International Standard 1337

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

Wrought coppers (having minimum copper contents of 99,85 %) — Chemical composition and forms of wrought products

Cuivres corroyés (de teneur en cuivre minimale de 99,85 %) — Composition chimique et formes des produits corroyés

First edition — 1980-05-01

UDC 669.3-13 **Ref. No. ISO 1337-1980 (E)**

Descriptors : copper, rolled products, metal bars, wire, metal sheet, metal plates, plates, metal strip, metal tubes, forgings, profiles, chemical composition, electrical properties, mechanical properties, designation.

ISO 1337-1980 (E)

International Organization for Standardization

Price based on 2 pages

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 1337 was developed by Technical Committee ISO/TC 26, *Copper and copper alloys*, and was circulated to the member bodies in January 1979.

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

Australia	France	Norway
Austria	Germany, F. R.	Poland
Belgium	Hungary	Romania
Bulgaria	India	South Africa, Rep. of
Canada	Italy	Spain
Chile	Japan	Sweden
China	Korea, Dem. P. Rep. of	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
Finland	Netherlands	USA

The member body of the following country expressed disapproval of the document on technical grounds :

United Kingdom

This International Standard cancels and replaces ISO Recommendation R 1337-1971, of which it constitutes a technical revision.

© **International Organization for Standardization, 1980** ●

Printed in Switzerland

International Organization for Standardization

Wrought coppers (having minimum copper contents of 99,85 %) — Chemical composition and forms of wrought products

1 Scope and field of application

This International Standard specifies the chemical composition of wrought coppers, having minimum copper contents of 99,85 %, and lists their electrical properties and the forms of wrought products in which they are currently available in commercial quantities.

2 References

ISO/TR 197/1, *Copper and copper alloys — Terms and definitions — Part 1 : Materials.*[1)]

ISO/R 1190/1, *Copper and copper alloys — Code of designation — Part 1 : Designation of materials.*[1)]

3 Definitions

For the purpose of this International Standard, the definitions given in ISO/TR 197/1 apply.

4 Chemical composition

If the purchaser's requirements necessitate limits for any element not specified in table 1, these should be agreed upon between the supplier and the purchaser.

The designations used are in accordance with the principles laid down in ISO/R 1190/1.

5 Electrical properties

The electrical properties of these coppers, in the annealed temper at 20 °C, are given in table 2.

6 Forms of wrought products and mechanical properties

The forms of wrought products, in which these coppers are available, are given in table 3. The mechanical properties for all forms of wrought products for which the symbol X is given, are defined in the following International Standards :

— ISO 1634, *Wrought copper and copper alloys — Rolled flat products (plate, sheet, strip) — Mechanical properties.*

— ISO 1635, *Wrought copper and copper alloys — Round tubes for general purposes — Mechanical properties.*

— ISO 1636, *Wrought copper and copper alloys — Condenser and heat exchanger tubes — Mechanical properties.*[2)]

— ISO 1637, *Wrought copper and copper alloys — Solid products supplied in straight lengths — Mechanical properties.*

— ISO 1638, *Wrought copper and copper alloys — Drawn solid products supplied in coils or on reels — Mechanical properties.*

— ISO 1639, *Wrought copper alloys — Extruded sections — Mechanical properties.*

— ISO 1640, *Wrought copper alloys — Forgings — Mechanical properties.*

1) Under revision.

2) At present at the stage of draft.

Table 1 — Chemical composition

Designation	Chemical composition %	Average density kg/dm³
Cu-ETP	Cu (+ Ag) min. 99,90	8,9
Cu-FRHC	Cu (+ Ag) min. 99,90	8,9
Cu-FRTP	Cu (+ Ag) min. 99,85	8,9
Cu-OF	Cu (+ Ag) min. 99,95	8,9
Cu-HCP[1]	Cu (+ Ag) min. 99,95 P 0,001 to 0,005	8,9
Cu-DLP	Cu (+ Ag) min. 99,90 P 0,005 to 0,012	8,9
Cu-DHP	Cu (+ Ag) min. 99,85 P 0,013 to 0,050	8,9

1) When produced from an oxygen-free base, the oxygen content shall not exceed 0,001 %.

Table 2 — Electrical properties in the annealed temper at 20 °C

NOTE — For specification purposes, maximum mass resistivity shall be quoted. The values given to five significant figures are specification values. Approximate rounded values are for information only.

Designation	Maximum mass resistivity $\frac{\Omega \cdot g}{m^2}$	Equivalent values for guidance only		
		Maximum volume resistivity $\frac{\Omega \cdot mm^2}{m}$	Minimum conductivity	
			$\frac{m}{\Omega \cdot mm^2}$	% IACS
Cu-ETP[1]	0,15 328 0,15 596	0,017 241 0,017 544	58,00 57,00	100,0 98,28
Cu-FRHC[1]	0,15 328 0,15 596	0,017 241 0,017 544	58,00 57,00	100,0 98,28
Cu-FRTP	≈ 0,178	≈ 0,02	≈ 50	≈ 86
Cu-OF	0,15 328	0,017 241	58,00	100,0
Cu-HCP	0,15 614	0,017 565	56,93	98,16
Cu-DLP[2]	≈ 0,158	≈ 0,017 8	≈ 56	≈ 97
Cu-DHP	≈ 0,222	≈ 0,025	≈ 40	≈ 69

1) Wire is usually supplied with maximum resistivity of 0,017 241 $\Omega \cdot mm^2/m$ at 20 °C (minimum conductivity100,0 % IACS or 58,00 $m/\Omega \cdot mm^2$), unless otherwise specified.

Other forms, however, are only so supplied if agreed between the supplier and the purchaser.

2) Electrical property requirements should be agreed between the supplier and the purchaser.

Table 3 — Forms of wrought products

NOTE — Where no symbol is given, the form is not considered of importance for that type of wrought copper but it does not necessarily indicate that such a product cannot be manufactured.
KEY :

X — main manufactured forms.

(X) — forms manufactured in smaller quantities, for example in certain countries only or for special purposes.

Designation	Plate Sheet	Strip	Rod Bar	Extruded profiles[1]	Tube[2]	Wire	Forgings
Cu-ETP	X	X	X	(X)	X	X	(X)
Cu-FRHC	X	X	X	(X)	X	X	(X)
Cu-FRTP	X	X	X	(X)			
Cu-OF	X	X	X	(X)	(X)	(X)	(X)
Cu-HCP	X	X	X	(X)	(X)	(X)	(X)
Cu-DLP	(X)	(X)	X	(X)	(X)		
Cu-DHP	X	X	X	(X)	X[3]		

1) Profiles made by extruding or by a combination of extruding and drawing.

2) Tubes for general purposes.

3) Also for condenser and heat exchanger tubes.