



BSI Standards Publication

Copper and copper alloys — Eddy current test for measuring defects on seamless round copper and copper alloy tubes

Part 2: Test with an internal probe on the inner surface

National foreword

This British Standard is the UK implementation of EN 1971-2:2019. It supersedes BS EN 1971-2:2011, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee NFE/34, Copper and copper alloys.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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English Version

**Copper and copper alloys — Eddy current test for
measuring defects on seamless round copper and copper
alloy tubes — Part 2: Test with an internal probe on the
inner surface**

Cuivre et alliages de cuivre — Méthode de contrôle
par courants de Foucault pour le mesurage
des défauts des tubes ronds sans soudure en
cuivre et alliages de cuivre — Partie 2 : Essai
avec un capteur interne sur la paroi interne

Kupfer und Kupferlegierungen —
Wirbelstromprüfung an Rohren zur Messung von
Fehlern an nahtlos gezogenen runden Rohren
aus Kupfer und Kupferlegierungen — Teil 2:
Prüfung mit Innensonde auf der Innenseite

This European Standard was approved by CEN on 4 September 2019.

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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 CEN-CENELEC Management Centre 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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Contents

Page

European foreword	iii
Introduction	iv
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 General requirements	5
4.1 Personnel qualification	5
4.2 Condition of tube to be tested	5
4.3 Equipment	6
5 Reference standard tube	6
6 Acceptance criteria	7
6.1 Detection of local discontinuities by internal probes systems	7
6.2 Detection of non-local discontinuities by internal probes systems with lower detection levels	7
6.3 Other test methods	7
7 Instrument adjustment	8
Bibliography	9

European foreword

This document (EN 1971-2:2019) has been prepared by Technical Committee CEN/TC 133 “Copper and copper alloys”, the secretariat of which is held by DIN.

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 2020, and conflicting national standards shall be withdrawn at the latest by May 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1971-2:2011.

The following modifications were implemented in this new edition of EN 1971-2:

— updated normative references.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The eddy current test with internal probe described in this document has the objective of detecting potential leaks and serious defects in seamless round copper and copper alloy tubes.

The eddy current test is able to detect material inhomogeneities and their positions throughout the length of tubes. The eddy current signals of material inhomogeneities are compared with reference signals of artificially produced test defects. It is possible to identify these inhomogeneities on the inner and outer surfaces as well as within the tube wall.

Since the distribution of eddy currents decreases as the distance from the test coil increases, the amplitude of defect signals also decreases with increasing distance from the test coil. Thus the eddy current test with internal probe on the inner surface is less sensitive to defects on the outer surface.

The purpose of this European Standard is not to define a method of measuring the actual extent of the material inhomogeneities as the signal amplitude is dependent on, amongst other factors, volume, form and position of the inhomogeneity.

Due to end effects, it is not possible to effectively test the ends of the tubes. The purchaser and the supplier could agree that the end effect may be overcome by cutting to length after testing.

1 Scope

This document specifies a procedure for the eddy current test with an internal probe for measuring defects on the inner surface of seamless round copper and copper alloy tubes.

This document applies particularly for finned tubes with high fins according to EN 12452.

NOTE The eddy current test method(s) required, together with the size range and acceptance level, are defined in the relevant product standard.

The choice of the method for eddy current test:

— with an encircling test coil on the outer surface according to EN 1971-1

or

— with an internal probe on the inner surface according to EN 1971-2

is at the discretion of the manufacturer if there are no other agreements between the purchaser and the supplier.

Especially for finned tubes according to EN 12452 with high fins, it is suggested to use eddy current test with internal probe as described in this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 9712, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712)*

EN ISO 12718, *Non-destructive testing - Eddy current testing - Vocabulary (ISO 12718)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12718 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at <http://www.electropedia.org/>

— ISO Online browsing platform: available at <http://www.iso.org/obp>

4 General requirements

4.1 Personnel qualification

The eddy current test shall be made by operators trained in this technique and it shall be done under the responsibility of qualified staff.

When agreed upon between the purchaser and the supplier, qualification of the personnel shall be certified according to EN ISO 9712.

4.2 Condition of tube to be tested

Tubes shall be sufficiently clean and straight to permit satisfactory operation of optionally drive mechanism and eddy current test equipment.