SIST

SLOVENSKI STANDARD
SIST EN 10246-2:2000

01-november-2000

Neporuġitveno preskuġanje jeklenih cevi - 2. del: Preverjanje hidravliļ ne tesnosti avstenitnih in avstenitno-feritnih jeklenih cevi, nevarjenih in varjenih (razen obloļ no varjenih pod praġkom), z avtomatsko preiskavo z vrtinļ nimi tokovi

Non-destructive testing of steel tubes - Part 2: Automatic eddy current testing of seamless and welded (except submerged arc-welded) austenitic and austenitic-ferritic steel tubes for verification of hydraulic leak-tightness

Zerstörungsfreie Prüfung von Stahlrohren - Teil 2: Automatische Wirbelstromprüfung nahtloser und geschweißter (ausgenommen unterpulvergeschweißter austenitischer und austenitisch-ferritischer Stahlrohre zum Nachweis der Dichtheit

Essais non destructifs sur des tubes en acier - Partie 2: Contrôle automatique par courants de Foucault des tubes en aciers austénitique et austéno-ferritique sans soudure et soudés (sauf a l'arc immergé sous flux en poudre) pour vérification de l'étanchéité hydraulique

Ta slovenski standard je istoveten z: EN 10246-2:2000

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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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 10246-2

February 2000

ICS 23.040.10; 77.040.20

English version

Non-destructive testing of steel tubes – Part 2: Automatic eddy current testing of seamless and welded (except submerged arc-welded) austenitic and austenitic-ferritic steel tubes for verification of hydraulic leak-tightness

Essais non destructifs sur des tubes en acier – Partie 2: Contrôle automatique par courants de Foucault des tubes en aciers austénitique et austéno-ferritique sans soudure et soudés (sauf à l'arc immergé sous flux en poudre) pour vérification de l'étanchéité hydraulique

Zerstörungsfreie Prüfung von Sthalrohren – Teil 2: Automatische Wirbelstromprüfung nahtloser und geschweißter (ausgenommen unterpulvergeschweißter) austenitischer und austenitisch-ferritischer Stahlrohre zum Nachweis der Dichtheit

This European Standard was approved by CEN on 25 December 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.

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 August 2000, and conflicting national standards shall be withdrawn at the latest by August 2000.

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 requirements for automatic eddy current testing of seamless and welded austenitic and austenitic-ferritic steel tubes with the exception of submerged arc-welded (SAW) tubes for verification of hydraulic leak-tightness. 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 4 mm.

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

2 NORMATIVE REFERENCES

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 20286-2	ISO system of limits and fits - Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts (ISO 286-2:1988)
EN ISO1127	Stainless steel tubes - Dimensions, tolerances and conventional masses per unit length (ISO 1127:1992)
ISO 235	Parallel shank jobber and stub series drills and Morse taper shank drills

3 GENERAL REQUIREMENTS

3.1 The eddy current inspection covered by this part of EN 10246 is usually carried out on tubes after completion of all the primary production process operations.

3.2 The tubes to be tested shall be sufficiently straight and free from foreign matter as to ensure the validity of the test.

4 METHOD OF TEST

4.1 The tubes shall be tested for verification of hydraulic leak-tightness by eddy current testing using one of the following techniques:

a) concentric coil (see figure 1);

b) segment coil(s) (see figure 2);

c) rotating tube/pancake coil (see figure 3).

It is recognized that under normal production conditions there may, as with hydraulic pressure testing, be a short length at both tube ends which cannot be tested.

NOTE: For guidelines on the limitation of eddy current test methods, see Annex B.

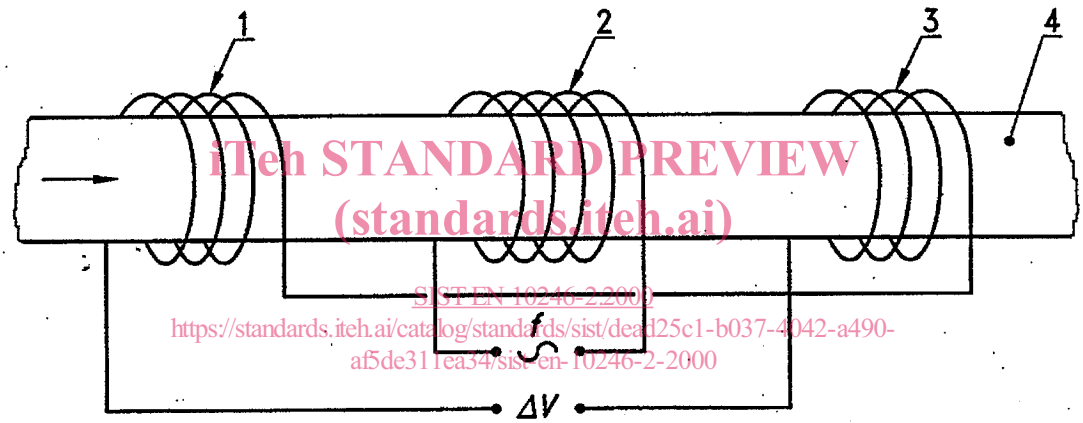
4.2 When testing tubes using the concentric coil technique, the maximum outside diameter of the tube to be tested is restricted to 180 mm.

4.3 When testing tubes using the segment coil technique, the maximum outside diameter of the tube to be tested is limited to:

- 219,1 mm for 2 x 180° coils;
- 508,0 mm for 4 x 100° coils.

4.4 When testing tubes using the rotating tube/pancake coil technique, the tube and pancake coil(s) shall be moved relative to each other so that the whole of the tube surface is scanned. There is no restriction on the maximum outside diameter using this technique.

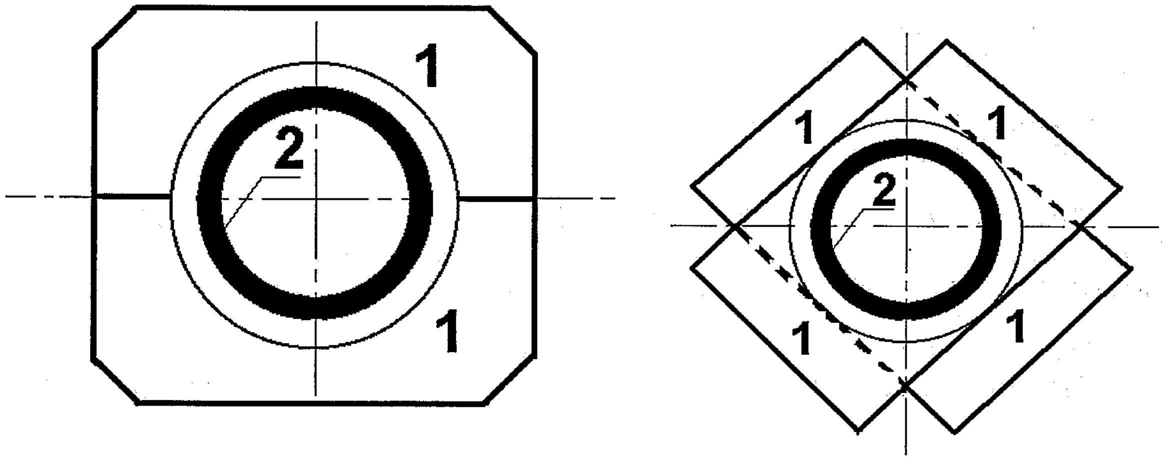
4.5 The equipment shall be capable of classifying tubes by either acceptable or suspect by means of an automatic trigger/alarm level combined with a marking and/or sorting system.



1 = secondary coil 1 2 = primary coil 3 = secondary coil 2 4 = Tube

NOTE: The above diagram is a simplified form of a multi-coil arrangement which may contain, for example, split primary coils, twin differential coil, a calibrator coil.

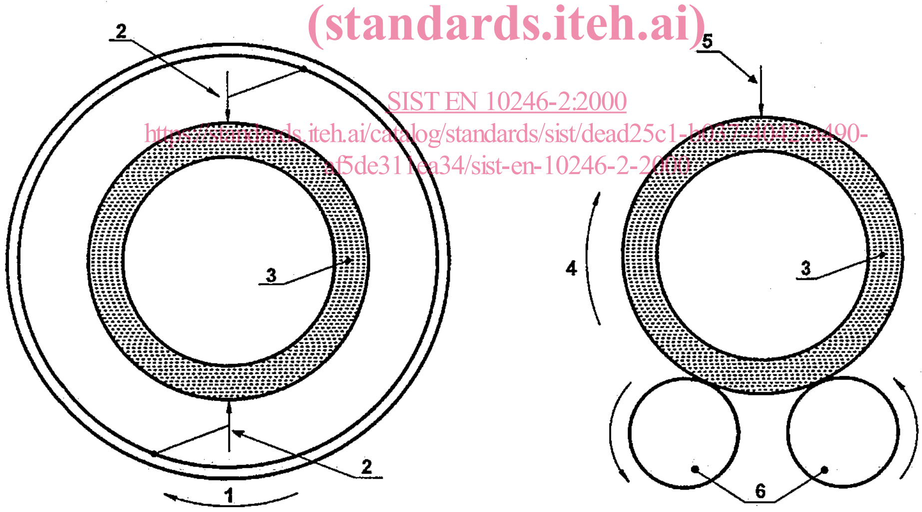
Figure 1 - Simplified diagram of the concentric coil technique



(a) 2 x 180° segment coils **(b) 4 x 100° segment coils**

1 = segment coil 2 = tube

Figure 2 - Simplified diagram of the segment coil technique



(a) Rotating pancake coil technique
(linear tube movement through the rotating pancake coil assembly)

(b) Rotating tube technique
(linear pancake coil traverses along the tube length or fixed coils during helical movement of tube)

1 = pancake coil rotation 2 = pancake coil 3 = tube 4 = tube rotation
5 = fixed pancake coil 6 =turning rolls

NOTE: The pancake coils in a) and b) may have different forms, e.g. single-coils, multiple coils of different configurations, depending on the equipment used and other factors.

Figure 3 - Simplified diagram of the rotating tube/pancake coil technique (helical scan)

5 REFERENCE STANDARDS

5.1 General

5.1.1 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.

5.1.2 The testing equipment shall be calibrated using a reference standard machined into a tubular test piece. The test piece shall be of the same specified diameter, thickness and surface finish as the tube to be tested and shall have similar electromagnetic properties.

NOTE: In special cases, for example testing hot tubes, a modified calibration procedure can be used by agreement.

5.1.3 The reference standards for the various techniques shall be as follows:

a) a reference hole or holes as defined in 5.2 when using the concentric coil technique;

b) a reference hole or holes as defined in 5.3 when using the segment coil technique;

c) a reference notch as defined in 5.4 when using the rotating tube/pancake coil technique.

5.1.4 The reference holes defined in clauses 5.2 and 5.3 shall meet the requirements of table 1.

The diameter of the reference hole or reference holes shall be verified and shall not exceed the specified drill diameter by more than 10 %.

Table 1: Drill to be used for producing the reference hole as a function of the tube diameter

Outside diameter of tube, D[1)] mm	Drill diameter[2)] mm
$D \leq 25$	1,2
$25 < D \leq 45$	1,7
$45 < D \leq 65$	2,2
$65 < D \leq 140$	2,7
$140 < D \leq 180$	3,2
$180 < D$[3)]	3,2

1) See EN ISO 1127

2) Tolerances in accordance with ISO 235 (jobber series) and EN 20286-2 (h8)

3) This applies only to the segment coil technique.