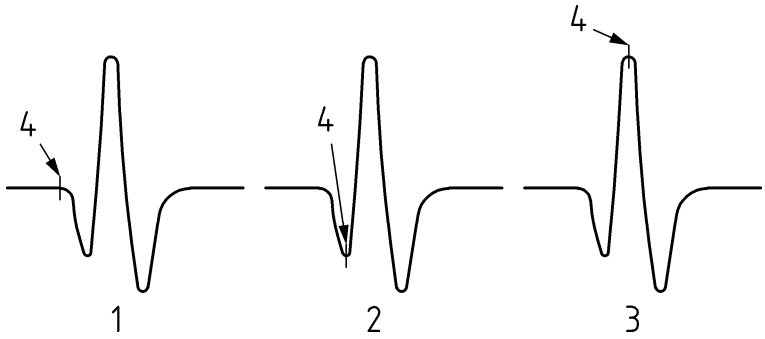
5.3.1 General

The height measurement shall be done from the A-scan and by choosing a consistent position on the signals, considering phase reversals. It is recommended to use one of the following methods:

— Method 1: by measuring the transit time between the leading edges of the signals;

— Method 2: by measuring the transit time between the first peaks;

— Method 3: by measuring the transit time between the maximum amplitudes.

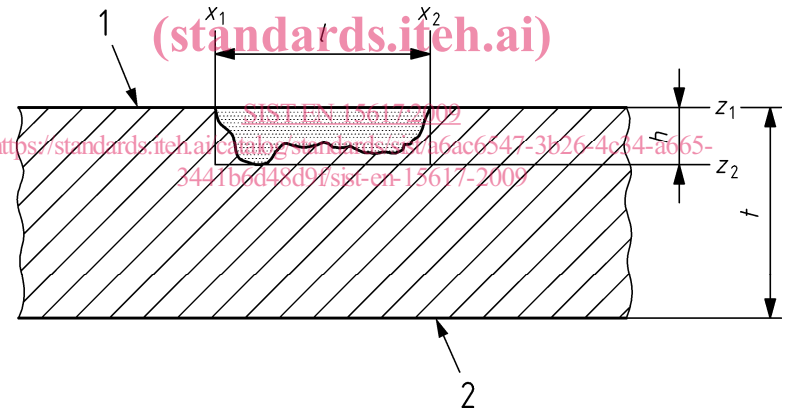


Key
1 Method 1
2 Method 2
3 Method 3
4 Positions for measuring the transit time

Figure 3 — Position of the cursor for time measurement – Methods 1, 2 and 3

5.3.2 Surface-breaking discontinuities

The height of an indication of a surface-breaking discontinuity is determined by the maximum difference between the lateral wave and the lower-tip diffraction signal.



Key
1 Scanning surface
2 Opposite surface
x_1 Start position of discontinuity
x_2 End position of discontinuity
z_1 Start depth of discontinuity
z_2 End depth of discontinuity
h Height
$l = x_2 - x_1$ length

Figure 4 — Height measurement definition of a scanning surface breaking discontinuity

For an opposite surface-breaking discontinuity, the height is determined by the maximum difference between the upper-tip diffraction signal and the back wall reflection (see Figure 5).