SLOVENSKI STANDARD

SIST EN 10246-4:2000

01-november-2000

Neporuġitveno preskuġanje jeklenih cevi - 4. del: Ugotavljanje preļ nih napak po celotnem obodu nevarjenih feromagnetnih cevi z avtomatsko preiskavo z magnetno sondo

Non-destructive testing of steel tubes - Part 4: Automatic full peripheral magnetic transducer/flux leakage testing of seamless ferromagnetic steel tubes for the detection of transverse imperfections

Zerstörungsfreie Prüfung von Stahlrohren - Teil 4: Automatische Magnetfeldsonden-Streuflußprüfung nahtloser ferromagnetischer Stahlrohre über den gesamten Rohrumfang zum Nachweis von Querfehlern

Essais non destructifs des tubes en acier - Partie 4: Contrôle automatique par flux de fuite a l'aide de palpeurs magnétiques sur toute la circonférence des tubes pour la détection des imperfections transversales des tubes en aciers ferromagnétiques sans soudure

Ta slovenski standard je istoveten z: EN 10246-4:1999

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 10246-4:2000 en

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 10246-4

November 1999

ICS 23.040.10; 77.040.20

English version

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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.

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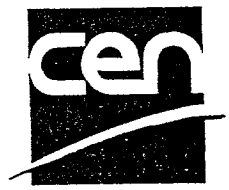

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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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.

1 Scope

This Part of EN 10246 specifies the requirements for automatic full peripheral magnetic transducer/flux leakage testing of seamless ferromagnetic steel tubes for the detection of transverse imperfections. The standard specifies acceptance levels, calibration procedures and gives guidance on the limitations of the tests.

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 magnetic transducer/flux leakage 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 a magnetic transducer/flux leakage technique for the detection of predominantly transverse imperfections (see figure 1). No limits on thickness are specified; The effectiveness of the technique decreases with increasing thickness (see Annex B).

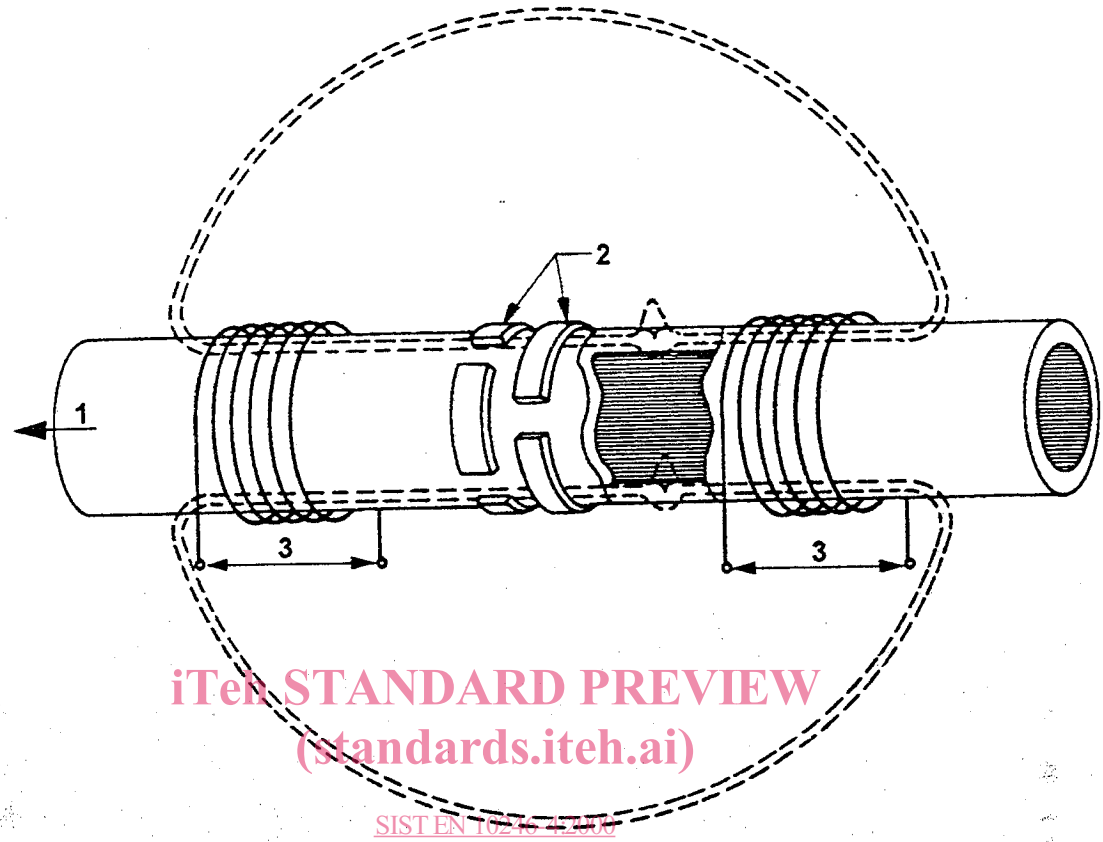
It is recognised that there may be a short length at both tube ends which cannot be tested. Any untested ends shall be dealt with in accordance with the requirements of the appropriate product standards.

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

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

3.3 The maximum width of each individual transducer, measured at right angles to the major axis of the tube shall be 30 mm.

3.4 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.



1= direction of tube movement 2= staggered array of transducers

3= direct voltage

NOTE: The magnetic transducer array in the above diagram may take different forms, for example absolute, differential, depending on the equipment used and other factors. The means of introducing magnetic flux in a direction parallel to the major axis of the tube can be achieved by methods other than that shown above.

Figure 1: Simplified diagram of typical magnetic transducer/flux leakage technique

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 magnetic transducer/flux leakage equipment shall be calibrated using a transverse reference notch on the outside and inside surfaces, or the outside surface only (see note below) of a tubular test piece.

Alternatively , a circular reference hole drilled radially through the full thickness of the test piece may be used for equipment calibration by agreement between the purchaser and the manufacturer.

In this case the diameter of the drill required to produce the reference hole for a specific acceptance level shall be agreed upon and the manufacturer shall demonstrate that the test sensitivity achieved using the reference hole and the equipment settings, for example filtering, is essentially equivalent to that obtained when using the specified external reference notch and the agreed internal reference notch depth.

The diameter of the reference hole, when used, shall be verified and shall not exceed the agreed drill diameter by more than 0,2 mm.

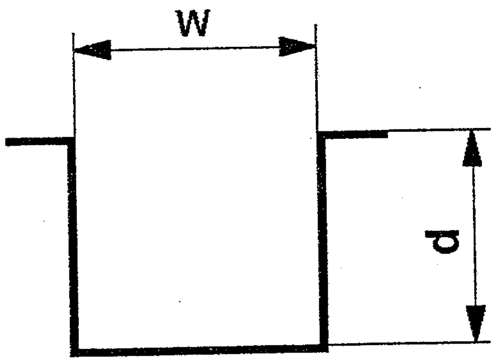
NOTE: The internal surface of the test piece may be dressed or machined prior to the preparation of the internal notch.
The internal notch should not be used when the tube internal diameter is less than 20 mm, unless otherwise agreed between the purchaser and the manufacturer, or when the tube thickness is greater than 20 mm since, due to technical limitations given in Annex B, the test at the tube bore is not adequate even after applying the maximum ratios given in table B1.

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 electromagnetic properties.

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

4.2 Types of reference notches

4.2.1 The reference notches shall be of the "N" type (see figure 2) 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 2: "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 notches normally used shall be as shown in figures 3(a) and 3(b). The notches shown in figures 3 (c), 3(d) and 3(e) may be used at the discretion of the manufacturer.

4.3 Dimensions of reference notch

4.3.1 The width, w (see figure 2), of the reference notch shall not be greater than twice the depth of the reference notch, with a maximum of 1 mm.

4.3.2 The depth, d (see figure 2), of the reference notch shall be as follows:

a) the external notch depth shall be as given in table 1 with the following limitations:

- minimum notch depth: 0,3 mm for F2 and F3 category and 0,5 mm for F4, F5 and F6 category tubes;
- maximum notch depth : 1,5 mm;

b) the internal notch depth shall be subject to agreement between purchaser and manufacturer (see Annex B) but in no circumstance shall be less than the specified external notch depth or greater than that applying the maximum ratios given in table B1; the maximum internal notch depth shall be 3,0 mm.