

TECHNICAL SPECIFICATION COPPER TUBES

Standard	JIS H3300	ASTM B-68	BS 2871 PART 3	DIN 1785	IS 2501	BS 2871 PART 2	IS 2501
Symbol	C 1220	C 12200	C 106	StCu 25	DHP IS191 PART VIII	C 101	ETP COPPER
Cu	99.9 Min	99.9 Min	99.85 Min	99.9 Min	99.8 Min	99.90** Min	99.90** Min
Sn	-	-	0.01 Max	-	0.01	-	-
Pb	-	-	0.01 Max	-	0.01	0.005	0.005
Ni	-	-	0.10 Max	0.01 Max	0.10 Max	-	-
Fe	-	-	0.03 Max	-	0.03	-	-
As	-	0.01 Max	0.05 Max	-	0.05	-	-
P	0.15-0.40	0.015-0.040	0.013-0.050	0.15-0.40	0.015-0.10	-	-
Total Impurities Max.	-	-	0.06*	-	0.06	0.03*	0.03*
Condition	O 1/2H H	050 - 060	M1/2H O	F 25	O,1/2H,HD	O M	O,1/2H,HD
Yield Strength N/mm ²	-	-	-	150-240	-	-	-
Tensile N/mm ²	205 Min 245-325 315Max.	-	-	250 Min	205Min 235Min 235Min 280Min	200 - 250 Min. 270 Min.	205Min 235Min 265Min 280Min
Elongation %	40% Min.	-	-	30% Min.	25%	40% Min.	25% Min
Hardness HV 5	-	-	105 Min 80-100 60 Max	-	-	100 Max 60 Max	40% Min 25% Min
Grain Size Mm (75X)	0.25-0.06-	0.015-0.040 0.040 Min	0.05 Max	-	-	-	-

Excluding Silver, Arsenic or Copper

TECHNICAL SPECIFICATION COPPER RODS & FLATS

COPPER RODS & SECTION AS PER BS 2874 : 1969

Manufacturing Range : Copper Rod: 6mm to 120mm Copper Flats: Width upto 150mm
Thk upto 25mm

	ETP COPPER		ARSENICAL COPPER	PHOS-DE-OX NON ARSINICAL COPPER	CADMIUM COPPER
SYMBOL	C 101		C 107	C 106	C 108
CU (Min)	99.90%		99.2% Incl. Silver	99.85% Incl. Silver	99.50%
Imp.(max)	0.03% Arsenic		0.2%-10.5% Phos	0.13%-0.5%	Cadmium 0. -1.2%
Condition	HH		O	O	HH
Tensile	10-12 MM	26.5 Min	22 Min Annealed	21.5	35
Kg/mm²	12-25 MM	25.5 Min	22 Min	23.5	
min.	> 25 MM	23.5 Min	21 Min	23.5	
Elongation	10-12MM	12% Min	35%Min Annealed	33%	8 % Min
% on	12-25MM	18% Min	35%Min As Manufacture 13%	13%	
5.65A(Min)	> 25 MM	22% Min	40%Min		
Conductivity I.A.C.S.	99.25%				80%
USES:	Electrical Conductors, Switched, Terminals, Gaskets, Nails Rivets, Radiators etc		Locomotive boiler stay bolts & Rivets. Plates for locomotive fire boxes etc.	Household & gen. purpose	Electrical holder for Resistance welding machine Arc-Furnaces Electrodes for spot seam welding of a aluminium alloy, commutator-bras, spring, contact switch gear components & for other equipment

TECHNICAL SPECIFICATION COPPER ALLOY TUBES

CHEMICAL COMPOSITION MECHANICAL PROPERTIES

63/37 BRASS TUBES

Product Application Areas: General Engineering, Furniture, Architectural Grill Work,

Standard	ASTMB-135	JIS H3300	JIS H3300	DIN 17671	DIN 17671	IS 407
Symbol	C 27200	*C 2720	*C 2280	CuZn 37	-	CuZn 37
Cu	62.0-65.0	63.0-67.0	59-63.0	62.0-64.0	-	62.0-65.0
Sn		-	-	0.10	-	-
Al		-	-	0.03	-	-
Pb	0.07	0.07Max	0.10	0.10	-	0.30
Ni		-	-	0.30	-	-
Fe	0.07	0.05Max	0.07	0.10	-	0.1
Zn	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder
As		-	-	-	-	0.06
Total Impurities Max.		-	-	0.10	-	0.06
Condition	H58	O	O	F 29	F 44	O
	H80	1/2H	1/2H	F 37	F 54	TA
		H	H			HD
Yield Strength				180 Max	340 Min	
N/mm ²				200 Min	470 Min	
Tensile	370 Min	294 Min.	314 Min.	290-370	440-540	285 Min
N / mm ²	455 Min	373 Min.	373 Min.	370-440	540 Min	320 Min
		450 Min	451 Min.			400 Min
Elongation		-	-	-	45 Min.	40 Min
%		-	-	-	45 Min.	35 Min
		-	-	-	20 Min.	-
Hardness HV 5	150 Min			75 Max	-	80 Max
	85-110		80-105	80-110		80-105
	75 Min			135 Min	-	95-130
						150 Min
Grain Size	0.05 Max	-	010-045	-	025-060	065 Max
		-		-		
Mm (75X)					035 Min	035 Min

C2700=65/37 *C2800=60/40

TECHNICAL SPECIFICATION COPPER ALLOY TUBES
CHEMICAL COMPOSITION MECHANICAL PROPERTIES

70/30 BRASS TUBES Product Application Areas: Sugar Industry, Hand Pumps, Plumbing, Furniture, General Engineering, Ammunitions And it is Commonly known as "Sugar Brass Tubes"

Standard	BS 2871 Part	ASTM B-135	NFA 51 102	IS 407	JIS H3300	AS 1572	DIN 17671	IS 1545
Symbol	CZ 126	C 26000	CuZn 30	CuZn 30As	C2600	259	CuZn 30 20265	CuZn 30 As
Cu	69.0 - 71.0	68.5 - 71.5	68.5 - 71.5	68.5 - 71.5	68.5-71.5	69.0-71.0	69.0-71.0	69.0-71.0
Sn	-	-	-	-	-	-	.05	-
Al	-	-	-	-	-	-	.02	-
Pb	0.07	0.07	0.07	0.07	0.07	0.05	0.05	0.07
Ni	-	-	-	-	-	-	0.2	-
Fe	0.06	0.05	0.06	0.06	0.05	0.05	0.05	0.06
Zn	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder
As	0.02-0.06	-	0.02 - 0.06	-	-	0.02 - 0.06	-	0.02 - 0.06
Total Impurities Max.	0.03	-	0.03	0.03	-	-	0.1	0.30
Condition	M	H58	-	O	O	O	F28	O
	TA	H80	-	TA	OH	1/4H	F35	TA
	O			HD	1/2H	1/2H	F42	HD
Yield						H	180 Max	
Strength							200 Max	
N/mm2							320 Max	
Tensile		370 Min	-	285Mps/Min	275 Min	280-350 Mps	280-350	375 Max
N / mm2		455 Min		300Mps/Min	275 Min	-	350-420	340 Min
				400Mps/Min	373 Min	320 Mps Min	420 Min	385 Min
					451 Min			
						400 Mps Min		
Elongation	-				45 Min	40 Min		
%	-	-	-	-	45 Min	35 Min	-	55 Min
					20 Min			
Hardness HV 5	150 Min			75 Max		80 Max		80 Max
	85-105	-	80-105	80-110	-	80-105	-	80-105
	75 Min			135 Min		95-130		130 Min
						150 Min		
Grain Size	0.05 Max	-	010 - 045	-	025 - 060	0.065Max		
Mm (75X)		-		-	035 Min	0.035Min		

TECHNICAL SPECIFICATION COPPER ALLOY TUBES

CHEMICAL COMPOSITION MECHANICAL PROPERTIES

ADMIRALITY BRASS TUBES *Product Application Areas:* Heat Exchangers, Refineries Power Plants, Desalination Plants, Ship Building & Ship Repairs, Condensers, Ferrules, Distillers

Standard	BS 2871 PART 3	ASTM B-111	DIN 1785	NFA 51 102	JIS H3300	IS 1575
Symbol	CN 111	C 44300	CuZn28 Sa 1	CuZn 29 Sa1	C4430	CuZn 29 SN 1 As
Cu	70.0 - 73.0	70.0 - 73.0	70.0 - 72.5	70.0 - 73.0	70.0 - 73.0	70.0 - 73.0
Sn	1.0 - 1.5	0.9-1.2	0.9-1.3	0.9 - 1.2	0.9 - 1.2	0.9 - 1.5
Pb	0.07	0.07	0.07	0.07	0.05Max	0.07
Ni	-	-	0.1	-	-	-
Fe	0.06	0.06	0.07	0.06	0.05Max	0.06
Zn	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder
As	0.02-0.06	0.02-0.06	0.02-0.35	0.02-0.06	0.02-0.06	0.02-0.06
P	-	-	0.1	-	-	-
Total Impurities Max.	0.30	-	0.1	0.30	-	0.30
Condition	M	O 61	F36	-	O	O
	TA		F 32			TA
	O					HD
Yield	-	105	140 - 220	-	-	-
Strength	-		100 - 170			
N/mm ²						
Tensile	-	310	360 Min	-	315Min	375 Mps Max
N / mm ²	-	-	320 Min	-	-	-
						340 Mps Min
						385 Mps Min
Elongation	-	-	45 Min	-	30 Min.	-
%	-	-	55 Min	-	-	35 Min
Hardness HV 5	150 Min	-	-	80-120	-	80 Max
	85-105			80-110		80-105
	75 Min					130 Min
						150 Min
Grain Size	0.05 Max	010 - 045	-	010-045	010-045	010-045
Mm (75X)						

Characteristics: A Copper Zinc Alloy containing tin and small amount of arsenic which is added as an inhibitor against dezincification. The presence of Tin imparts to the alloy good corrosion resistance in a moderately polluted river water and clean sea water, either stagnant or slow moving (up to about 2 mtrs/sec.). The most common and wrought form of tube is tube for heat exchange equipment.

GUIDE TO THE SELECTION OF TUBE MATERIAL: CLEAR, RIVER, LAKE OR CANAL WATER : a) Dissolved salts more than from 2000 ppm • b) Suspended solids more than 25 ppm • c) H₂S or Ammonia is less than 1 ppm • d) Chloride less than 20 ppm • e) For temperature more than 200°C and less than 450°C Permissible average velocity of water 2.0 – 2.5 meters/sec.

TECHNICAL SPECIFICATION COPPER ALLOY TUBES

CHEMICAL COMPOSITION MECHANICAL PROPERTIES

ALUMINIUM BRASS TUBES

Product Application Areas: Heat Exchangers, Refineries Power Plants, Desalination Plants, Ship Building & Ship Repairs, Condensers, Ferrules, Distillers.

Standard	BS 2871 PART 3	ASTM B-111	DIN 1785	NFA 51 102	JIS H3300	IS 1545
Symbol	CZ 110	C 68700	CuZn20 Al 1	CuZn Al 2	C 6870	CuZn21 Al 2 As
Cu	76.0 - 78.0	76.0 - 79.0	76.0 - 79.0	76.0 - 79.0	76.0 - 79.0	76.0 - 78.0
Al	1.8 - 2.3	1.8 - 2.5	1.8 - 2.3	1.8 - 2.5	1.8 - 2.5	1.8 - 2.3
Pb	0.07	0.07	0.07	0.07	0.05	0.07
Ni	-	-	0.1	-	-	-
Fe	0.06	0.06	0.07	0.06	0.06	0.06
Zn	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder
As	0.02-0.06	0.02-0.06	0.02-0.35	0.02-0.06	0.02-0.06	0.02-0.06
P	-	-	0.1	-	-	-
Total Impurities Max.	0.30	-	0.1	0.30	-	0.30
Condition	M		F 39			O
	TA	O 61			O	TA
	O		F 34			HD
Yield	-		150 - 230	-	-	400 Mps Max
Strength	-	125	120-180	-	-	355 Mps Max
N/mm ²	-					415 Mps Max
Tensile	-		390 Min			-
N / mm ²	-	345	340 Min	-	375	-
	-					-
Elongation	-	-	45 Min	-	-	85 Max
%	-	-	55 Min	-	40	80-110
	-					130 Min
Hardness HV 5	150 Min	-	-	-	-	-
	85-110		80-130	-		-
	75 Min					-
Grain Size	0.05 Max	010 - 045	-	010-045	010-045	010-045
Mm (75X)						

Characteristics: A Copper Zinc Alloy containing Aluminium and small amount of arsenic which is added as an inhibitor against dezincification. Inhibited Aluminium Brass resists the action of high velocity salt and brackish water and is commonly used for condenser tube. The outstanding characteristics of Aluminium Brass is the high resistance to impingement attack. Tubes of this alloy are recommended for use in marine and land power stations where cooling water velocity are high and where inhibited admiralty brass has failed from impingement

GUIDE TO THE SELECTION OF TUBE MATERIAL:

Sea Water: (a) Dissolved salts more than from 2000 ppm. • (B) Suspended solids more than 30 ppm • (C) H₂S or Ammonia is less than 1 ppm. Permissible average velocity of water 2.0 – 2.5 meters/sec.

TECHNICAL SPECIFICATION COPPER ALLOY TUBES

CHEMICAL COMPOSITION MECHANICAL PROPERTIES

70/30 CUPRONICKEL TUBES

PRODUCT APPLICATION AREAS: Heat Exchangers, High Capacity Power Plants, Ship Building & Ship Repairs, Condensers, Offshore Oil rigs, Distiller Tubes, Evaporators, Ferrules.

Standard	BS 2871 PART 3	ASTM B-111	DIN 1785	NFA 51 102	JIS H3300	IS 1545
Symbol	CN 107	C 71500	CuNi30 Mn 1 Fe	CuNi30 Mn 1 Fe	C 7150	CuZn 30 Mn 1 Fe
Cu	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder
Pb	0.01	0.05	0.03	0.05	0.05	0.05
				Sn+Pb		
Ni	30.00 - 32.0	29.0 - 33.0	30.0 - 32.0	29.0- 32.0	29.0- 33.0	29.0- 33.0
Fe	0.4 -1.0	0.4 - 1.0	0.4-1.0	0.4 - 0.7	0.4 - 0.7	0.4 - 1.0
Mn	0.5 - 1.0	1.0	0.5 - 1.5	0.5 - 1.5	0.2 - 1.0	0.5 - 1.0
S	0.05	-	0.05	0.02	-	-
C	0.06	-	0.30	0.10	-	0.30
Total Impurities Max.	0.30	-	0.1	0.30	Rem (Cu+Ni+ Fe+Mn 99.5 Min)	0.30
Condition	M	O 61	F37	-	O	O
	O	HR 50	F 42			D
Yield	-	125 Min	120 - 220 150 - 260	-	-	-
Strength	-	345 Min				
N/mm ²						
Tensile	-	360 Min	370 Min	-	363 Min	360 Min
N / mm ²	-	495 Min	420Min	-	-	480 Min
Elongation	-	12/15*	35 Min	-	30 Min.	-
%	-	-	30 Min	-		
Hardness HV 5	150	-	-	90-130	-	115 Max
	90 - 120					140 Min
Grain Size	0.05 Max	-	-	010-045	010-045	-
Mm (75X)						

* 12% Wall thickness upto 1.21mm, including; 15% wall thickness over 1.21mm characteristics:

A Copper Nickel alloy having small amount of iron and manganese to improve corrosion resistance in high velocity (from 1 to about 4 mtrs/sec.) waters, including sea water. The alloy is relatively insensitive to stress corrosion. It has good cold and hot working properties and is readily weldable.

GUIDE TO THE SELECTION OF TUBE MATERIAL:

a) Dissolved salts from 10000 ppm. • b) Absence of abrasive suspended solids. • c) Polluted with H₂S and Ammonia. Permissible average velocity of water 3 – 4 meters/sec.

TECHNICAL SPECIFICATION COPPER ALLOY TUBES

CHEMICAL COMPOSITION MECHANICAL PROPERTIES

90/10 CUPRONICKEL TUBES

Product Application Areas: Heat Exchangers, Application, Refineries, Power Plants, Desalination Plants, Ship Building & Ship Repairs, Condensers, Offshore Oil rigs, Car Braking Systems etc...

Standard	BS 2871 PART 3	ASTM B-111	DIN 1785	NFA 51 102	JIS H3300	IS 1545
Symbol	CN 102	C 70600	CuNi28 Fe 1 Mn	CuNi10 Fe 1 Mn	C 7060	CuNi 10 Fe1
Cu	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder
Pb	0.01	0.05	0.03	0.05 Sn+Pb	0.05	0.05
Ni	10.0-11.0	9.0 - 11.0	9.0-11.0	9.0-11.0	9.0-11.0	9.0-11.0
Fe	1.0-2.0	1.0 - 1.8	1.0 - 1.8	1.0 - 2.0	1.0-1.8	1.0-1.8
Mn	0.5-1.0	1.0	0.5 - 1.0	0.3 - 1.0	0.2 - 1.0	0.5 - 1.0
Zn	-	1.0	0.5	0.5	0.5	0.5
S	0.05	-	0.05	0.05	-	-
C	0.06	-	0.05	0.05	-	-
Total Impurities Max.	0.30	-	0.01 Max	0.02	Rem (Cu+Ni+ Fe+Mn 99.5 Min)	0.30
Condition	M	O 61	F 29	-	O	O
	O	HR 55				HD
Yield	-	105 Min	90-180	-	-	-
Strength	-	240 Min				
N/mm ²						
Tensile	-	275 Min	290 Min	-	275 Min	295 Min
N / mm ²	-	310 Min		-	-	285 Min
Elongation	-	-	30 Min	-	30 Min.	35 Min
%	-	-		-		
Hardness HV 5	150	-	-	70-100	-	110 Max
	80 - 110					130 Min
Grain Size	0.05 Max	-	-	010-045	010-045	0.01-0.05
Mm (75X)						

Characteristics: This alloy has very high erosion and corrosion resistance. It has very high weldability, easy for installation and high anti fouling properties against sea microorganisms. Relatively high iron content provides better impingement attack resistance. The alloy is unique to stress corrosion cracking.

GUIDE TO THE SELECTION OF TUBE MATERIAL:

a) Dissolved salts more than from 1500 to 3000 ppm. • (b) Suspended solids more than 25 ppm. • (c) H₂S or Ammonia is less than 1 ppm. Permissible average velocity of water 2.5 – 2.7 meters/sec