SLOVENSKI STANDARD
SIST EN 10246-1:1997

01-december-1997

Neporušitvene preiskave jeklenih cevi - 1. del: Avtomatska elektromagnetna preiskava nevarjenih ali varjenih (razen obločno varjenih pod praškom) feromagnetnih jeklenih cevi za preverjanje tesnosti

Non destructive testing of steel tubes - Part 1: Automatic electromagnetic testing of seamless and welded (except submerged arc welded) ferromagnetic steel tubes for verification of hydraulic leak-tightness

Zerstörungsfreie Prüfung von Stahlrohren - Teil 1: Automatische elektromagnetische Prüfung nahtloser und geschweißter (ausgenommen Unter-Pulver-geschweißter) ferromagnetischer Stahlrohre zum Nachweis der Dichtheit

Essais non destructifs des tubes en acier - Partie 1: Contrôle automatique électromagnétique pour vérification de l'étanchéité hydraulique des tubes en acier sans soudure et soudés ferromagnétiques (sauf a l'arc immergé sous flux en poudre)

Ta slovenski standard je istoveten z: EN 10246-1:1996

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 10246-1:1997 **en**

EUROPEAN STANDARD

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EUROPÄISCHE NORM

EN 10246-1

March 1996

ICS 23.040.10

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

English version

Non destructive testing of steel tubes - Part 1: Automatic electromagnetic testing of seamless and welded (except submerged arc welded) ferromagnetic steel tubes for verification of hydraulic leak-tightness

Essais non destructifs des tubes en acier - Partie 1: Contrôle automatique électromagnétique pour vérification de l'étanchéité hydraulique des tubes en acier sans soudure et soudés ferromagnétiques (sauf à l'arc immergé sous flux en poudre)

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This European Standard was approved by CEN on 1995-12-28. 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.

The European Standards exist 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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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.

1 Scope

This Part of EN 10 246 specifies the requirements for automatic electromagnetic testing of seamless and welded ferromagnetic steel tubes, with the exception of submerged arc - welded (SAW) tubes, for verification of hydraulic leak-tightness.

This Part of EN 10 246 is applicable to the inspection of tubes with an outside diameter greater than or equal to 4mm.

For automatic eddy current testing of seamless and welded austenitic and austenitic-ferritic steel tubes (excluding SAW tubes), for verification of hydraulic leak-tightness, EN 10 246-2 applies.

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

2 Normative references

This Part of EN 10 246 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 those publications apply to this Part of EN 10 246, 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.

ENV 10 220 Plain end steel tubes, welded and seamless - General tables of dimensions and masses per unit length

ISO 235 Parallel shank jobber and stub series drills and Morse taper shank drills

3 General requirements

3.1 The electromagnetic inspection covered by this Part of EN 10 246 is usually carried out on tubes after completion of all the primary production process operations.

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

3.2 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.

4 Method of test

4.1 Test techniques

4.1.1 The tubes shall be tested for verification of hydraulic leak-tightness by either the eddy current method or flux leakage method using one of the followlng alternative techniques:

(a) Concentric coil (eddy current method) - see figure 1

(b) Rotating tube/pancake coil (eddy current method) - see figure 2

(c) Rotating tube/magnetic transducer (flux leakage method) - see figure 3

(d) Multiple concentric magnetic transducers (flux leakage method) - see figure 4

NOTE 1 - It is recognised that there may be, as in the case of hydraulic testing under normal production conditions, a short length at both tube ends which cannot be tested.

NOTE 2 - For guidelines on the limitations of the eddy current and flux leakage test methods, see Annex B.

4.1.2 When testing seamless or welded tubes using the eddy current concentric coil technique, the maximum outside diameter tube to be tested is restricted to 177,8mm.

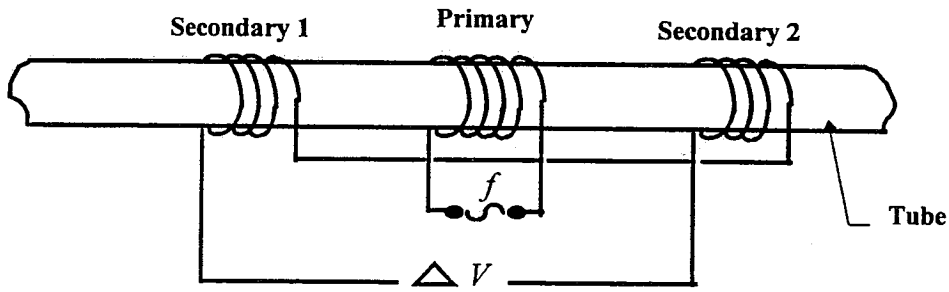
NOTE - Square or rectangular tubes, used for structural purposes, with a maximum dimension across the diagonal of 177,8mm may also be tested using this technique.

4.1.3 When testing seamless or welded tubes using the rotating tube/pancake coil eddy current technique or rotating tube/magnetic transducer flux leakage technique, the tube and the pancake coils/magnetic transducers 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 be more than $\pm 10\%$. There is no restriction on the maximum outside diameter using these techniques.

4.1.4 When testing seamless and welded tubes using the multiple concentric magnetic transducer technique, the tube and the multiple transducer assembly shall be linearly 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.

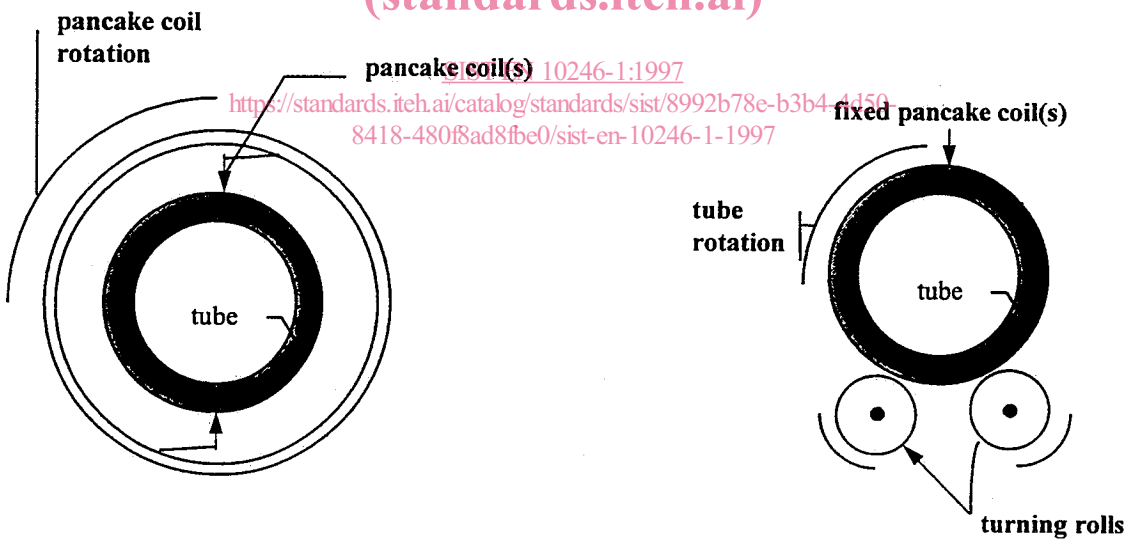
4.2 Test equipment

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



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

Figure 1 - Simplified diagram of eddy current concentric coil technique

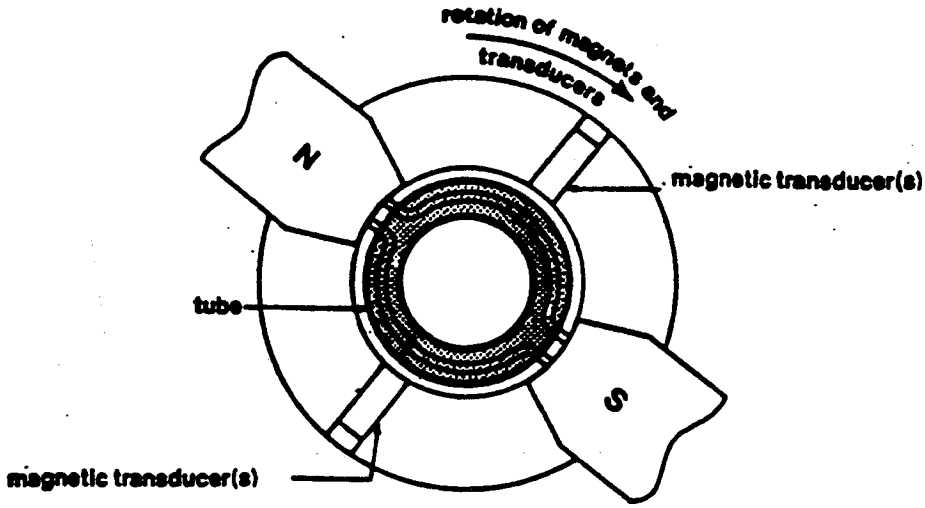


(a)- **Rotating pancake coil technique**
(linear movement through rotating pancake coil assembly)

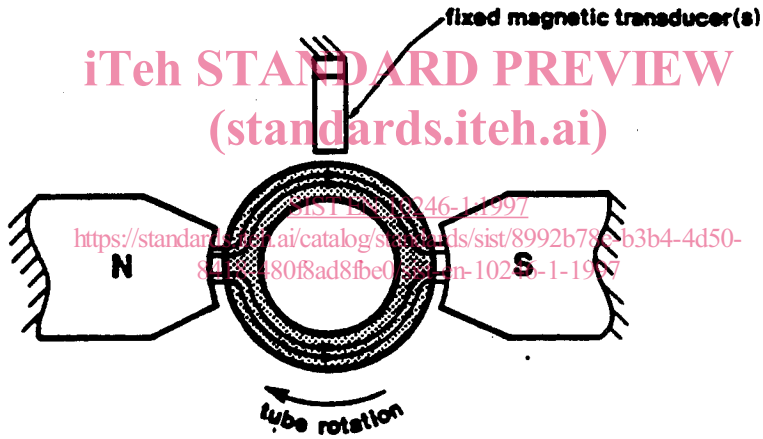
(b)- **Rotating tube technique**
(linear pancake coil traverse along the tube length or fixed coils during helical movement of tube)

NOTE: The pancake colis used In a) and b) above take many forms, for example, single coil, multi-coil of various configumtions, depending on the equipment used and other factors.

Figure 2 - Simplified diagram of rotating tube/pancake coil eddy current technique (helical scan)



(a) **Rotating magnetic transducer technique**
(rotating magnets and transducers
with linear movement of the tube)



(b) **Rotating tube technique**
(fixed magnets and magnetic transducer(s)
with helical movement of the tube)

NOTE - The magnetic transducers used in **a)** and **b)** above may take many forms, for example absolute, differential, multi-differential etc, depending on the equipment used and other factors.

Figure 3 - Simplified diagram of rotating magnetic transducer/tube flux leakage technique