
Neporušitvene preiskave jeklenih cevi - 7. del: Avtomatično odkrivanje vzdolžnih napak na obodu nevarjenih in varjenih (razen obločno varjenih pod praškom) jeklenih cevi z ultrazvokom

Non destructive testing of steel tubes - Part 7: Automatic full peripheral ultrasonic testing of seamless and welded (except submerged arc welded) steel tubes for the detection of longitudinal imperfections

Zerstörungsfreie Prüfung von Stahlrohren - Teil 7: Automatische Ultraschallprüfung nahtloser und geschweißter (ausgenommen Unter-Pulver-geschweißter) Stahlrohre über den gesamten Rohrumfang zum Nachweis von Längsfehlern

[SIST EN 10246-7:1997](https://standards.iteh.ai/catalog/standards/sist/f6322529-094c-49a2-8d1d-10246-7/EN-10246-7)

Essais non-destructifs des tubes en acier - Partie 7: Contrôle automatique par ultrasons sur toute la circonférence pour la détection des imperfections longitudinales des tubes en acier sans soudure et soudés (sauf a l'arc immergé sous flux en poudre)

Ta slovenski standard je istoveten z: EN 10246-7:1996

ICS:

23.040.10	Železne in jeklene cevi	Iron and steel pipes
77.040.20	Neporušitveno preskušanje kovin	Non-destructive testing of metals

SIST EN 10246-7:1997**en**

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EUROPEAN STANDARD

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Descriptors: metal tubes, steel tubes, welded tubes, seamless tubes, non-destructive tests, ultrasonic tests, inspection, leak-tightness

English version

**Non destructive testing of steel tubes - Part 7:
Automatic full peripheral ultrasonic testing of
seamless and welded (except submerged arc
welded) steel tubes for the detection of
longitudinal imperfections**

Essais non-destructifs des tubes en acier -
Partie 7: Contrôle automatique par ultrasons
sur toute la circonférence pour la détection
des imperfections longitudinales des tubes en
acier sans soudure et soudés (sauf à l'arc
immergé sous flux en poudre)

Zerstörungsfreie Prüfung von Stahlrohren - Teil
7: Automatische Ultraschallprüfung nahtloser
und geschweißter (ausgenommen
unterpulvergeschweißter) Stahlrohre über den
gesamten Rohrfumfang zum Nachweis von
Längsfehlern

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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.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee ECISS/TC 29 "Steel tubes and fittings for steel tubes", the secretariat of which is held by UNI.

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 1996, and conflicting standards shall be withdrawn at the latest by September 1996.

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

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1 Scope

This Part of EN 10 246 specifies the requirements for automatic full peripheral ultrasonic shear wave testing of seamless and welded steel tubes, with the exception of submerged arc-weld (SAW) tubes, for the detection of longitudinal imperfections according to six different acceptance levels (see table I and associated notes).

This Part of EN 10 246 is applicable to the inspection of tubes with an outside diameter greater than 10 mm, and with an outside diameter-to-thickness ratio equal to or greater than 5.

For tubes with an outside diameter-to-thickness ratio less than 5 one of the options specified in Annex B shall be used by agreement between purchaser and manufacturer.

European Standard EN 10 246 'Non-destructive testing of steel tubes' comprises the parts shown in Annex A.

2 General requirements

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- 2.1 The ultrasonic inspection covered by this Part of EN 10246 is usually carried out on tubes after completion of all the primary production process operations.

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This inspection shall be carried out by suitably trained, qualified and competent NDT personnel approved by the manufacturer.

- 2.2 The tubes to be tested shall be sufficiently straight to ensure the validity of the test. The surfaces shall be sufficiently free from foreign matter which would interfere with the validity of the test.

3 Method of test

- 3.1 The tubes shall be tested using an ultrasonic shear wave technique for the detection of predominantly longitudinal imperfections.
- 3.2 During testing, the tubes and the transducer assembly shall be moved relative to each other so that the whole of the tube surface is scanned. The chosen relative speed of movement during testing shall not vary by more than $\pm 10\%$.

NOTE - It is recognised that there may be a short length at both tube ends which cannot be tested. Any untested ends shall be dealt with in accordance with the requirements of the appropriate product standards (see also Annex C).

- 3.3 During testing, the tubes shall be scanned in two opposing circumferential directions of beam travel, unless otherwise agreed between purchaser and manufacturer.
- 3.4 The ultrasonic test frequency to be applied shall be in the range of 1 MHz to 15 MHz dependant upon the thickness and surface finish of the tube to be tested.
- 3.5 The maximum width of each individual transducer, measured parallel to the major axis of the tube, shall be 25mm.
- For U 1 and U2 category tubes with an outside diameter equal to or less than 50mm, the width of any one transducer is normally restricted to a maximum of 12,5mm (see also 5.3).
- 3.6 The equipment shall be capable of classifying tubes as either acceptable or suspect by means of an automatic trigger/alarm combined with a marking and/or sorting system.
- 3.7 Where manual ultrasonic testing of untested tube ends and/or local suspect areas is required, this shall be carried out in accordance with Annex C.

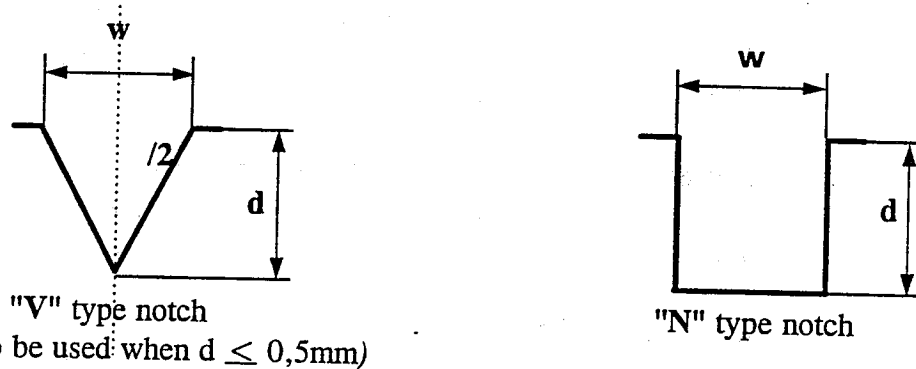
4 Reference standards

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- 4.1 The reference standards defined in this Part of EN 10246 are convenient standards for the calibration of non-destructive testing equipment. The dimensions of these standards should not be construed as the minimum size of imperfection detectable by such equipment.
- 4.2 The ultrasonic equipment shall be calibrated using a longitudinal reference notch on the outside and inside surfaces, or the outside surface only of a tubular test piece. The internal notch shall not be used when the tube internal diameter is less than 20mm, unless otherwise agreed between purchaser and manufacturer.
- 4.3 The test piece shall have the same specified diameter, thickness, surface finish and heat treated condition as the tube to be tested, and shall have similar acoustic properties (for example velocity, attenuation coefficient, etc).
- 4.4 The external and internal notches shall be sufficiently separated from the extremities of the test piece and from each other (when both are used), so that clearly distinguishable signal indications are obtained.

- 4.5 The reference notch or notches shall lie parallel to the major axis of the test piece.

The reference notch or notches shall be of the "N" type except that the "V" type notch may be used at the discretion of the manufacturer when the specified notch depth is less than or equal to 0,5mm (see figure 1). In the case of the "N" type notch, the sides shall be nominally parallel and the bottom shall be nominally square to the sides.



$= 60^\circ$, $w = \text{width}$, $d = \text{depth}$

Figure 1 - Reference notch forms
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- 4.6 The reference notch shall be formed by machining, spark erosion or other methods.

NOTE - It is recognised that the bottom or the bottom corners of the notch may be rounded.

5. Dimensions of reference notches

The dimensions of the reference notches shall be as follows:

- 5.1 **Width, w** (see figure 1) The width of the reference notch shall be 1,0mm max.
- 5.2 **Depth, d** (see figure 1)
- 5.2.1 **Reference notch depth**
The reference notch depth shall be as given in table 1.

Table 1 Acceptance level designation and corresponding reference notch depth

Acceptance level	Notch depth in % of the specified thickness (see note 1)
U1 (see note 2)	3
U2 (see note 3)	5
U3	10
U4	12,5
U5	15
U6	20

Note 1 - The values of notch depth specified in this table are the same, for the corresponding categories, in all European Standards concerning non-destructive testing of steel tubes where reference is made to different acceptance levels. It should, however, be kept in mind that although the reference standards are identical, the various test methods involved can give different test results. Accordingly the acceptance level designation prefix U (ultrasonic) has been adopted to avoid any inferred direct equivalence with other test methods

Note 2 - Acceptance level U1 is not applicable to welded tubes.

Note 3 - For welded tubes, acceptance level U2 can be used as an alternative to or in combination with U3 by agreement between purchaser and manufacturer.

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5.2.2 Minimum notch depth

The minimum notch depth is related to the type of tube used for a particular application and is denoted by a sub-category as given in table 2, unless otherwise agreed between purchaser and manufacturer.

Table 2 - Minimum notch depth categories

Sub-category	Minimum notch depth	Typical tube condition
A	0,1mm	Cold-finished and machined tubes
B	0,2mm	
C	0,3mm	All other conditions
D	0,5mm	

Note 1 - The minimum notch depth that can be used is related to specific tube manufacturing methods where the surface finish plays a dominant role in the minimum notch depth that can be adopted for ultrasonic equipment calibration in order to achieve an acceptable signal/noise ratio.

Note 2 - Sub-categories A and B do not apply to welded tubes.

5.2.3 Maximum notch depth

The maximum notch depth for all acceptance levels and sub-categories shall be 1,5mm, with exception that in the case of tubes with a thickness in excess of 50mm, the maximum notch depth, may be extended to 3,0mm unless otherwise agreed.