

COST : 2060-73

Title : BRASS RODS

Translated  
and

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Group B55 (V55)

USSR STATE STANDARD

Brass Rods

GOST 2060-73  
This supersedes  
GOST 2060-60

Valid upto 01.01.1979

The present standard relates to drawn and extruded brass rods of circular, square and hexagonal section, used in different sectors of industry.

This standard has been drawn up in conformity with CЭБ [GOST] recommendations PC 2803-70, PC 1183-64 and PC 2789-70 on standardisation.

1. Assortment

1.1 Diameter of drawn rods and the tolerance in it must conform to values specified in Table 1.

Nominal diameter	Tolerance in diameter					
	Round rods			Squares and hexagons		
	High accuracy	Increased accuracy	Normal accuracy	Increased accuracy	Normal accuracy	Normal accuracy
3.0	-0.04	-0.06	-0.10	-	-	-
3.5	-0.05	-0.08	-0.12	-	-	-
4.0	-0.05	-0.08	-0.12	-	-	-
4.5	-0.05	-0.08	-0.12	-	-	-
5.0	-0.05	-0.08	-0.12	-0.03	-	-0.12

mm

Table 1

Table 1 contd.

Nominal diameter	mm				Tolerance in diameter	
	Round rods		Squares and hexagons		Normal accuracy	Increased accuracy
	High accuracy	Increased accuracy	Normal accuracy	Increased accuracy		
5,5	-0,05	-0,08	-0,12	-0,08	0,12	0,12
6,0	-0,05	-0,08	-0,12	-0,08	0,12	0,12
6,5	-0,06	-0,09	-0,15	-0,09	0,15	0,15
7,0	-0,06	-0,09	-0,15	-0,09	0,15	0,15
7,5	-0,06	-0,09	-0,15	-0,09	0,15	0,15
8,0	-0,06	-0,09	-0,15	-0,09	0,15	0,15
8,5	-0,06	-0,09	-0,15	-0,09	0,15	0,15
9,0	-0,06	-0,09	-0,15	-0,09	0,15	0,15
9,5	-0,06	-0,09	-0,15	-0,09	0,15	0,15
10,0	-0,06	-0,09	-0,15	-0,09	0,15	0,15
11,0	-	-0,11	-0,18	-0,11	0,18	0,18
12,0	-	-0,11	-0,18	-0,11	0,18	0,18
13,0	-	-0,11	-0,18	-0,11	0,18	0,18
14,0	-	-0,11	-0,18	-0,11	0,18	0,18
15,0	-	-0,11	-0,18	-0,11	0,18	0,18
16,0	-	-0,11	-0,18	-0,11	0,18	0,18
17,0	-	-0,11	-0,18	-0,11	0,18	0,18
18,0	-	-0,11	-0,18	-0,11	0,18	0,18
19,0	-	-0,13	-0,21	-0,13	0,21	0,21
20,0	-	-0,13	-0,21	-0,13	0,21	0,21
21,0	-	-0,13	-0,21	-0,13	0,21	0,21
22,0	-	-0,13	-0,21	-0,13	0,21	0,21
23,0	-	-0,13	-0,21	-0,13	0,21	0,21
24,0	-	-0,13	-0,21	-0,13	0,21	0,21
25,0	-	-0,13	-0,21	-0,13	0,21	0,21
27,0	-	-0,13	-0,21	-0,13	0,21	0,21
28,0	-	-0,13	-0,21	-0,13	0,21	0,21
30,0	-	-0,13	-0,21	-0,13	0,21	0,21
32,0	-	-0,16	-0,25	-0,16	0,25	0,25
35,0	-	-0,16	-0,25	-0,16	0,25	0,25
36,0	-	-0,16	-0,25	-0,16	0,25	0,25
38,0	-	-0,16	-0,25	-0,16	0,25	0,25
40,0	-	-0,16	-0,25	-0,16	0,25	0,25
41,0	-	-0,16	-0,25	-0,16	0,25	0,25
45,0	-	-0,16	-0,25	-0,16	0,25	0,25
46,0	-	-0,16	-0,25	-0,16	0,25	0,25
50,0	-	-0,16	-0,25	-0,16	0,25	0,25

Note:1. Drawn round rods of diameter over 10 mm are made to high accuracy against customer's order with proper justification. Tolerances are set as per class 3a in GOST 1945-59.

2. Only round rods of diameter ranging from 5 mm upto and including 20 mm are made out of JC 63-3 grade brass. Rods of diameter 3 to 4.5 mm incl. are made by mutual consent.

3. In the case of square and hexagonal rods the width across flats is taken as the diameter.
4. Area of cross-section and theoretical weight per metre of round, square and hexagonal rods are listed in annexure 3.

Table 2  
Tolerance in diameter

Nominal diameter	Round rods		Squares and hexagons	
	Increased accuracy	Normal accuracy	Increased accuracy	Normal accuracy
10	-0,36	-0,58		
11	-0,43	-0,70		
12	-0,43	-0,70		
14	-0,43	-0,70		
16	-0,43	-0,70		
18	-0,43	-0,70		
20	-0,52	-0,84		
22	-0,52	-0,84		
23	-0,52	-0,84	-0,52	-0,84
24			-0,52	-0,84
25			-0,52	-0,84
27			-0,52	-0,84
28	-0,52	-0,84		
30	-0,52	-0,84		
32	-0,52	-0,84		
35	-0,62	-1,00	-0,52	-0,84
36			-0,62	-1,00
38	-0,62	-1,00		
40	-0,62	-1,00		
41				
42	-0,62	-1,00		
45	-0,62	-1,00		
46				
48	-0,62	-1,00		
50	-0,62	-1,00		
55				
60				
65				
70				
75				
80				
85				
90				
95				
100				
110				

2\*

1.2 Dimensions of extruded rods and tolerances in it must conform to values specified in Table 2.

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mm

Table 2 contd.

Nominal diameter	Tolerance in diameter			
	Round rods		Squares and hexagons	
	Increased accuracy	Normal accuracy	Increased accuracy	Normal accuracy
120	-	-2.20	-	-
130	-	-2.50	-	-
140	-	-2.50	-	-
150	-	-2.50	-	-
160	-	-2.50	-	-

**Notes:**

1. Rods of diameter 130 to 140 mm with tolerance of minus 3 mm and rods of diameter 150 to 160 mm with tolerance of minus 3.5 mm may be supplied by mutual consent.
2. Ingots of diameter 130 to 160 mm made by semi-continuous casting process may be supplied instead of extruded rods of the same diameters by mutual consent.
3. Area of cross-section and theoretical weight per metre of extruded rods are listed in reference annexure 4.
4. Approximate density of different grades of brass is listed in annexure 5.

1.3 Rods must be made to different lengths as below:

a) nonuniform length:

- 2 to 5 m - for diameters upto 40 mm;
- 1 to 4 m - for diameters over 40 upto 80 mm;
- 1 to 3 m - for diameters over 80 upto 100 mm;
- 0.5 to 3 m - for diameters over 100 mm.

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- b) Uniform length within the range of nonuniform length with tolerance of + 15 mm (for drawn tubes of all diameters);
- c) Multiples of uniform length - in the range of nonuniform length - with an allowance of 5 mm per cut and with overall tolerance corresponding to subclause (b). Rods of uniform length or multiples of it are supplied against customer's order with proper justification.

Note:

1. Rods of nonuniform length may be supplied in length lower than those specified in subclause (a) but not shorter than 0.5 m upto 10% of batch by weight.
2. Rods of diameter 3 to 4 mm incl. are made in length from 1.5 to 3 m.
3. Rods of brass grade АС 63-3 are made in lengths not less than 1 m.
4. Extruded tubes may be made to uniform length at customer's request with the following tolerances in length:
  - + 15 mm - for rods of diameter upto 80 mm;
  - + 20 mm - for rods of diameter over 80 mm.

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5. Drawn and extruded rods of diameter upto and including 18 mm may be supplied in bundles weighing upto 80 kg by mutual consent. Their length in this case should be not less than 4 m.
6. Rods may be supplied to other lengths and tolerances in length by mutual consent.

1.4 The order must specify the dimensions, manufacturing accuracy, brass grade and condition of material.

Examples of conventional designation of rods:

Rod from А60 grade brass, drawn, round, with high manufacturing accuracy, hard, with diameter 10 mm;

Rod А60 Т.кп. В.Т. -10 GOST 2060-73

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-do- from АС59-1 grade brass, drawn, with normal manufacturing accuracy, soft, with diameter 20 mm;

Rod АС59-1 Т.кп.Н.М.-20 GOST 2060-73

-do- from АС63-3 grade brass, drawn, round, with normal manufacturing accuracy, hard, with diameter 12 mm, intended for machining on autos;

Rod АС63-3- Т.кп.Н.Т.-12-0 GOST 2060-73

-do- from АС59-1 grade brass, drawn, square, with increased manufacturing accuracy, hard with diameter 15 mm.

Rod АС59-1 Т.квнт-15 GOST 2060-73

-do- from А062-1 grade brass, drawn, hexagonal, with normal manufacturing accuracy, medium hard, with diameter 25 mm, with uniform length of 3500 mm

Rod А062-1 Т.у.Н. П Т-25x3500 GOST 2060-73

-do- from АМц58-2 grade brass, extruded, round, with increased manufacturing accuracy and diameter 18 mm;

Rod АМц58-2-рп.кп.П -18 GOST 2060-73

-do- from АЖС58-1-1- extruded, square, with normal manufacturing accuracy and diameter 24 mm;

Rod АЖС 58-1-1- рп.кв.Н-24 GOST 2060-73

-do- from АЖ-Мц59-1-1 grade brass, extruded, hexagonal with normal manufacturing accuracy and diameter 75 mm and uniform length 2500 mm;

Rod АЖ-Мц59-1-1 рп.у. Н-75x2500 GOST 2060-73.

-do- from ААЖ60-1-1 grade brass, extruded, round, with increased manufacturing accuracy, diameter 30 mm and length multiple of 2500 mm;

Rod ААЖ60-1-1- рп.кп.П-30x2500 крт. GOST 2060-73

## 2. Technical Requirements

2.1 Rods are made out of copper-zinc alloys (brass) to GOST 1552770 in conformity with the requirements of Table 3.

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Table 3

Manufacturing process	Rod profile	Brass grade
Drawn	Rounds, squares and hexagonal	Л60; Л63; ЛС59-1; ЛО62-1; ЛЖС58-1-1; ЛМУ58-2; ЛЖМУ59-1-1
Drawn	Rounds	ЛС63-3
Extruded	Rounds, squares, and hexagonals	Л60; Л63; ЛО62-1; ЛС59-1; ЛМУ58-2; ЛЖМУ59-1-1; ЛЖЖ60-1-1; ЛЖС58-1-1

2.2 Rods are made with nonmagnetic properties in accordance with the requirements of GOST 15527-70 out of Л63, ЛС59-1 and ЛС63-3 grade brass at customer's request.

2.3 Drawn rods are made to different material conditions as follows: Soft, medium hard and hard out of Л60; Л63 and ЛС59-1 grade alloys; Medium hard and hard out of ЛО62-1; ЛЖС58-1-1; ЛМУ58-2 and ЛЖМУ59-1-1 Hard and medium hard out of ЛС63-3 grade alloy.

2.4 Rod surface must be clean and free from cracks and peeling.

Minor flaws, dents, blowholes, grooves, scoring, ring marks and marks left after trimming are permissible on the surface provided trimming them for inspection does not result in tolerance in diameter being exceeded.

Local reddening and temper colour after annealing are permitted on the rod surface.

2.5 Internal defects like blowholes, nonmetallic impurities and press shrinkage are not acceptable in rods.

2.6 Rods must be evenly trimmed. The cut must be perpendicular to the centre line of the rod.

Obliquity in the cut must not exceed half the tolerance in length. 7/12

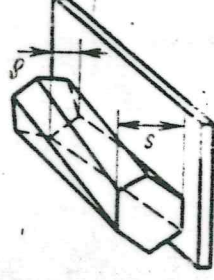
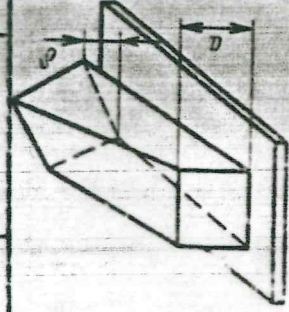
The trailing end of the rod leaving the press is broken off or cut (in the case of nondestructive testing) till press-shrinkage is totally removed.

The broken end is not trimmed before despatch to customer. Rods of diameter less than 28 mm may be supplied with cut ends without agreement on obliquity of cut.

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2.7 Rods must be straightened, Curvature in rods per metre must not exceed the norms given in Table 4.

Manufacturing process of rods.	Curvature per metre of length for diameter mm				Table 4
	upto 18	over 18 upto 40	over 40 upto 50	over 50 upto 120	
Drawn, hard, medium hard (for machining on autos)	1.25	1.0	2	-	-
Drawn hard and medium hard	2.0	1.5	2	-	-
Drawn soft and extruded	4.0	5.0	5.0	6.0	9.0



Total curvature in the rod must not exceed the product of local curvature per metre and the rod length in metres.

2.8 Deviation from shape in the crosssection (ovality, rhombus shape) is permissible within the tolerance in diameter.

2.9 Twist in square and hexagonal rods in the hard, and medium hard condition must not exceed the values specified in the drawing and in Table

Red dimensions a, s	mm	
	Maximum permissible twist per metre	Maximum permissible twist over the entire length of rod
upto 17 over 17 upto 50	1.0 2.0	2.0 5.0

Table 5

Note: Soft and extruded rods must not have twist visible to the eye

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2.10 Longitudinal edges of drawn rods of square and hexagonal section may be filleted with:

radius upto 0.5 mm upto 25 mm size and upto 1.0 mm over 25 mm size.

2.11 Residual tensile stresses must be removed from drawn rods of all grades of alloys by heat treatment (low temperature annealing) or by mechanical means.

2.12 Mechanical properties of rods must conform to requirements specified in Table 6.

Brass grade	Manufacturing process and material condition	Rod diameter, mm	Table 6	
			Ultimate tensile strength $\sigma_B$ , kgf/mm <sup>2</sup>	Relative elongation $\delta$ , %
Л60	Extruded Drawn soft Drawn medium hard Drawn hard	10-160	30	30
		3-50	34	30
		3-40	40	17
		3-12	48	9
Л63	Extruded Drawn soft Drawn medium hard Drawn hard	10-160	30	30
		3-50	30	40
		3-40	38	15
		3-12	45	10
ЛС59-1	Extruded Drawn soft Drawn medium hard Drawn hard	10-160	37	18
		3-50	34	22
		3-40	40	15
		3-12	50	5

not less than

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