

Copper Alloy

Chemical & Mechanical properties

manufactured to current British, American, German, French, Japanese, Standards EN and EEMUA Standards

	Standard	Symbol	Cu	Sn	Al	Pb	Ni	Fe	Mn	Zn	As
Copper	BS 2871	C 106	99.85	0.01	-	0.01	-	0.05	-	-	0.05
	ASTM B 111	C 12200	99.90	-	-	-	-	-	-	-	-
	DIN 1785	2.0090	99.90	-	-	-	-	-	-	-	-
Brass 70/30	BS 2871	CZ 126	69.0/71.0	-	-	0.07	-	0.06	-	Bal.	0.02/0.06
	ASTM B 135	C 26000	68.5/71.5	-	-	0.07	-	0.06	-	Bal.	-
	NF A 51 102	Cu-Zn30	68.5/71.5	-	-	0.07	-	0.06	-	Bal.	0.02/0.06
Admiralty Brass	BS 2871 Part3	CZ 111	70.0/73.0	1.0/1.5	-	0.07	-	0.06	-	Bal.	0.02/0.06
	ASTM B 111	C 44300	70.0/73.0	0.9/1.2	-	0.07	-	0.06	-	Bal.	0.02/0.10
	DIN 1785	Cu-Zn29Sn	70.0/72.5	0.9/1.3	-	0.07	0.1	0.07	-	Bal.	0.02/0.035
	NF A 51 102	Cu-Zn29Sn1	70.0/73.0	0.9/1.2	-	0.07	-	0.06	-	Bal.	0.02/0.06
	JIS H 3300	C4430	70.0/73.0	0.9/1.2	-	0.07	-	0.06	-	Bal.	0.02/0.06
Aluminium Brass	BS 2871 Part3	CZ 110	76.0/78.0	-	1.8/2.3	0.07	-	0.06	-	Bal.	0.02/0.06
	ASTM B 111	C 68700	76.0/79.0	-	1.8/2.5	0.07	-	0.06	-	Bal.	0.02/0.10
	DIN 1785	Cu-Zn20Al	76.0/79.0	-	1.8/2.3	0.07	0.01	0.07	-	Bal.	0.02/0.035
	NF A 51 102	Cu-Zn22Al2	76.0/79.0	-	1.8/2.5	0.07	-	0.06	-	Bal.	0.02/0.06
	JIS H 3300	C6870	76.0/79.0	-	1.8/2.5	0.07	-	0.06	-	Bal.	0.02/0.06
90/10 Copper-Nickel-Iron	BS 2871 Part 2 & 3	CN 102	Bal.	-	-	0.01	10.0/11.0	1.0/2.0	0.5/1.0	-	-
	ASTM B 111	C 70600	Bal.	-	-	0.05	9.0/11.0	1.0/1.8	1.0	1.0	-
	DIN 1785	Cu-Ni10Fe	Bal.	-	-	0.03	9.0/11.0	1.0/1.8	0.5/1.5	0.5	-
	NF A 51 102	Cu-Ni10Fe	Bal.	-	-	0.05 ⁴	9.0/11.0	1.0/2.0	0.3/1.0	0.5	-
	JIS H 3300	C7060	Bal.	-	-	0.05	9.0/11.0	1.0/1.8	0.2/1.0	1.0	-
70/30 Copper-Nickel-Iron	BS 2871 Part 2 & 3	CN 107	Bal.	-	-	0.01	30.0/32.0	0.4/1.0	0.5/1.5	-	-
	ASTM B 111	C 71500	Bal.	-	-	0.05	29.0/33.0	0.4/1.0	1.0	1.0	-
	DIN 1785	Cu-Ni30Fe	Bal.	-	-	0.03	30.0/32.0	0.4/1.0	0.5/1.5	0.5	-
	NF A 51 102	Cu-Ni30Mn1Fe	Bal.	-	-	0.05 ⁴	29.0/32.0	0.4/0.7	0.5/1.5	0.5	-
	JIS H 3300	C 7150	Bal.	-	-	0.05	29.0/33.0	0.4/0.7	0.2/1.0	1.0	-
66/30/2/2 Copper-Nickel-Iron	BS 2871 Part 3	CN 108	Bal.	-	-	-	29.0/32.0	1.7/2.5	1.7/2.3	-	-
	DIN 1785	Cu-Ni30Fe2Mn2	Bal.	-	-	-	29.0/32.0	1.5/2.5	1.5/2.5	0.5	-
	NF A 51 102	Cu-Ni30 Fe2Mn2	Bal.	-	-	-	29.0/32.0	1.5/2.0	1.5/2.0	0.5	-
Low Silicon Bronze	ASTM B315	C 65100	Bal.	-	-	0.05	-	0.8	0.7	1.5	-
Aluminium Bronze	BS 2871 Part 3	CA 1012	Bal.	-	-	-	Ni+Fe+Mn 1.0/2.5 Optional but between these limit percent	-	-	-	-
	ASTM B511	C 60800	Min.93.0	-	-	0.10	-	0.10	0.10	-	0.02/0.35
	DIN 1785	CuA15As	92.5/96.0	-	-	0.02	-	0.2	0.2	0.3	0.2
	NF A 51 102	Cu-A16	Bal.	-	-	0.10	0.2	-	-	0.3	-

1. All Chemical values are maximum except where otherwise specified
 2. All Mechanical values are minimum except where otherwise stated
 (Figures in brackets are typical Alcobex values not specified in the Standards)

3. The elongation values are based on gauge lengths of 5.65V (cross sectional area) or DIN 1785 and BS 2871 but for ASTM B 111. It is 50.8 mm
 4. Sn + Pb
 5. Microns (square root of the average area of a grain)

Condenser, Heat Exchanger Tube and Marine / Offshore Pipes Data

P	As+P	S	C	Impurities	Condition	0.2% Proof Stress		Tensile Strength			HV5 ^{85s}	Grain Size mm
						N/mm ²	1000 lbf/in ²	N/mm ²	1000 lbf/in ²	%		
0.013/0.050/0.015/0.040/0.015/0.040	-	-	-	Total: 0.06	M	(110-140)	(16-20)	(290-390)	(42-57)	(10-25)	105(-135)	-
					Half Hard	(90-105)	(13-15)	(250-290)	(36-42)	(30-45)	85-100	-
					O	(60-85)	(9-12)	(215-260)	(31-38)	(40-60)	max 60	max 0.05
					Hard Drawn	275	40	310	45	-	-	-
					Light Drawn	205	30	250-325	36	-	-	-
					F25	105-240	-	250	-	30	-	-
				Total: 0.30	M	(310-450)	(45-65)	(455-600)	(66-87)	(10-20)	150(-180)	-
					TA	(160-215)	(23-31)	(345-400)	(50-58)	(40-60)	80-105	max 0.05
					O	(105-150)	(15-22)	(290-340)	(42-49)	(55)	max 60	-
					As Drawn	-	-	370	54	-	-	-
					Hard Drawn	-	-	455	66	-	-	-
					-	-	-	-	-	-	-	10-45 ⁵
				Total: 0.30	M	(310-450)	(45-65)	(455-66-00)	(66-87)	(10-20)	150(-180)	-
					TA	(160-215)	(23-31)	(350-400)	(51-58)	(40-60)	80-105	max 0.05
					O	(105-150)	(15-23)	(290-340)	(42-49)	(55)	max 75	-
					Annealed	105*	15*	310	45	-	-	-
0.01	0.035	-	-	Other: 0.1	F36	140-220	20-32	360	52	45	-	-
					F32	100-170	15-23	320	46	55	-	-
				Total: 0.30	-	-	-	-	-	-	80-120	10-45 ⁵
					O	-	-	314	-	30	-	-
				Total: 0.30	M	(380-520)	(55-75)	(520-635)	(75-92)	(10-15)	150(-200)	-
					TA	(160-215)	(23-31)	(350-460)	(51-67)	(40-60)	85-110	max 0.05
					O	(105-160)	(15-2)	(300-350)	(44-51)	(55)	max 75	-
					Annealed	125*	18*	-	50	-	-	-
0.01	0.035	-	-	Other: 0.1	F39	150-230	-	390	-	45	-	-
					F34	120-180	-	340	-	55	-	-
				Total: 0.30	-	-	-	-	-	-	80-130	10-45 ⁵
					O	-	-	373	-	40	-	-
		0.05	0.05	Total: 0.30	M	(345-483)	(50-70)	(485-600)	(70-87)	(10-15)	150(-90)	-
					O	(110-160)	(16-23)	(300-380)	(44-55)	(35)	80-110(max100)	max 0.05
					Annealed	105*	15*	275	40	-	-	-
					Light Drawn	240*	35*	310	45	-	-	-
		0.05	0.05	Other: 0.1	F29	90/180	-	290	-	30	-	-
		0.02	0.02	Total: 0.10	-	-	-	275	-	30	70-100	-
					O	-	-	-	-	-	-	10-45 ⁵
					Cu+Ni+Fe +Mn 99.5 min	O	-	-	-	-	-	-
		0.08	0.06	Total: 0.30	M	(415-585)	(60-85)	(550-660)	(80-96)	(5-10)	150(-210)	-
					O	(125-200)	(18-29)	(350-450)	(51-65)	(35)	90-120(max110)	max 0.05
					Annealed	125*	18*	360	52	-	-	-
					Light Drawn	345*	50*	495	72	12+15	-	-
		0.05	0.06	Other: 0.1	F37	120-200	-	370	-	35	-	-
		0.02	0.06	Total: 0.10	-	-	-	363	-	30	90-130	-
					O	-	-	-	-	-	-	10-45 ⁵
					Cu+Ni+Fe +Mn 99.5 min	O	-	-	-	-	-	-
				Total: 0.30	M	(450-620)	(65-90)	(620-730)	(90-106)	(5-10)	150(-220)	-
		0.06	0.05	Total: 0.10	F42	(150-230)	(22-33)	(400-500)	(58-73)	(35)	90-120	max 0.05
		0.02	0.06	Total: 0.10	-	-	-	420	-	-	-	10-45 ⁵
					Annealed	69*	10*	275	40	35	-	-
					Hard Drawn	275*	40*	345	50	07	-	-
				Total: 0.50	M	(345-520)	(50-75)	(480-700)	(70-110)	(5-10)	150(-210)	max 0.05
					O	(115-195)	(17-28)	(330-430)	(48-62)	(50)	max 110	-
					Annealed	130*	19*	345	50	-	-	-
				Other: 0.1	F35	110-220	-	350	-	45	45	-
				Total: 0.50	-	-	-	-	-	-	80-120	10-45 ⁵

Values are at 0.5% extension under load
 Wall thicknesses up to and including 1.21 mm (0.048 in)
 Wall thicknesses over 1.21 mm (0.048 in)
 M As drawn (and stress relieved if necessary)
 TA Heat treated to an intermediate temper
 O Annealed

Tubes that are to be fixed into tubeplates are normally supplied in one of the following conditions:
 (a) For packing at both ends: Condition M
 (b) For packing at one end roller expansion at the other: Condition M with one end roller locally annealed
 (c) For roller expansion at both ends: Conditions TA or O as appropriate