Irish Standard
I.S. EN 13604:2013

Copper and copper alloys - Semiconductor devices, electronic and vacuum products made from high conductivity copper

I.S. EN 13604:2013

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EN 13604

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Supersedes EN 13604:2002

English Version

Copper and copper alloys - Semiconductor devices, electronic and vacuum products made from high conductivity copper

Cuivre et alliages de cuivre - Produits en cuivre de haute conductivité pour application dans les tubes électroniques, semi-conducteurs et vide

Kupfer und Kupferlegierungen - Produkte aus hochleitfähigem Kupfer für Elektronenröhren, Halbleiterbauelemente und für die Anwendung in der Vakuumtechnik

This European Standard was approved by CEN on 25 April 2013.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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Foreword

This document (EN 13604:2013) 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of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.

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

This document supersedes EN 13604:2002.

In comparison with EN 13604:2002, the following changes have been made:

— Normative references have been updated.

— Editorial modifications have been made.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 4 "Extruded and drawn products, forgings and scrap" to prepare the revision of the following standard:

EN 13604:2002, *Copper and copper alloys — Products of high conductivity copper for electronic tubes, semi-conductor devices and vacuum applications.*

The two copper grades Cu-OFE (CW009A) and Cu-PHCE (CW022A) specified in this European Standard are those which are especially suitable for electronic, semiconductor and vacuum applications.

Annex A (normative) is the reference for microscopic examination.

Annex B (informative) gives guidance on the characteristics of coppers for electrical purposes.

This is one of a series of European Standards for copper products for electrical purposes. Other copper products are specified as follows:

— EN 13599, *Copper and copper alloys — Copper plate, sheet and strip for electrical purposes*

— EN 13600, *Copper and copper alloys — Seamless copper tubes for electrical purposes*

— EN 13601, *Copper and copper alloys — Copper rod, bar and wire for general electrical purposes*

— EN 13602, *Copper and copper alloys — Drawn, round copper wire for the manufacture of electrical conductors*

— EN 13605, *Copper and copper alloys — Copper profiles and profiled wire for electrical purposes*

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the composition, property requirements including electrical properties and tolerances on dimensions and form of semiconductor devices, electronic and vacuum products in two copper grates Cu-OFE (CW009A) and Cu-PHCE (CW022A), in the form of wrought products, e.g. plate, sheet, strip, seamless tube, rod, bar, wire, profiles.

The sampling procedures, the methods of test for verification of conformity to the requirements of this European Standard, and the delivery conditions are also specified.

This European Standard applies to the wrought copper products as delivered to the device manufacturer, i.e. for further fabrication.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1655, *Copper and copper alloys — Declarations of conformity*

EN 1976, *Copper and copper alloys — Cast unwrought copper products*

EN 10204, *Metallic materials — Types of inspection documents*

EN 13599, *Copper and copper alloys — Copper plate, sheet and strip for electrical purposes*

EN 13600, *Copper and copper alloys — Seamless copper tubes for electrical purposes*

EN 13601, *Copper and copper alloys — Copper rod, bar and wire for general electrical purposes*

EN 13602, *Copper and copper alloys — Drawn, round copper wire for the manufacture of electrical conductors*

EN 13605, *Copper and copper alloys — Copper profiles and profiled wire for electrical purposes*

EN ISO 2624, *Copper and copper alloys — Estimation of average grain size (ISO 2624)*

EN ISO 2626, *Copper — Hydrogen embrittlement test (ISO 2626)*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1)*

EN ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method (ISO 6507-1)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*

EN ISO 7438, *Metallic materials — Bend test (ISO 7438)*

IEC 60468, *Method of measurement of resistivity of metallic materials*

ISO 1811-2, *Copper and copper alloys — Selection and preparation of samples for chemical analysis — Part 2: Sampling of wrought products and castings*

ISO 4746, *Oxygen-free copper — Scale adhesion test*

ISO 7801, *Metallic materials — Wire — Reverse bend test*