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# International Standard



# 6958

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

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## Wrought copper and copper alloys — Drawn rectangular bars — Dimension and form tolerances

*Cuivre et alliages de cuivre corroyés — Barres étirées de section rectangulaire — Tolérances sur dimensions et tolérances de forme*

First edition — 1984-12-15

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UDC 669.3-422.42

Ref. No. ISO 6958-1984 (E)

**Descriptors** : copper, copper alloys, drawn products, metal bars, rectangular bars, dimensions, thickness, width, length, dimension tolerances, form tolerances.

## Foreword

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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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 6958 was prepared by Technical Committee ISO/TC 26, *Copper and copper alloys*.

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# Wrought copper and copper alloys — Drawn rectangular bars — Dimension and form tolerances

## 1 Scope and field of application

This International Standard specifies the dimensional tolerances and form tolerances of wrought copper and copper alloy drawn rectangular bars with thickness in the range from 2 up to and including 40 mm and widths in the range from 3 up to and including 120 mm.

## 2 Reference

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

## 3 Dimensions and tolerances

### 3.1 Thickness and widths (see tables 1 and 2)

Table 1 — Tolerances for material group I

Values in millimetres

Width $b^{1)}$			Tolerance on thickness for thickness $a$					
>	<	Tolerance	$\begin{matrix} > 2 \\ < 3 \end{matrix}$	$\begin{matrix} > 3 \\ < 6 \end{matrix}$	$\begin{matrix} > 6 \\ < 10 \end{matrix}$	$\begin{matrix} > 10 \\ < 18 \end{matrix}$	$\begin{matrix} > 18 \\ < 30 \end{matrix}$	$\begin{matrix} > 30 \\ < 40 \end{matrix}$
> 3	10	$\pm 0,08$	$\pm 0,05$	$\pm 0,07$	$\pm 0,08$	—	—	—
10	18	$\pm 0,10$	$\pm 0,05$	$\pm 0,07$	$\pm 0,09$	$\pm 0,10$	—	—
18	30	$\pm 0,15$	$\pm 0,05$	$\pm 0,07$	$\pm 0,09$	$\pm 0,10$	$\pm 0,15$	—
30	50	$\pm 0,20$	$\pm 0,07$	$\pm 0,09$	$\pm 0,10$	$\pm 0,12$	$\pm 0,15$	$\pm 0,20$
50	80	$\pm 0,25$	$\pm 0,09$	$\pm 0,11$	$\pm 0,12$	$\pm 0,15$	$\pm 0,20$	$\pm 0,25$
80	120	$\pm 0,30$	—	$\pm 0,12$	$\pm 0,15$	$\pm 0,18$	$\pm 0,23$	$\pm 0,30$

1) Where the ratio  $b/a$  is greater than 20 : 1, tolerances shall be agreed.

Table 2 — Tolerances for material group II

Values in millimetres

Width $b^{1)}$			Tolerance on thickness for thickness $a$					
>	<	Tolerance	$\begin{matrix} > 2 \\ < 3 \end{matrix}$	$\begin{matrix} > 3 \\ < 6 \end{matrix}$	$\begin{matrix} > 6 \\ < 10 \end{matrix}$	$\begin{matrix} > 10 \\ < 18 \end{matrix}$	$\begin{matrix} > 18 \\ < 30 \end{matrix}$	$\begin{matrix} > 30 \\ < 40 \end{matrix}$
> 3	10	$\pm 0,12$	$\pm 0,07$	$\pm 0,10$	$\pm 0,12$	—	—	—
10	18	$\pm 0,15$	$\pm 0,07$	$\pm 0,10$	$\pm 0,12$	$\pm 0,15$	—	—
18	30	$\pm 0,22$	$\pm 0,07$	$\pm 0,10$	$\pm 0,12$	$\pm 0,15$	$\pm 0,22$	—
30	50	$\pm 0,30$	$\pm 0,10$	$\pm 0,13$	$\pm 0,15$	$\pm 0,18$	$\pm 0,22$	$\pm 0,30$
50	80	$\pm 0,37$	$\pm 0,13$	$\pm 0,16$	$\pm 0,18$	$\pm 0,22$	$\pm 0,30$	$\pm 0,37$
80	120	$\pm 0,45$	—	$\pm 0,18$	$\pm 0,22$	$\pm 0,27$	$\pm 0,35$	$\pm 0,45$

1) Where the ratio  $b/a$  is greater than 20 : 1, tolerances shall be agreed.

\* Under revision.

3.2 Corner radii

Rectangular bars may have rounded corners with corner radii according to table 3.

Table 3 – Corner radii

Values in millimetres

Width		Maximum corner radius
>	<	
≥ 3	6	0,5
6	10	0,8
10	18	1,2
18	30	1,8
30	50	2,8
50	80	4,0

3.3 Twist tolerance

Rectangular bars may have a twist, but not more than the tolerances according to table 4.

Table 4 – Twist tolerances

Values in millimetres

Width	Per metre	Tolerance per total length		
		< 3 000	> 3 000 < 5 000	> 5 000
≥ 18 < 80	3°	6°	8°	to be agreed
> 80	2°	4°	6°	to be agreed

NOTE – Minimum thickness : 6 mm

3.4 Straightness tolerance

The straightness tolerances listed in table 5 apply to bars of widths equal to or greater than 10 mm and all tempers except O and M-tempers.

Table 5 – Straightness tolerance

Values in millimetres

Nominal length $l_{nom}$		Maximum curvature (Depth of arc)
>	<	
≥ 1 000	2 000	2,0 in any length $l_m = 1 000$
2 000	3 000	5,5 in any length $l_m = 2 000$
3 000	—	12,0 in any length $l_m = 3 000$
Local kinks		0,6 in any length $l_m = 300$

The straightness is measured by determining the curvate  $c$  against a straightedge, having the appropriate length  $l_m$ , when the bar is lying flat on a base plate, (see the figure).

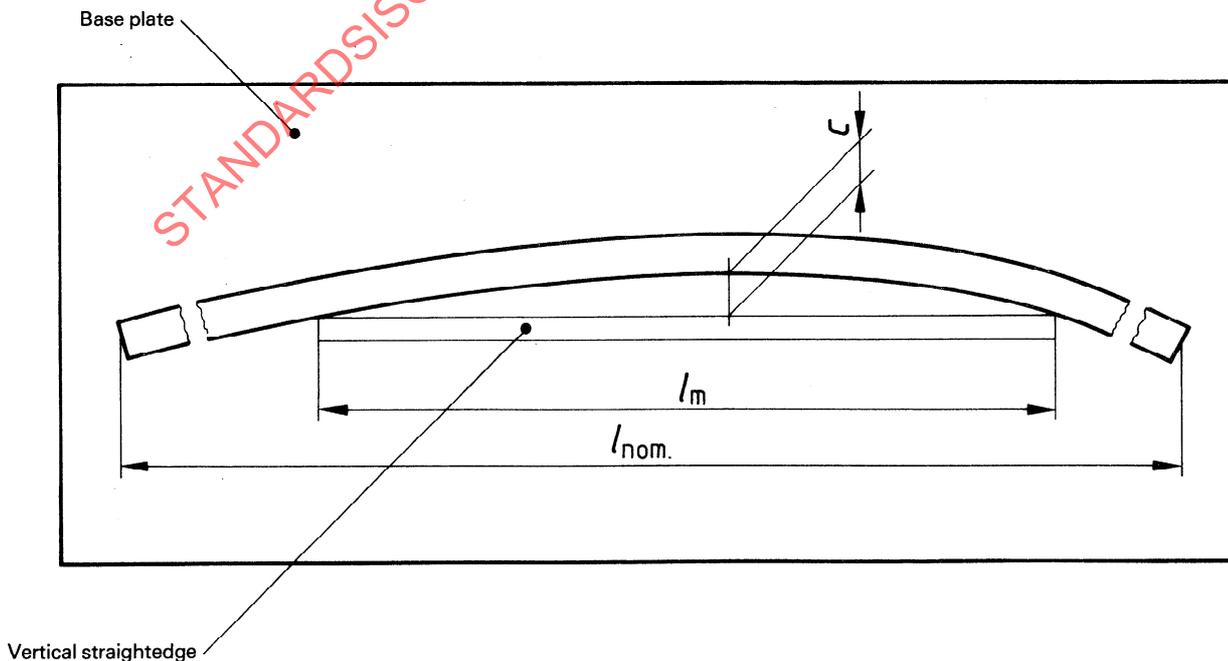


Figure – Measurement of straightness

### 3.5 Length tolerance

#### 3.5.1 Length as manufactured

The length as manufactured is delivered in nominal length and tolerances according to table 6; permissible underlengths are listed in table 7.

**Table 6 – Length as manufactured**

Values in millimetres

Width		Nominal length	Tolerance
>	<		
> 3	18	3 000 to 4 000	± 50
18	40		± 100
40	50	2 000 to 4 000	± 200
50	60	2 000 to 3 000	
60	120	1 000 to 2 000	

**Table 7 – Permissible underlength**

Width mm		Shortest permissible length	Permissible mass of underlengths
>	<	% of nominal length	% of lot mass
> 3	18	75	20
18	50	50	40
50	120		50

#### 3.5.2 Fixed length

The length of fixed lengths shall be agreed upon between the purchaser and supplier. Fixed lengths shall have a tolerance of  $+^{10}_0$  mm.

## 4 Material

Drawn rectangular bars according to this International Standard are currently available in commercial quantities in wrought copper and copper alloys listed in table 8.

The mechanical properties of the materials listed are specified in ISO 1637.

The materials are divided into material groups I and II as classified in table 8.

Table 8 — Materials

Material group	Type	Designation
I	Coppers (Cu min. 99,85 %)	Cu-ETP Cu-FRHC Cu-FRTP Cu-OF Cu-HCP Cu-DLP Cu-DHP
	Coppers (Cu min. 97,5 %)	CuPb 1 CuS (P0,01) CuS (P0,03) CuTe CuTe (P)
	Copper-zinc-lead alloys	CuZn36Pb3 CuZn38Pb2 CuZn38Pb4 CuZn39Pb1 CuZn39Pb3 CuZn40Pb CuZn40Pb2
II	Coppers (Cu min. 97,5 %)	CuCr1 CuCr1Zr CuSi1
	Special copper-zinc alloys	CuZn38Sn1 CuZn37Sn1Pb1

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