ASTM B927 / ASME SB927

Standard Specification for Brass Rod, Bar, and Shapes

This specification establishes requirements for brass rod (round, hexagonal, and octagonal), bar (rectangular and square), and shapes of UNS Alloys C21000, C22000, C23000, C24000, C26000, C26800, C27000, and C27400.

A. General Requirements :-

The following sections of Specification B 249/B 249M constitute a part of this specification:

1. Materials and Manufacture,
2. Test Methods,
3. Mill Test Reports,
4. Supplementary Requirements.

B. Chemical Composition :-

The material shall conform to the chemical compositional requirements specified in Table 1.

Table 1

Copper Alloy UNS No.	Composition, %			
	Copper	Lead, max	Iron, max	Zinc
C21000	94.0-96.0	0.05	0.05	remainder
C22000	89.0-91.0	0.05	0.05	remainder
C23000	84.0-86.0	0.05	0.05	remainder
C24000	78.5-81.5	0.05	0.05	remainder
C26000	68.5-71.5	0.07	0.05	remainder
C26800	64.0-68.5	0.15	0.05	remainder
C27000	63.0-68.5	0.10	0.07	remainder
C27400	61.0-64.0	0.10	0.05	remainder

C. Temper :-

1. The standard tempers for rod and bar described in this specification are given in Tables 2 and 3.
   i. O60 (Soft Anneal),
   ii. H01 (1⁄4Hard),
   iii. H02 (1⁄2Hard), and
   iv. H04 (Hard).
2. Other tempers, and temper for other products including shapes, shall be subject to agreement between the manufacturer and the purchaser.

D. Tensile Strength Requirements :-

1. Product shall conform to the requirements of Tables 2 and 3 when tested in accordance with Test Methods E 8 or E 8M.

Table 2: Tensile Requirements (Inch-Pound Units)

Temper		Diameter or Distance Between Parallel Surfaces, in.	Tensile Strength, min, ksi	Yield Strength at 0.5 % Extension Under Load, min, ksi	Elongation[A] in 4× diameter or 4× thickness, min, %
Code	Name				
Copper Alloy UNS No. C21000 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	30	10	25
H01	1⁄4 Hard	Under 1⁄2	36	16	15

		1⁄2 to 1, incl	34	14	17
		over 1	32	12	19
H02	1⁄2 Hard	Under 1⁄2	42	25	8
		1⁄2 to 1, incl	40	23	9
		over 1	37	20	11
H04	Hard	Under 1⁄2	52	40	5
		1⁄2 to 1, incl	48	37	7
		over 1 to 2 incl	45	35	9
Copper Alloy UNS No. C21000 Bar[B]					
O60	Soft Anneal	All sizes	30	10	25
H01	1⁄4 Hard	Under 1⁄2	34	14	17
		1⁄2 to 2, incl	32	12	19
Copper Alloy UNS No. C22000 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	32	10	25
H01	1⁄4 Hard	Under 1⁄2	39	20	15
		1⁄2 to 1, incl	37	17	17
		over 1	34	15	19
H02	1⁄2 Hard	Under 1⁄2	50	30	7
		1⁄2 to 1, incl	45	27	10
		over 1	40	25	12
H04	Hard	Under 1⁄2	57	40	5
		1⁄2 to 1, incl	55	37	7
		over 1 to 2 incl	50	35	9
Copper Alloy UNS No. C22000 Bar[B]					
O60	Soft Anneal	All sizes	32	10	25
H01	1⁄4 Hard	Under 1⁄2	35	16	17
		1⁄2 to 2, incl	34	15	19
Copper Alloy UNS No. C23000 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	35	10	25
H01	1⁄4 Hard	Under 1⁄2	44	20	15
		1⁄2 to 1, incl	42	17	17
		over 1	40	15	19
H02	1⁄2 Hard	Under 1⁄2	50	30	7
		1⁄2 to 1, incl	45	27	10
		over 1	40	25	12
H04	Hard	Under 1⁄2	63	40	5
		1⁄2 to 1, incl	60	37	7
		over 1 to 2 incl	58	35	9
Copper Alloy UNS No. C23000 Bar[B]					
O60	Soft Anneal	All sizes	35	10	25
H01	1⁄4 Hard	Under 1⁄2	40	15	19
		1⁄2 to 1, incl	38	13	22
		over 1 to 2 incl	36	11	25
H02	1⁄2 Hard	Under 1⁄2	44	20	15
		1⁄2 to 1, incl	42	17	17
		over 1 to 2 incl	40	15	19
Copper Alloy UNS No. C24000 Rod (round, hexagonal, octagonal)					

O60	Soft Anneal	All sizes	40	10	30
H01	1⁄4 Hard	Under 1⁄2	47	25	18
		1⁄2 to 1, incl	45	20	20
		over 1	43	18	22
H02	1⁄2 Hard	Under 1⁄2	53	33	10
		1⁄2 to 1, incl	48	30	13
		over 1	43	28	15
H04	Hard	Under 1⁄2	68	45	8
		1⁄2 to 1, incl	65	40	10
		over 1 to 2 incl	60	35	12
Copper Alloy UNS No. C24000 Bar[B]					
O60	Soft Anneal	All sizes	40	10	30
H01	1⁄4 Hard	Under 1⁄2	45	20	20
		1⁄2 to 1, incl	43	18	22
		over 1 to 2 incl	41	16	25
Copper Alloy UNS No. C26000 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	40	12	30
H01	1⁄4 Hard	Under 1⁄2	50	30	20
		1⁄2 to 1, incl	48	25	24
		over 1	46	20	28
H02	1⁄2 Hard	Under 1⁄2	57	35	15
		1⁄2 to 1, incl	54	32	20
		over 1	50	30	25
H04	Hard	Under 1⁄2	70	50	10
		1⁄2 to 1, incl	65	45	15
		over 1 to 2 incl	60	40	20
Copper Alloy UNS No. C26000 Bar[B]					
O60	Soft Anneal	All sizes	40	12	30
H02	1⁄2 Hard	Under 1⁄2	50	25	10
		1⁄2 to 1, incl	45	17	20
		over 1 to 2 incl	40	15	20
Copper Alloy UNS No. C26800, C27000, C27400 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	40	12	30
H01	1⁄4 Hard	Under 1⁄2	47	25	18
		1⁄2 to 1, incl	45	20	20
		over 1	43	18	22
H02	1⁄2 Hard	Under 1⁄2	53	33	10
		1⁄2 to 1, incl	48	30	13
		over 1	43	28	15
H04	Hard	Under 1⁄2	68	45	8
		1⁄2 to 1, incl	65	40	10
		over 1 to 2 incl	60	35	12
Copper Alloy UNS No. C26800, C27000, C27400 Bar[B]					
O60	Soft Anneal	All sizes	40	12	30
H02	1⁄2 Hard	Under 1⁄2	50	25	10
		1⁄2 to 1, incl	45	17	20
		over 1 to 2 incl	40	15	20

[A] *In any case, a minimum gage length of 1 in. shall be used.*

[B] *For rectangular bar, the Distance between Parallel Surfaces refers to thickness.*

Table 3: Tensile Requirements (SI Units)

Temper		Diameter or Distance Between Parallel Surfaces, in.	Tensile Strength, min, Mpa	Yield Strength at 0.5 % Extension Under Load, min, Mpa	Elongation[A] in 4× diameter or 4× thickness, min, %
Code	**Name**				
Copper Alloy UNS No. C21000 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	205	70	25
H01	1⁄4 Hard	Under 12	250	110	15
		12 to 25, incl	235	95	17
		over 25	220	85	19
H02	1⁄2 Hard	Under 12	290	170	8
		12 to 25, incl	275	160	9
		over 25	255	140	11
H04	Hard	Under 12	360	275	5
		12 to 25, incl	330	255	7
		over 25 to 50 incl	310	240	9
Copper Alloy UNS No. C21000 Bar[B]					
O60	Soft Anneal	All sizes	205	70	25
H01	1⁄4 Hard	Under 12	235	95	17
		12 to 50, incl	220	85	19
Copper Alloy UNS No. C22000 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	220	70	25
H01	1⁄4 Hard	Under 12	270	140	15
		12 to 25, incl	255	115	17
		over 25	235	105	19
H02	1⁄2 Hard	Under 12	345	205	7
		12 to 25, incl	310	185	10
		over 25	275	170	12
H04	Hard	Under 12	395	275	5
		12 to 25, incl	380	255	7
		over 25 to 50 incl	345	240	9
Copper Alloy UNS No. C22000 Bar[B]					
O60	Soft Anneal	All sizes	220	70	25
H01	1⁄4 Hard	Under 12	240	110	17
		12 to 50, incl	235	105	19
Copper Alloy UNS No. C23000 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	240	70	25
H01	1⁄4 Hard	Under 12	305	140	15

		12 to 25, incl	290	115	17
		over 25	275	103	19
H02	1/2 Hard	Under 12	345	205	7
		12 to 25, incl	310	185	10
		over 25	285	170	12
H04	Hard	Under 12	435	275	5
		12 to 25, incl	415	255	7
		over 25 to 50 incl	400	240	9
Copper Alloy UNS No. C23000 Bar[B]					
O60	Soft Anneal	All sizes	240	70	25
H01	1/4 Hard	Under 12	275	105	19
		12 to 25, incl	260	90	22
		over 25 to 50 incl	250	75	25
H02	1/2 Hard	Under 12	305	140	15
		12 to 25, incl	290	115	17
		over 25 to 50 incl	275	105	19
Copper Alloy UNS No. C24000 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	275	70	30
H01	1/4 Hard	Under 12	325	170	18
		12 to 25, incl	310	140	20
		over 25	295	125	22
H02	1/2 Hard	Under 12	365	230	10
		12 to 25, incl	330	205	13
		over 25	295	195	15
H04	Hard	Under 12	470	310	8
		12 to 25, incl	450	275	10
		over 25 to 50 incl	415	240	12
Copper Alloy UNS No. C24000 Bar[B]					
O60	Soft Anneal	All sizes	275	70	30
H01	1/4 Hard	Under 12	310	140	20
		12 to 25, incl	295	125	22
		over 25 to 50 incl	285	110	25
Copper Alloy UNS No. C26000 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	275	85	30
H01	1/4 Hard	Under 12	345	205	20
		12 to 25, incl	330	170	24
		over 25	315	140	28
H02	1/2 Hard	Under 12	395	240	15
		12 to 25, incl	370	220	20
		over 25	345	205	25
H04	Hard	Under 12	485	345	10
		12 to 25, incl	450	310	15

		over 25 to 50 incl	415	275	20
Copper Alloy UNS No. C26000 Bar[B]					
O60	Soft Anneal	All sizes	275	85	30
H02	1/2 Hard	Under 12	345	170	10
		12 to 25, incl	310	115	20
		over 25 to 50 incl	275	105	20
Copper Alloy UNS No. C26800, C27000, C27400 Rod (round, hexagonal, octagonal)					
O60	Soft Anneal	All sizes	275	85	30
H01	1/4 Hard	Under 12	325	170	18
		12 to 25, incl	310	140	20
		over 25	295	125	22
H02	1/2 Hard	Under 12	365	230	10
		12 to 25, incl	330	205	13
		over 25	295	195	15
H04	Hard	Under 12	470	310	8
		12 to 25, incl	450	275	10
		over 25 to 50 incl	415	240	12
Copper Alloy UNS No. C26800, C27000, C27400 Bar[B]					
O60	Soft Anneal	All sizes	275	85	30
H02	1/2 Hard	Under 12	345	170	10
		12 to 25, incl	310	115	20
		over 25 to 50 incl	275	105	20

[A] *In any case, a minimum gage length of 25 mm shall be used.*

[B] *For rectangular bar, the Distance between Parallel Surfaces refers to thickness.*

E. Test Methods :-

1. Chemical Analysis:
   Composition shall be determined, in case of disagreement, as follows:

Element	Test Method
Copper	E 478
Lead	E 478 (AA)
Iron	E 478
Zinc	E 478 (Titrametric)

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