



## FREE CUTTING BRASS RODS - GRADE I

IS 319 / 89 NR. EQUIVALENT SPEC. BS 2874 / 86, CZ121PB3, JIS3250H C-3604, ASTMBC38500

Chemical Requirements (%)	Grade I
Copper	56.0 - 59.0 %
Lead	2.0 - 3.50 %
Iron	0.35% max.
Total Imp. Excl. Iron	0.70% max.
Zinc	Remainder

Physical Properties			
Condition	Size	T. S. MPA	EL % Min
Annealed (O)	6-25	345	12
	25-50	315	17
	50 above	285	22
Half-Hard (HB)	6-12	405	4
	12-25	395	6
	25-50	355	12
Hard (HD)	50 above	325	17
	6-12	550	-
	12-25	490	4

Fabrication Properties	
Capacity for being	

Cold worked	Poor
Hot formed	Fair
Machinability Rating	100%
Suitability for Soldering	Excellent
Suitability for Brazing	Good

## FREE CUTTING BRASS RODS - GRADE II & III

IS 319 / 89 NR. EQUIVALENT SPEC. BS 2874 / 86 CZ124, JIS3250 H C-3602, ASTMBC36000

Chemical Requirements (%)	Grade II	Grade III
Copper	60.0 - 63.0 %	60.0 - 63.0 %
Lead	2.50 - 3.70 %	0.50 - 1.50 %
Iron	0.35 % max.	0.20 % max.
Total Imp. Excl. Iron	0.50 % max.	0.50 % max.
Zinc	Remainder	Remainder

Physical Properties					
		Grade II	Grade III		
Condition	Size	T. S. MPA	EL % Min	T. S. MPA	EL % Min
Annealed (O)	6-25	355	15	315	22
	25-50	305	20	285	27
	50 above	275	25	255	32
Half-Hard (HB)	6-12	395	7	355	8
	12-25	385	10	345	12
	25-50	345	15	305	22
Hard (HD)	50 above	315	20	285	27
	6-12	550	-	460	-
	12-25	485	4	400	4

Physical Properties					
		Grade II	Grade III		

Capacity for being		
Cold worked	Poor	Fair
Hot formed	Fair	Excellent
Machinability Rating	90%	80%
Suitability for Soldering	Excellent	Excellent
Suitability for Brazing	Good	Excellent

## FREE CUTTING BRASS RODS WITH IMPROVED DUCTILITY

BS 2874 – CZ 131 NR, EQUIVALENT SPEC. DTD 627, EN CW606N – 12164

DIN CuZn36Pb2 – 17900, UNS – C35300

Chemical Requirements(%)	
Copper	61.00 - 63.00 %
Lead	1.50 - 2.50 %
Iron	- 0.20 % max
Total Imp Excl. Iron	- 0.50 % max
Zinc	Remainder

Physical Properties : (1/2 Hard)			
Condition	Size	T. S. MPa	EL % Min.
Half-Hard (AB)	6 - 18	350	22
	18 - 40	350	25
	40 - 80	350	28
	Above 80 mm	330	28

Fabrication Properties	
Capacity for being	
Cold Worked	Poor
Machinability Rating (IS 319-I 100)	70

Bending	Excellent
Cold Heading	Excellent
Rivetting	Excellent

## FREE CUTTING & FORGING BRASS RODS

EN 12164 : 1998

Chemical Requirement(%)	A	B
	CuZn39Pb3	CuZn40Pb2
	CW614N	CW617N
Copper	57 - 59 %	57-59 %
Lead	2.5 - 3.5 %	1.6 - 2.5 %
Aluminum	0.05 % max	0.05 % max
Iron	0.30 % max	0.30 % max
Nickle	0.30 % max	0.30 % max
Tin	0.30 % max	0.30 % max
Total Imp.	0.20 % max	0.20 % max
Zinc	Remainder	Remainder

Physical Properties : (1/2 Hard)						
Condition	Size	T. S. MPa	EL % Min.	Size	T. S. MPa	EL % Min.
Half-Hard (AB)	6 -14	400	15	6 -14	550	
	14 - 40	380	18	14 - 40	500	8
	40 - 80	360	20	40 - 80	430	10

Fabrication Properties	
Capacity for being	
Cold Worked	Poor
Hot Formed	Excellent

Suitability for Soldering	Excellent
Suitability for Brazing	Good

## FORGING BRASS RODS

BS 218

Chemical Requirement (%)	
Copper	56.50 - 60.00 %
Lead	1.00 - 2.50 %
Iron	0.30 % max
Total Imp.	0.70 % max
Zinc	Remainder

Physical Properties	
Rm - Tensile strength in Kg / mm <sup>2</sup>	32 min.
Elongation on 5.65 A%	25 min.

Fabrication Properties	
Capacity for being	
Cold Worked	Poor
Hot Formed	Excellent
Hot Forgeability Rating (Forging Brass - 100 )	100
Machinability Rating (IS 319-I 100)	80
Suitability for Soldering	Excellent
Suitability for Brazing	Good

## FORGING BRASS RODS

IS – 6912 / 2005 FLB

**Chemical Requirement (%)**

Copper	56.50 - 60.00 %
Lead	0.60 - 2.00 %
Iron	0.30 % max.
Total Imp excl Fe	0.75 % max
Zinc	Remainder

**Physical Properties**

Rm - Tensile strength in Mpa	310 min.
Elongation on 5.65 A%	25 min.

**Fabrication Properties**

Capacity for being	
Cold Worked	Poor
Hot Formed	Excellent
Hot Forgeability Rating (Forging Brass - 100 )	100
Machinability Rating (IS 319-I 100)	80
Suitability for Soldering	Excellent
Suitability for Brazing	Good

## FORGING BRASS RODS

IS 3488 / 80 NR. EQUIVALENT SPEC. BS 2874 / 86 CZ122,ASTMBC37700

Chemical Requirements (%)	CuZn42Pb2	CuZn40Pb2
Copper	56.5 - 60.0 %	57.0 - 59.0 %
Lead	0.60 - 2.0 %	1.50 - 2.50 %
Iron	0.30 % max.	0.40 % max.
Total Imp. Excl. Iron	0.20% max	0.70 % max
Zinc	Remainder	Remainder

### Physical Properties

Tensile Strength	380 Mpa Min	40 kg/mm2 min
Elongation %	25% Min	18% Min.
Izod Value	-	2.0 KJ Min.

### Fabrication Properties

Capacity for being		
Cold worked	Poor	Poor
Hot formed	Excellent	Excellent
Hot forgeability Rating	100%	100%
Machinability Rating	80%	80%
Suitability for Soldering	Excellent	Excellent
Suitability for Brazing	Good	Good

## SPECIAL FORGING BRASS RODS FOR VALVES

IS 8737 / AMD – 2

### Chemical Requirements %

Copper	56.5 - 60.0 %
Lead	1.0 - 2.0 %
Manganese	0.50 % max.
Iron	0.30 % max.
Total Imp.	0.75% max.
Zinc	Remainder

### Physical Properties

Tensile Strength	40 kg/mm2 Min
Elongation %	18% Min.
Izod Value	2.2 Kgf Min.

### Fabrication Properties

Capacity for being	
Cold worked	Poor
Hot formed	Excellent
Hot forgeability Rating	100%
Machinability Rating	80%
Suitability for Soldering	Excellent
Suitability for Brazing	Good

## RIVETING QUALITY BRASS RODS & WIRES

IS 4170 / 67 NR. EQUIVALENT SPEC. BS 2874 / 86 CZ 109,  
JIS3250H C-2800, ASTMBC36500

### Chemical Requirements %

### CuZn40

Copper	59.0 - 62.0 %
Lead	0.75 % max.
Iron	0.10% max.
Total Imp. Excl. Iron	0.30 % max.
Zinc	Remainder

### Physical Properties

Tensile Strength	40 kg/mm <sup>2</sup> Min
Elongation %	18% Min.
Izod Value	2.2 Kgf Min.

### Fabrication Properties

Capacity for being	
Machinability Rating	55 %
Bending	Excellent

Riveting	Excellent
Forging	Excellent

## RIVETING QUALITY BRASS RODS (LEAD FREE)

IS 4413 / 81 NR. EQUIVALENT SPEC. BS 2872 / 86 CZ 108

Chemical Requirements %	CuZn37	CuZn30
Copper	62.0 - 65.0 %	60.5 - 71.50 %
Lead	0.30 % max.	0.05 % max.
Iron	0.10 % max.	0.05 % max.
Total Imp.	0.60 % max.	0.30 % max.
Zinc	Remainder	Remainder

Physical Properties				
Condition	T. S. MPa	EL % Min	T. S. MPa	EL % Min
Annealed (O)	325 min	35 %	315 min	45 %
Half-Hard (HB)	460-620	-	460-620	-
Hard (HD)	660-775	-	620 min	-

Fabrication Properties	
Capacity for being	
Machinability Rating	40 %
Bending	Excellent
Riveting	Excellent
Forging	Excellent

## RIVETING BRASS RODS (LEADED)

IS 2704 / 83 NR. EQUIVALENT SPEC. BS 2874 CZ 119

JIS3250 H C-2700, ASTMBC34000

Chemical Requirements %	CuZn35Pb1	CuZn35
Copper	62.0 - 65.0 %	63.0 - 68.0 %
Lead	0.75 - 1.50 %	0.02 % max.
Iron	0.10 % max.	0.05 % max.
Total Imp.	0.50 % max.	0.30 % max.
Zinc	Remainder	Remainder

### Physical Properties

Condition	T. S. MPa	EL % Min	T. S. MPa	EL % Min
Quarter Hard (HA)	325-390	30%	340-345	30%
Half-Hard (HB)	400-490	20%	420-510	15%
Hard (HD)	500-685	15%	-	-
Extra Hard (HE)	695-885	5%	-	-

### Fabrication Properties

Capacity for being	
Cold Forming	Excellent
Machinability Rating	70 %
Bending	Excellent
Riveting	Excellent

## HIGH TENSILE BRASS RODS

IS 320 / 80 NR. EQUIVALENT SPEC. BS 2874 CZ 114 & CZ 115,

JIS3250H C6782 & C6783

Chemical Requirements %	HT1	HT2
Copper	56.0 - 60.0 %	56.0 - 61.0 %

Lead	0.20 - 1.50 %	0.50 - 1.50 %
Iron	0.20 - 1.25 %	0.20 - 1.50 %
Tin	0.20 - 1.0 %	1.0 % max
Aluminum	0.20 % max.	0.30 - 2.0 %
Manganese	0.25 % - 2.0 %	0.50 - 2.0 %
Total Imp.	0.50 % max.	0.50 % max.
Zinc	Remainder	Remainder

### Physical Properties

Condition	Size	T. S. Mpa	EL % Min	T. S. Mpa	EL % Min
As manufactured	All Size	430 min	20 %	460 min	20 %
Cold worked & Stress	10-40	480 min	12 %	520 min	12 %
Relieved	40 above			500 min	15 %

### Fabrication Properties

Capacity for being		
Cold Formed	Poor	Fair
Hot Worked	Good	Good
Machinability Rating	30 %	30%
Resistance to Corrosion	Excellent	Excellent
Suitability for Soldering	Excellent	Fair

## NAVAL BRASS RODS - GRADE I & II

IS 291 / 89 NR. EQUIVALENT SPEC. BS 2874 CZ 112, CZ 113,  
JIS3250 H C4622 / 41, ASTMBC482 / 8500

Chemical Requirements %	Grade I	Grade II
Copper	61.0 - 64.0 %	59.0 - 62.0 %
Lead	0.20% max.	0.50 - 1.0 %

Tin	1.0 - 1.50 %	0.50 - 1.0 %
Iron	0.10 max.	-
Total Imp.	0.20 max.	0.20 % max.
Zinc	Remainder	Remainder

Physical Properties					
Condition	Size	T. S. kg/mm <sup>2</sup>	EL % Min	T. S. kg/mm <sup>2</sup>	EL % Min
Half-Hard (HB)	Upto 12.5	40 min	18 %	40 min	15%
	12.5 to 50	38.5 min	18 %	40 min	15%
	50 to 100	35 min	18 %	40 min	15%

Fabrication Properties		
Capacity for being		
Cold Worked	Fair	Poor
Hot Worked	Excellent	Good
Machinability Rating	30%	50%
Forgeability Rating	90%	90%
Silver Alloy Brazing	Excellent	Good
Soft Soldering	Excellent	Excellent
Oxyacetylene Welding	Good	Not Suitable

## DEZINCIFICATION RESISTANCE BRASS (DZR)

Standard Specification	CW602N
(A) Chemical Requirements %	Europe
Copper	61.0 - 63.0 %
Lead	1.70 - 2.8 %
Aluminum	0.05 % max.
Nickel	0.30 % max.

Iron	0.10 % max.
Tin	0.10 % max.
Zinc	Remainder
Total Impurities	0.20 % max.
Arsenic	0.02 - 0.15 %
Remarks :	Mn <=0.1
(B) Mechanical Properties	
Ultimate Tensile Strength MPa	430 min.
Elongation MPa	200 min.
Hardness HB	110 min.

## LEADED COPPER

IS 8328 / 77

### Chemical Requirements %

Copper + Ag	99.90 % min
Lead	0.8 - 1.5 %

### Physical Properties

Condition	T. S. MPa	EL % Min
Half-Hard (HB)	260	12 %

### Fabrication Properties

Capacity for being Cold Worked	Good
Hot Worked	Poor
Machinability Rating	80%
Suitability for Soldering	Excellent
Suitability for Brazing	Good
Electrical Conductivity	85% IACS

## LEADED BRASS FOR SECTION

BS 2874 CZ 130, EN 12167, CW 624 N

Chemical Requirement (%)	
Copper	55.50 - 57.50 %
Lead	2.50 - 3.50 %
Aluminum	0.50 % max.
Total Imp.	0.70 % max.
Zinc	Remainder

Physical Properties :	
Rm - Tensile strength in Mpa	370 min.
Elongation on 5.65 A%	25 min.
Proof stress (0.20%) in Kg/mm <sup>2</sup>	160 min.
Hardness (HV)	90-120

Fabrication Properties :	
Machinability Rating (IS 319-I 100)	100

## ARSENICAL COPPER

IS 288 / 81

Chemical Requirements %	
Copper + Silver	99.20 % min
Arsenic	0.20 - 16.50 %
Antimony	0.05 % max.
Bismuth	0.002 % max.

Oxygen	0.10 % max
Lead	0.01 % max

### Physical Properties

Condition	Size	T. S. MPa	EL % Min
Annealed	10 to 25	215	35%
	25 to 50	205	40%
	50 & above	195	40%
As Manufactured	10 to 25	255	15%
	25 to 50	245	18%
	50 & above	235	20%

### Fabrication Properties

Capacity for being	
Cold Worked	Excellent
Hot Formed	Excellent
Suitability for Soldering	Good
Suitability for Brazing	Good
Suitability for Riveting	Excellent

## ALUMINUM SILICON BRONZE RODS

IS 10569 / 05 NR. EQUIVALENT SPEC. ASTMBC64200

Chemical Requirements %	CuAl7Si2
Copper	Remainder
Aluminum	6.3 - 7.60 %
Iron	0.30 % max.
Nickel	0.25 % max.
Manganese	0.10 % max.

Tin	0.20 % max.
Lead	0.05 % max.
Zinc	0.50 % max.
Silicon	1.5 - 2.2 %
Total Imp. Excl. Fe, Ni & Mn	0.50 % max.

### Physical Properties

Condition	Size	T. S. Kg/mm <sup>2</sup>	EL % Min
Annealed / As Manufactured	6 to 15	620	9%
	15 to 50	575	12%
	50 to 80	515	12%
	80 & above	485	15%

### Fabrication Properties

Capacity for being	
Cold Worked	Not Suitable
Hot Formed	Excellent
Machinability Rating	80%
Suitability for Soldering	Excellent
Suitability for Brazing	Good