



SLOVENSKI STANDARD SIST EN 10246-6:2000

01-november-2000

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Non-destructive testing of steel tubes - Part 6: Automatic full peripheral ultrasonic testing of seamless steel tubes for the detection of transverse imperfections

Zerstörungsfreie Prüfung von Stahlrohren - Teil 6: Automatische Ultraschallprüfung nahtloser Stahlrohre über den gesamten Rohrumfang zum Nachweis von Querfehlern

Essais non destructifs des tubes en acier - Partie 6: contrôle automatique par ultrasons sur toute la circonférence des tubes pour la détection des imperfections transversales des tubes en acier sans soudure

Ta slovenski standard je istoveten z: EN 10246-6:1999

ICS:

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

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en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 10246-6

November 1999

ICS 23.040.10; 77.040.20

English version

Non-destructive testing of steel tubes - Part 6: Automatic full
peripheral ultrasonic testing of seamless steel tubes for the
detection of transverse imperfections

Essais non destructifs des tubes en acier - Partie 6:
Contrôle automatique par ultrasons sur toute la
circonférence des tubes pour la détection des imperfections
transversales des tubes en acier sans soudure

Zerstörungsfreie Prüfung von Stahlrohren - Teil 6:
Automatische Ultraschallprüfung nahtloser Stahlrohre über
den gesamten Rohrumfang zum Nachweis von Querfehlern

This European Standard was approved by CEN on 6 October 1999.

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.

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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 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 May 2000, and conflicting national standards shall be withdrawn at the latest by May 2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association. This European Standard is considered to be a supporting standard to those application and product standards which in themselves support an essential safety requirement of a New Approach Directive and which make reference to this European Standard.

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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1 Scope

This Part of EN 0246 specifies the requirements for automatic ultrasonic shear wave testing of seamless steel tubes for the detection of transverse imperfections. The standard specifies acceptance levels and calibration procedures.

This Part of EN 10246 is applicable to the inspection of tubes with an outside diameter equal to or greater than 10 mm.

European Standard EN 10246 "Non-destructive testing of steel tubes" comprises the Parts shown in Annex A.

2 General requirements

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.

2.2 The tubes to be tested shall be sufficiently straight and free from foreign matter as to ensure 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 transverse imperfections.

3.2 During testing the tube and the transducer assembly shall be moved relative to each other so that the whole of the tube surface is scanned.

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 B).

The relative speed during testing shall not vary by more than +10%.

3.3 During testing, the tubes shall be scanned in two opposite longitudinal directions of beam travel, unless otherwise agreed between purchase and manufacturer.

3.4 The ultrasonic test frequency applied shall be in the range of 1 MHz to 15 MHz dependant upon the thickness and surface finish of the tubes to be tested.

3.5 The maximum width of each individual transducer, measured at right angles to the major axis of tube, shall be 25 mm.

3.6 The equipment shall be capable of classifying tubes as either acceptable or suspect tubes by means of an automatic trigger/alarm level 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 B.

4 Reference standards

4.1 General

4.1.1 The reference standards defined in this Part of EN 10246 are convenient standards for calibration of non-destructive testing equipment. The dimensions of these standards should not be construed as the minimum size of imperfections detectable by such equipment.

4.1.2 The ultrasonic equipment shall be calibrated using a transverse reference notch on the outside surface of a tubular test piece. By agreement between purchaser and manufacturer and for internal diameter greater than 20 mm, both external and internal notches may be used.

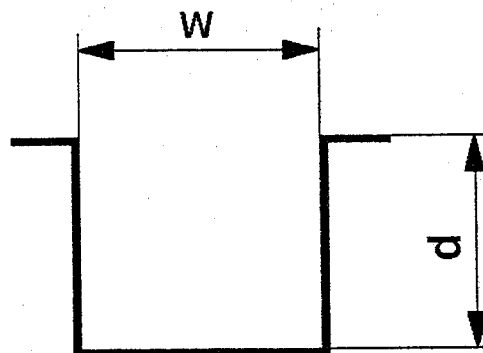
NOTE: The internal surface of the test piece may be dressed or machined prior to the preparation of the internal notch.

4.1.3 The test piece shall be of the same specified diameter, thickness, surface finish and heat treatment conditions as the tube to be tested and shall have similar acoustic properties (for example velocity, attenuation coefficient).

4.1.4 The external notch (and the internal notch when used) shall be sufficiently separated from the ends of the test piece and from each other (when both are used), so that clearly distinguishable signal indications are obtained.

4.2 Types of references notches

4.2.1 The reference notch shall be of the "N" type (see figure 1) and shall be transverse to the major axis of the tube. The sides shall be nominally parallel and the bottom shall be nominally square to the sides.



w = width d = depth

Figure 1: "N" type notch

4.2.2 The reference notch shall be formed by machining, spark erosion or other methods.

NOTE: It is recognized that the bottom or the bottom corners of the notch may be rounded.

4.2.3 The reference notch used shall be one of the form shown in figures 2 at the discretion of the manufacturer.

4.3 Dimensions of reference notch

4.3.1 The width, w (see figure 1), of the reference notch shall not be greater than 1,0 mm.

4.3.2 The reference notch depth (see figure 1) shall be as given in table 1 with the following limitations:

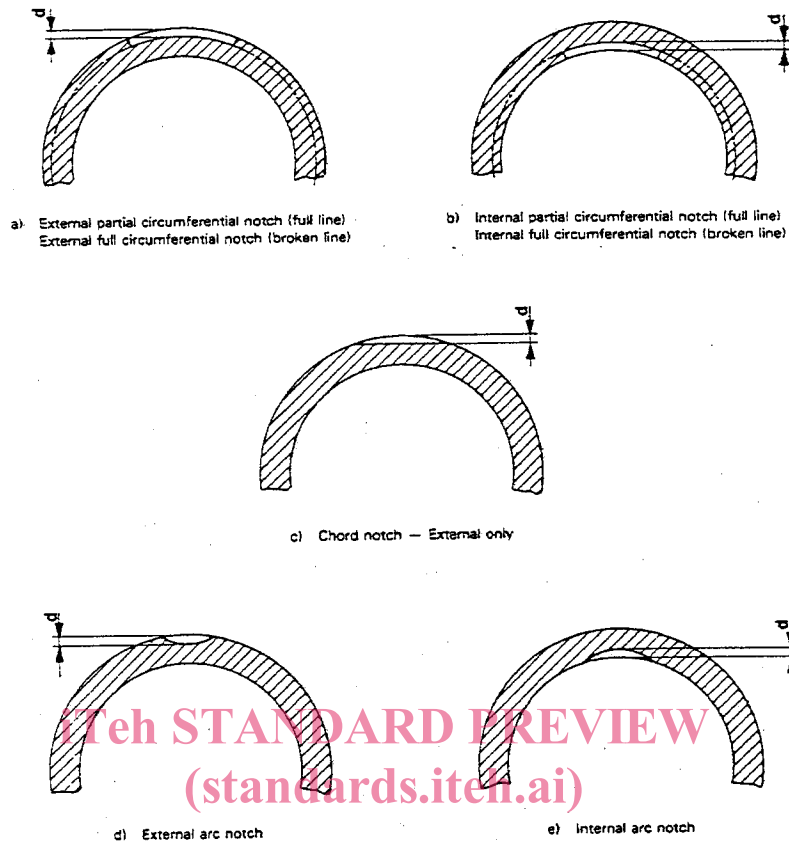
- the minimum notch depth is related to the type of tube used for a particular application and is denoted by a sub-category as given in table 2, unless otherwise agreed between purchaser and manufacturer;
- the maximum notch depth for all acceptance levels and sub-categories shall be 1,5 mm, with the exception that in the case of tubes with a thickness greater than 50 mm, the maximum notch depth shall be agreed between purchase and manufacturer.

4.3.3 The tolerance on notch depth shall be $\pm 15\%$ of the reference notch depth or $\pm 0,05$ mm whichever is the larger at the deepest point, with the exception that when the notch depth is less than 0,2 mm, the tolerance on the depth shall be $\pm 0,03$ mm.

4.3.4 The length of the reference notch, as far as it is not specified by the type of notch (chord notch, arc notch - see figures 2c to 2e), shall be at least 25 mm.

4.4 Verification of reference notch

The reference notch dimensions and shape shall be verified by a suitable technique



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Figure 2: Transverse notch forms

Table 1: Acceptance level designation and corresponding reference notch depth

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

Note. 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.