International Standard 426/1

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

Wrought copper-zinc alloys — Chemical composition and forms of wrought products — Part 1: Non-leaded and special copper-zinc alloys

Alliages cuivre-zinc corroyés — Composition chimique et formes des produits corroyés — Partie 1: Alliages de cuivre-zinc sans plomb et spéciaux

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Descriptors : copper alloys, zinc-containing alloys, brasses, chemical composition, wrought products.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (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 authorized 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 426/1 was developed by Technical Committee ISO/TC 26, *Copper and copper alloys*, and was circulated to the member bodies in November 1981.

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

Austria	Germany, F.R.	South Africa, Rep. of
Belgium	Hungary	Spain
Brazil	Italy	Sweden
Bulgaria	Japan	Switzerland
Canada	Korea, Dem. P. Rep. of	Turkey
China	Netherlands	United Kingdom
Czechoslovakia	Norway	USA
Egypt, Arab Rep. of	Poland	USSR
Finland	Romania	

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

France

This second edition cancels and replaces the first edition (i.e. ISO 426/1-1973).

Wrought copper-zinc alloys — Chemical composition and forms of wrought products — Part 1 : Non-leaded and special copper-zinc alloys

1 Scope and field of application

This part of ISO 426 specifies the chemical composition of non leaded and special copper-zinc alloys and lists the forms of wrought products in which they are currently available in commercial quantities.

For wrought leaded copper-zinc alloys, see ISO 426/2.

2 References

ISO 197, *Copper and copper alloys — Terms and definitions*
Part 1: Materials.
Part 3: Wrought products.

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

ISO 1634, *Wrought copper and copper alloys — Mechanical properties*
Part 1: Plate, sheet and strip for general purposes. [1]
Part 2: Plate and sheet for boilers, pressure vessels and condensers. [1]

ISO 1635, *Wrought copper and copper alloys — Round tubes for general purposes — Mechanical properties.* [1]

ISO 1636, *Wrought copper and copper alloys — Seamless condenser and heat-exchanger tubes — Technical conditions of delivery.* [1]

ISO 1637, *Wrought copper and copper alloys — Rod and bar — Mechanical properties.* [2]

ISO 1638, *Wrought copper and copper alloys — Wire — Mechanical properties.* [2]

ISO 1639, *Wrought copper alloys — Extruded profiles — Mechanical properties.* [2]

ISO 1640, *Wrought copper alloys — Forgings — Mechanical properties.* [2]

ISO 4382/2, *Plain bearings — Copper alloys — Part 2: Wrought copper alloys for solid plain bearings.*

ISO 6957, *Wrought copper alloys — Strip for springs.* [1]

3 Definitions

For the purpose of this International Standard, the definitions given in ISO 197/1 and ISO 197/3 apply.

4 Chemical composition

The chemical composition of the copper alloys is given in tables 1 and 2. The composition limits do not preclude the possible presence of other elements not specified. If the purchaser's requirements necessitate limits for any other element not specified, these shall be agreed upon between the supplier and the purchaser. Percentage content of elements shown as "remainder" is usually calculated by difference from 100 %.

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

5 Forms of wrought products and mechanical properties

The forms of wrought products in which these copper alloys 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 1634/1, ISO 1634/2, ISO 1635, ISO 1636, ISO 1637, ISO 1638, ISO 1639, ISO 1640, ISO 6957.

1) At present at the stage of draft.

2) Under revision.

Table 1 — Non-leaded copper-zinc-alloys

Designation	Element	Chemical composition by mass, %				Average density kg/dm³
		Cu 1)	Zn	Fe	Pb	
CuZn5	min. max.	94,0 96,0	Rem.	— 0,1	— 0,05	8,9
CuZn10	min. max.	89,0 91,0	Rem.	— 0,1	— 0,05	8,8
CuZn15	min. max.	84,0 86,0	Rem.	— 0,1	— 0,05	8,8
CuZn20	min. max.	78,5 81,5	Rem.	— 0,1	— 0,05	8,7
CuZn30	min. max.	68,5 71,5	Rem.	— 0,1	— 0,05	8,6
CuZn35	min. max.	64,0 67,0	Rem.	— 0,1	— 0,1	8,6
CuZn37	min. max.	62,0 65,0	Rem.	— 0,2	— 0,3	8,5
CuZn40	min. max.	59,0 62,0	Rem.	— 0,2	— 0,3	8,4

1) Nickel up to a maximum of 0,3 % to count as copper.

Table 2 — Special copper-zinc alloys

Designation	Element	Chemical composition by mass, %											Average density kg/dm³
		Cu	Zn	Al	As	Fe	Mn	Ni	P	Pb	Sb	Si	Sn	
CuZn20Al2	min. max.	76,0 79,0	Rem.	1,8 2,3	0,02 0,06 1)	— 0,07	— —	— —	— 0,010	— 0,05	0,02 0,06 1)	— —	— —	8,4
CuZn28Sn1	min. max.	70,0 73,0	Rem.	— —	0,02 0,06 2)	— 0,07	— —	— —	0,02 0,06 2)	— 0,05	0,02 0,06 2)	— —	0,9 1,3	8,6
CuZn30As	min. max.	68,5 71,5	Rem.	— —	0,02 0,06	— 0,07	— —	— —	— 0,02	— 0,05	— —	— —	— —	8,6
CuZn31Si1 3)	min. max.	66,0 70,0	Rem.	— —	— —	— 0,4	— —	— 0,5	— —	— 0,8	— —	0,7 1,3	— —	8,4
CuZn37Sn1Pb1	min. max.	59,0 62,0	Rem.	— —	— —	— 0,10	— —	— —	— —	0,4 1,0	— —	— —	0,5 1,0	8,4
CuZn38Sn1	min. max.	59,0 62,0	Rem.	— —	— —	— 0,10	— —	— —	— —	— 0,20	— —	— —	0,5 1,2	8,4
CuZn37Mn3Al2Si 3)	min. max.	57,0 60,0	Rem.	1,0 2,5	— —	— 0,6	1,5 3,5	— 0,25 4)	— —	— 0,8	— —	0,3 1,3	— 0,5	8,1
CuZn39AlFeMn	min. max.	56,0 61,0	Rem.	0,2 1,5 5)	—	0,2 1,5	0,2 2,0	— 2,0	— —	— 1,5	— —	— —	— 1,2	8,3

1) Either As or Sb.

2) Either As or Sb or P.

3) Mainly for wear resistance applications, e.g. plain bearings according to ISO 4382/2.

4) By agreement between supplier and purchaser the Ni-content may be maximum of 2,0 %.

5) For good brazing, less than 0,2 %.

Table 3 — Forms of wrought products

KEY :

X — main manufactured forms.

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

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

Designation	Plate, sheet		Strip		Tubes		Rod, bar	Wire	Extruded profiles[1]	Forgings
	General purpose	Boilers	General purpose	Springs	General purpose	Con-denser				
Copper-zinc alloys (non-leaded brasses)										
CuZn5	X		X		(X)			(X)		
CuZn10	X		X		X		(X)	(X)		
CuZn15	X		X	X	X		(X)	X		
CuZn20	X		X		(X)		(X)	X		
CuZn30	X		X	X	X		(X)	X		
CuZn35	X		X		(X)		(X)	X		
CuZn37	X		X	X	X		X	X	(X)	
CuZn40	(X)				X		X	(X)	X	(X)
Special copper-zinc alloys (special brasses)										
CuZn20Al2		X			X	X				
CuZn28Sn1		X			(X)	X				
CuZn30As					X	X				
CuZn31Si1			(X)[2]		(X)[2]		(X)[2]			
CuZn37Sn1Pb1							X		(X)	
CuZn38Sn1		X			(X)		X		(X)	(X)
CuZn37Mn3Al2Si			(X)[2]		(X)[2]		(X)[2]		(X)[2]	(X)[2]
CuZn39AlFeMn					X		X	(X)	X	X

1) Made by extruding or by a combination of extruding and drawing.

2) Mainly for wear resistance applications, e.g. plain bearings according to ISO 4382/2.

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