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Copper and copper alloys – Determination of spiral elongation number

The European Standard EN 12893:2000 has the status of a Swedish Standard. This document contains the official English version of EN 12893: 2000.

Swedish Standards corresponding to documents referred to in this Standard are listed in ”Catalogue of Swedish Standards”, issued by SIS. The Catalogue lists, with reference number and year of Swedish approval, International and European Standards approved as Swedish Standards as well as other Swedish Standards.

Koppar och kopparlegeringar – Bestämning av fjädersträcktal

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ICS 77.120.30

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English version

Copper and copper alloys - Determination of spiral elongation number

Cuivre et alliages de cuivre - Détermination de l'indice d'allongement par spirale

Kupfer und Kupferlegierungen - Bestimmung der Spiralverlängerungszahl

This European Standard was approved by CEN on 24 January 2000.

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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 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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 133 "Copper and copper alloys", the secretariat of which is held by DIN.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 1 “Unwrought copper products” to prepare the following standard:

EN 12893 Copper and copper alloys - Determination of spiral elongation number

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of an identical text or by endorsement, at the latest by September 2000, and conflicting national standards shall be withdrawn at the latest by September 2000.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.

Introduction

The spiral elongation test is a means for measuring the response of high purity copper, intended for drawing into wire, to low temperature annealing. It is possible to discriminate between different purities of copper which vary only slightly within the composition limits of the grade and hence to assess their suitability for use in critical production processes.

The test method described is based essentially on that reviewed in ISO/TR 4745 High Conductivity Copper - Spiral Elongation Test, published in 1978 by the International Organization for Standardization (ISO). The Technical Report drew attention to the uncertainties of the test and also suggested further work by which these uncertainties might be dispelled.

A Task Group was established by CEN/TC 133/WG 1 “Unwrought copper products” to investigate the precision, in terms of repeatability and reproducibility, of a test method which had been drafted by CEN/TC 133/WG 1 following work undertaken, mainly in the UK, to improve the precision of the ISO/TR 4745 test method. The Task Group comprised eight laboratories representing five countries: Belgium, France, Germany, Spain and UK. After testing an initial round of samples, the draft test method was further moderately revised and used for a further round of tests, the results of which were subjected to statistical assessment and used for the precision details in the present test method.

The Spiral Elongation Number (SEN) obtained from the test is indicative of the annealability of the sample.

NOTE: The word spiral used in this context implies helical in strictly scientific terms.

1 Scope

This European Standard specifies a method for performing the spiral elongation test on high purity copper drawing stock conforming to EN 1977, grade Cu-ETP1 (CW003A).

The method has been designed for testing high purity copper sampled at the drawing stock stage. It is not relevant for assessing the quality of copper wire selected at a later stage of processing.

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 1977
Copper and copper alloys - Copper drawing stock (wire rod)

3 Principle

Copper wire is drawn using specified conditions, and annealed at low temperature under carefully controlled conditions. It is then wound into a spiral while supporting a specified mass. The spiral is then axially extended by the same mass. The change in length, after removal of the mass, is measured.

A spiral wound from wire that retains, after the annealing treatment, some effects of the previous cold working does not extend as much as one made from wire which the annealing treatment has made softer.

Correct preparation of the test piece is very important to achieve an accurate test result.