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# International Standard



# 431

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Copper refinery shapes

*Formes brutes d'affinage du cuivre*

Second edition — 1981-12-15

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UDC 669.3-4

Ref. No. ISO 431-1981 (E)

**Descriptors** : copper, refining, shape, designations, chemical composition, electrical properties, impurities, mass, tolerances, dimensions, chemical analysis, physical tests, defects.

Price based on 7 pages

ISO 431-1981 (E)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 431 was developed by Technical Committee ISO/TC 26, *Copper and copper alloys*, and was circulated by the member bodies in November 1979.

It has been approved by the member bodies of the following countries :

Australia	Germany, F.R.	South Africa, Rep. of
Belgium	Hungary	Spain
Bulgaria	India	Sweden
Canada	Korea, Rep. of	Switzerland
China	Mexico	Turkey
Czechoslovakia	Netherlands	USA
Egypt, Arab Rep. of	Poland	USSR
Finland	Portugal	Yugoslavia
France	Romania	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Chile  
United Kingdom

This second edition cancels and replaces the first edition (i.e. ISO 431-1972), ISO Recommendations R 1428, R 1429 and R 1430 and International Standard ISO 2311.

# Copper refinery shapes

## 1 Scope and field of application

This International Standard specifies the requirements of refined copper listed in table 1, in the form of refinery shapes (unwrought products). The refinery shapes included are cathodes, horizontally, vertically and continuously cast wire bars, cakes, billets and ingots.

**Table 1 — Designation and terms of refined copper**

Designation	Term
<b>Cu-CATH</b>	Cathode copper
<b>Cu-ETP</b>	Electrolytically refined tough pitch copper
<b>Cu-FRHC</b>	Fire-refined high-conductivity copper
<b>Cu-CRTP</b>	Chemically refined tough-pitch copper
<b>Cu-FRTP</b>	Fire-refined tough-pitch copper
<b>Cu-HCP</b>	High-conductivity phosphorus-containing copper
<b>Cu-PHC</b>	High-conductivity phosphorus-containing copper
<b>Cu-PHCE</b>	High-conductivity phosphorus-containing copper (electronic grade)
<b>Cu-DLP</b>	Phosphorus-deoxidized copper — Low residual phosphorus
<b>Cu-DHP</b>	Phosphorus-deoxidized copper — High residual phosphorus
<b>Cu-OF</b>	Oxygen-free electrolytically refined copper
<b>Cu-OFE</b>	Oxygen-free electrolytically refined copper (electronic grade)
<b>Cu-Ag (OF)</b>	Oxygen-free copper-silver
<b>Cu-Ag</b>	Tough-pitch copper-silver
<b>Cu-Ag (P)</b>	Phosphorus-deoxidized copper-silver

## 2 References

- ISO 197, *Copper and copper alloys — Terms and definitions*.  
 — Part 1 : *Materials*.<sup>1)</sup>  
 — Part 2 : *Unwrought products*.<sup>2)</sup>

- 1) At present at the stage of draft. (Revision of ISO/TR 197/1.)  
 2) At present at the stage of draft. (Revision of ISO/TR 197/2.)  
 3) At present at the stage of draft. (Revision of ISO/R 1190/1.)  
 4) Under revision.

ISO 1190/1, *Copper and copper alloys — Code of designation — Part 1 : Designation of materials*.<sup>3)</sup>

ISO 1553, *Unalloyed copper containing not less than 99,90 % of copper — Determination of copper content — Electrolytic method*.

ISO 1554, *Wrought and cast copper alloys — Determination of copper content — Electrolytic method*.

ISO/R 1811, *Chemical analysis of copper and copper alloys — Sampling of copper refinery shapes*.<sup>4)</sup>

ISO 2626, *Copper — Hydrogen embrittlement test*.

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

IEC Publication 28, *International standard of resistance for copper*.

IEC Publication 468, *Method of measurement for resistivity of metallic materials*.

## 3 Definitions

For the purpose of this International Standard, the definitions for refined copper in ISO/TR 197/1 and for refinery shapes in ISO/TR 197/2, as well as the principles for the designation of copper in ISO 1190/1, apply.

## 4 Requirements

### 4.1 Composition and properties

The copper in each refinery shape shall conform to the requirements for composition and physical properties specified in tables 2 and 3 as appropriate.

### 4.2 Refinery shapes

The shapes in which each grade is available are shown in table 2.

Wire bars, cakes and billets are intended for fabricating into wrought products; ingots are intended for alloying in wrought and cast copper alloys.