



# SLOVENSKI STANDARD SIST EN 10246-3:2000

01-november-2000

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Non-destructive testing of steel tubes - Part 3: Automatic eddy current testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of imperfections

Zerstörungsfreie Prüfung von Stahlrohren - Teil 3: Automatische Wirbelstromprüfung nathloser und geschweißter (ausgenommen unterpulverschweißter) Stahlrohre zum Nachweis von Fehlern

Essais non destructifs des tubes en acier. Partie 3: contrôle automatique par courants de Foucault pour la détection des imperfections des tubes en acier sans soudure et soudés (sauf a l'arc immergé sous flux en poudre)

**Ta slovenski standard je istoveten z: EN 10246-3:1999**

## 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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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN 10246-3

November 1999

ICS 23.040.10; 77.040.20

English version

Non-destructive testing of steel tubes - Part 3: Automatic eddy current testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of imperfections

Essais non destructifs des tubes en acier - Partie 3: Contrôle automatique par courants de Foucault pour la détection des imperfections des tubes en acier sans soudure et soudés (sauf à l'arc immergé sous flux en poudre)

Zerstörungsfreie Prüfung von Stahlrohren - Teil 3: Automatische Wirbelstromprüfung nahtloser und geschweißter (ausgenommen unterpuivergeschweißter) Stahlrohre zum Nachweis von Fehlern

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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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 10246 specifies the requirements for automatic eddy current testing of seamless and welded tubes with the exception of submerged arc-welded (SAW) tubes for the detection of 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 4 mm.

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

## 2 Normative references

This Part of EN 10246 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 10246 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)
ENV 10220	Seamless and welded steel tubes - Dimensions and masses per unit length <small>SIST EN 10246-3:2000 <a href="https://standards.iteh.ai/catalog/standards/sist/3bcb33a6-0257-4045-bc19-329a940c4110/sist-en-10246-3-2000">https://standards.iteh.ai/catalog/standards/sist/3bcb33a6-0257-4045-bc19-329a940c4110/sist-en-10246-3-2000</a></small>
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 by the eddy current test method for the detection of imperfections using one of the following techniques, as appropriate:

- a) Concentric coil technique - full peripheral (see figure 1);
- b) Rotating tube/pancake coil technique - full peripheral (see figure 2) ;
- c) Segment coil technique - weld only (see figure 3).

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.

NOTE: For the guidelines of limitations of the eddy current test method, 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 177,8 mm.

The relative speed during testing shall not vary by more than  $\pm 10\%$ .

NOTE 1: It is emphasized that the test sensitivity is at a maximum at the tube surface adjacent to the test coil and decrease with increasing thickness (see Annex B).

NOTE 2: Square and rectangular tubes, used for structural purposes, with a maximum dimensions across the diagonal of 177,8 mm may also be tested using this technique.

**4.3** When testing using the rotating tube/pancake coil technique, the tube and the 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 tube diameter using this technique.

The relative speed during testing shall not vary by more than  $\pm 10\%$ .

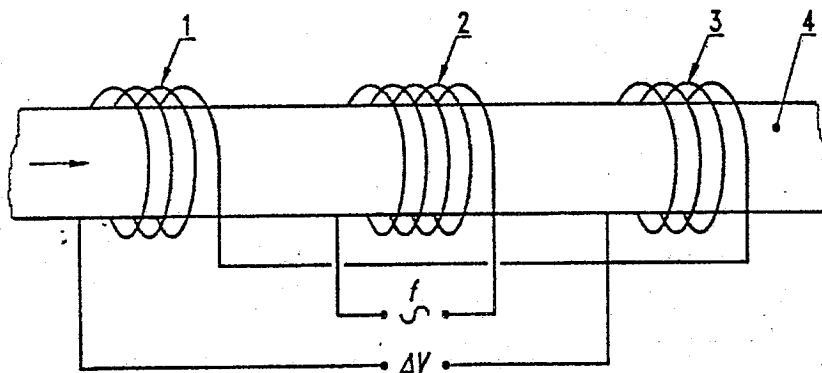
NOTE : It is emphasised that only external surface breaking imperfections can be detected using this technique.

**4.4** When testing the weld of welded tubes using the segment coil technique, the test coil shall be maintained in proper alignment with the weld, such as that the whole of the weld is scanned. There is no restriction on the maximum outside tube diameter using this technique.

The relative speed during testing shall not vary by more than  $\pm 10\%$ .

NOTE : It is emphasized that the test sensitivity is at a maximum at the tube surface adjacent to the test coil and decreases with increasing thickness (see Annex B).

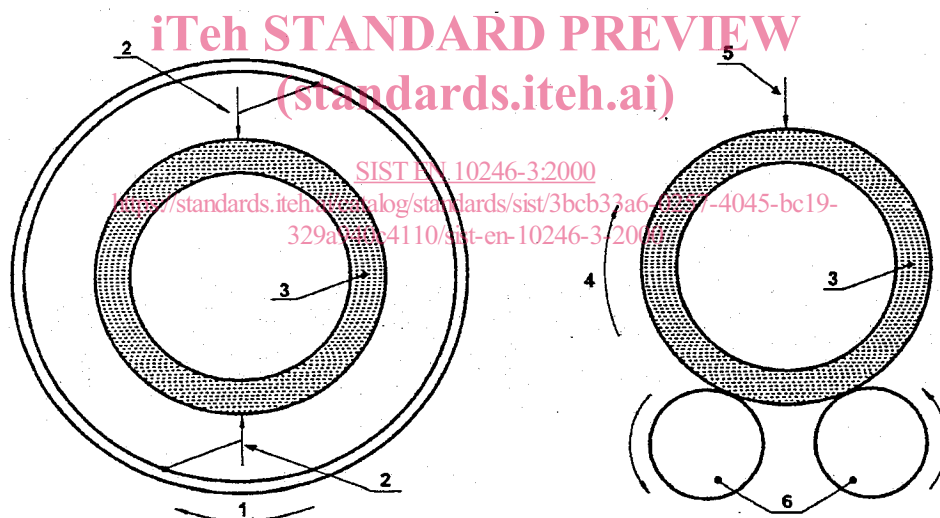
**4.5** The equipment shall be capable of classifying tubes as either acceptable or suspect tubes by means of an automatic trigger/alarm level combined with a marking and/or sorting system.



1= 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 coils, a calibrator coil.

Figure 1: Simplified diagram of the concentric coil technique



(a) Rotating pancake coil technique

(linear tube movement through the rotating pancake coil assembly)

1= pancake coil rotation;      2= pancake coil;  
4= tube rotation

(b) Rotating tube technique

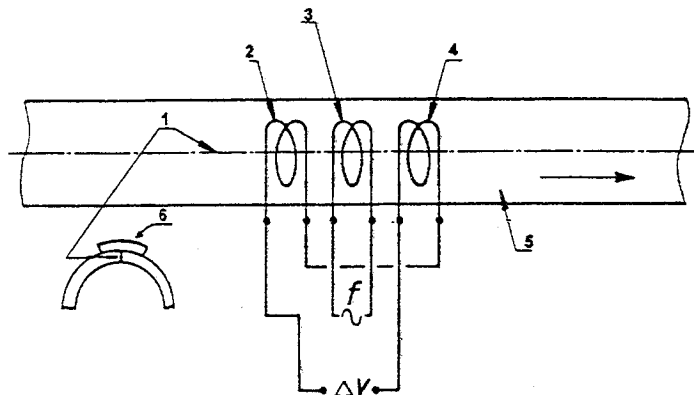
(linear pancake coil traverses along the tube length or fixed coils during helical movement of tube)

3= tube  
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 2: Simplified diagram of the rotating tube/pancake coil technique (helical scan)





1= weld seam

2= secondary 1

3= primary

4= secondary 2

5= tube

6= coil

NOTE: The segment coil arrangement in the above diagram may take many forms depending, for example, on the equipment used and the product to be inspected.

Figure 3: Simplified diagram of segment coil testing method of the weld seam

## 5 Reference standards

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### 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 introduced 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 or using equipment contained within a continuous tube mill, a modified calibration or calibration checking procedure can be used, by agreement.

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

- a reference hole or holes as defined in 5.2 when using the concentric coil technique;
- a reference hole or holes as defined in 5.3 when using the segment coil technique;