ALUMINUM BRONZE (WROUGHT)

CuAl10Ni5Fe4 - C63000

EN 12163/165/167/420 EN 1653: CW307G
ASTM B150, B124, B171
AMS 4640
NFL 14705

COMPOSITION:

	Cu	Al	Fe	Mn	Ni	Pb	Si	Sn	Zn	Others
EN	Remainder	8.5 / 11	3 / 5	≤ 1	4 / 6	≤ 0.05	≤ 0.2	≤ 0.1	≤ 0.4	≤ 0.2
ASTM / AMS	Remainder*	9 / 11	2 / 4	≤ 1.5	4 /5.5		≤ 0.25	≤ 0.2	≤ 0.3	

*Copper + Silver

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
EN	R680	Ø < 120	680	99	320	47	10	170
	R740	Ø < 80	740	108	400	58	8	200
ASTM	HR50	Ø ≤ 25.4 (1")	690	100	345	50	5	-
	HR50	Ø ≤ 50.8 (2")	620	90	310	45	6	-
	O25	50.8 (2") to 76.2 (3")	620	90	275	40	15	-
	TQ50	Ø > 76.2 (3")	690	100	345	50	10	-
AMS	-	Ø ≤ 25.4 (1")	759	110	469	68	10	201-248
	-	Ø ≤ 50.8 (2")	759	110	414	60	10	201-248
	-	Ø ≤ 76.2 (3")	725	105	380	55	10	187-241
	-	Ø ≤ 127 (5")	690	100	345	50	10	187-241

FORM AND SIZES AVAILABLE:

	Rod:	From Ø 10 to Ø 300 mm (from Ø 0.39 to Ø 11.81")
	Hexagon:	From 10 to 70 mm (from 0.39 to 2.76")
	Square:	From 10 x 10 mm to 300 x 300 mm (from 0.39 x 0.39 to 11.8 x 11.8")
	Flat:	From 6 x 50 mm to 300 x 400 mm (from 0.24 x 1,97 to 11.8 x 15,7")
	Sheet:	Thickness from 3 to 150 mm (from 0.12 to 5.91")
		Other sizes on request

Physical properties:

This alloy has excellent bearing qualities with a high strength and its 5% nickel contain which provides good corrosion resistance.
It is used where high mechanical properties are required.

Applications:

Aerospace: Landing gear bushings and bearings, flap bushings, actuator parts, strut bushings.
Marine: Pump parts, bolts, nuts, propellers, ship propellers.
General purpose: Bolts, nuts, body pump, mecanical moving or friction parts.

ALUMINUM BRONZE (WROUGHT)
CuAl10Ni5Fe4 - CuAl9Ni5Fe4 - CuAl9Ni3Fe2

STF 22-55/B004
GAM MM11/12/13
MILITARY STANDARDS

COMPOSITION:

	Cu	Al	Fe	Mn	Ni	Pb	Si	Sn	Zn	Cd	Others
CuAl10Ni5Fe4 STF	Remainder	8.5 / 11	3 / 5	≤ 1	4 / 6	≤ 0.02	≤ 0.2	≤ 0.1	≤ 0.4		≤ 0.2
CuAl9Ni5Fe4 GAM	Remainder[1]	8.5 / 10.1	3 / 5.5	≤ 1.5	4 / 5.5	≤ 0.05	≤ 0.1	≤ 0.1	≤ 0.3	≤ 0.01	≤ 0.1
CuAl9Ni3Fe2 GAM	Remainder[1-2]	8.4 / 10.1	1 / 3	≤ 1.5	2 / 4	≤ 0.05	≤ 0.1	≤ 0.1	≤ 0.3	≤ 0.01	≤ 0.1

1 : Fe-Ni ≤ 0.50 2 : Al -Ni/2.5 ≤ 8.5

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥	Resilience KCU (J/cm²)
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell	
CuAl10Ni5Fe4 STF	H180 EN 12165	6 < Ø < 80	650	94	350	51	14	180	
	H170 EN 12420	80 < Ø < 250	700	102	320	46	12	170	
CuAl9Ni5Fe4 GAM	M2 ou O	Ø < 25	650 - 760	94 - 102	280	41	15	165	≥ 25
		25 < Ø < 50	650 - 760	94 - 102	270	39	16	160	
		50 < Ø < 80	650 - 740	94 - 107	250	36	16	155	
		Ø > 80	610 - 730	89 - 106	250	36	18	152	
CuAl9Ni3Fe2 GAM	M2 ou O		500 - 600	73 - 87	180	26	25	115 - 150	≥ 55
	H	Ø < 25	640 - 760	93 - 110	280	41	15	165	≥ 25
		25 < Ø < 50	640 - 760	93 - 110	270	39	16	160	
		50 < Ø < 80	620 - 740	90 - 107	250	36	16	155	

FORM AND SIZES AVAILABLE:

	Rod:	From Ø 10 to Ø 300 mm (from Ø 0.39 to Ø 11.81")
	Hexagon:	From 10 to 70 mm (from 0.39 to 2.76")
	Square:	From 10 x 10 to 200 x 200 mm (from 0.39 x 0.39 to 7.87x7.87")
	Flat:	From 6 x 50 to 150 x 400 mm (from 0.24 x 1.97 to 5.91x15.75")
	Sheet:	Thickness from 3 to 150 mm (from 0.12 to 5.91")
		Other sizes on request

Physical properties:

This alloy has excellent bearing qualities with a high strength and its nickel contain which provides good corrosion resistance.
It is used where high mechanical properties are required.

Applications:

Aerospace: Landing gear bushings and bearings, flap bushings, actuator parts, strut bushings.
Marine: Pump parts, bolts, nuts, propellers, ship propellers.
General purpose: Bolts, nuts, body pump, mecanical moving or friction parts.

ALUMINUM BRONZE (WROUGHT)
CuAl11Fe6Ni6 - C63020/C63200

EN 12163/165/167/240: CW308G
AMS 4590, 4640, 4880
ASTM B150, B124, B171

COMPOSITION:

	Cu	Al	Fe	Mn	Ni	Pb	Si	Sn	Zn	Others
EN	Remainder	10.5 / 12.5	5 / 7	≤ 1.5	5 / 7	≤ 0.05	≤ 0.2	≤ 0.1	≤ 0.5	0.2
ASTM / AMS C63020	74.5 ≤*	10 / 11	4 / 5.5	≤ 1.5	4.2 / 6	≤ 0.05	-	≤ 0.25	≤ 0.3	-
ASTM / AMS C63200	Remainder*	8.7 / 9.5	3.5 / 4.3	1.2 / 2	4 / 4.8	≤ 0.02	≤ 0.10	-	-	-

*Copper + Silver

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
EN	R740	10 < Ø < 120	740	107	420	61	5	220 - 260
	R830	10 < Ø < 80	830	120	550	80	-	240
ASTM / AMS C63020	TQ30	Ø ≤ 25.4 (1")	930	135	690	100	6	220
		25 (1")< Ø ≤ 50.8 (2")	890	130	650	95	6	220
		50 (2") < Ø ≤ 101.6 (4")	890	130	620	90	6	220
ASTM / AMS C63200	TQ50 / TQ55	Ø ≤ 76.2 (3")	620	90	345	50	15	-
		76.2 (3") < Ø ≤ 127 (5")	620	90	310	45	15	-
		127 (5") < Ø ≤ 304.8 (12")	620	90	275	40	15	-
	020 / 025	All dimensions	620	90	275	40	15	-

FORM AND SIZES AVAILABLE:

	Rod:	From Ø 10 to Ø 300 mm (from Ø 0.39 to Ø 11.81")
	Hexagon:	On request
	Square:	On request
	Flat:	On request
	Sheet:	On request
		Other sizes or hollow bars on request

Physical properties:

This alloy is an high strength version of nickel aluminum bronze due to a special heat treatment process which improves the mechanical properties. This process provides extreme wear resistance for extreme loads, abrasive wear and high impact landings. This alloy has excellent abrasion and high deformation resistant properties. It is used where parts require extra high strength and hardness with some ductility and toughness.

Applications:

Aerospace: Landing gear bushings and bearings, flap bushings, actuator parts, strut bushings.
Marine: Pump parts, bolts, nuts, propellers, ship propellers.
General purpose: Bolts, nuts, body pump, mecanical moving or friction parts.

ALUMINUM BRONZE (CAST ALLOY)

CuAl10Fe5Ni5 - C95800/C95500/C95400/C95510

EN 1982: CC333G
ASTM B148/271/505
AMS 4871/4873

COMPOSITION:

	Cu	Al	Bi	Cr	Fe	Mg	Mn	Ni	Pb	Si	Sn	Zn
EN 1982	76/83	8.5/10.5	≤ 0.01	≤ 0.05	4/5.5	≤ 0.05	≤ 3	4/6	≤ 0.03	≤ 0.1	≤ 0.1	≤ 0.5
ASTM	≤ 79	8.5/9.5	-	-	3.5/4.5	-	0.8/1.5	4/5	≤ 0.03	≤ 0.1	-	-

MECHANICAL PROPERTIES:

	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
	mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
EN	All diameter	650	94	280	41	13	150
ASTM	All diameter	585	85	240	35	15	-

FORM AND SIZES AVAILABLE:

	Rod:	From Ø 12 to Ø 400 mm (from Ø 1/2 to Ø 15.74")
	Square:	From 40x40 to 250x250 mm (from 1.57x1.57 to 9.84x9.84")
	Flat:	From 100x250 to 140x200 mm (from 3.94x9.84 to 5.51x7.87")
	Hollow:	From Ø 17x27 to 197x253 mm (from Ø 0.67x1.06 to 7.75 x 9.96")
		Also rings up to OD 2500 mm
		Other sizes on request

Applications:

Aerospace: Landing gear bushings and bearings, flap bushings, actuator parts, strut bushings.
Marine: Pump parts, bolts, nuts, propellers, ship propellers.
General purpose: Bolts, nuts, body pump, mecanical moving or friction parts.

PHOSPHOR BRONZE (DRAWN)

CuSn8-C52100/CuSn8P

EN 12163/167/449: CW453K CW459K
NFL 14703
ASTM B103

COMPOSITION:

	Cu	Fe	Ni	P	Pb	Sn	Zn	Others
CuSn8 - CW453K	Remainder	≤ 0.1	≤ 0.2	0.01 - 0.4	≤ 0.02	7.5 - 8.5	≤ 0.2	≤ 0.2
CuSn8P - CW459K	Remainder	≤ 0.1	≤ 0.3	0.2 - 0.4	≤ 0.05	7.5 - 8.5	≤ 0.3	≤ 0.2
ASTM B103	Remainder	≤ 0.1	-	0.03 - 0.35	≤ 0.05	7 - 9	≤ 0.2	-

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell	Vickers
EN 12163 EN 12167 CuSn8 CuSn8P	R450	2 ≤ Ø ≤ 50	450	65	280	41	26		
	H135	2 ≤ Ø ≤ 50						135 - 165	
	R550	2 ≤ Ø ≤ 12	550	80	400	58	15		
	H160	2 ≤ Ø ≤ 12						160 - 190	
	R620	2 ≤ Ø ≤ 8	620	90	500	73	-		
	H180	2 ≤ Ø ≤ 8						180	
Drawn hollow bar EN 12449 CuSn8P	R460	Wall thickness ≤ 10	460	67	280	41	30		
	H130	Wall thickness ≤ 10						125 - 160	130 - 165
	R550	Wall thickness ≤ 5	550	80	480	70	12		
	H165	Wall thickness ≤ 5						160 - 190	165 - 195
	R620	Wall thickness ≤ 3	620	90	540	78	5		
	H180	Wall thickness ≤ 3						175	180

FORM AND SIZES AVAILABLE:

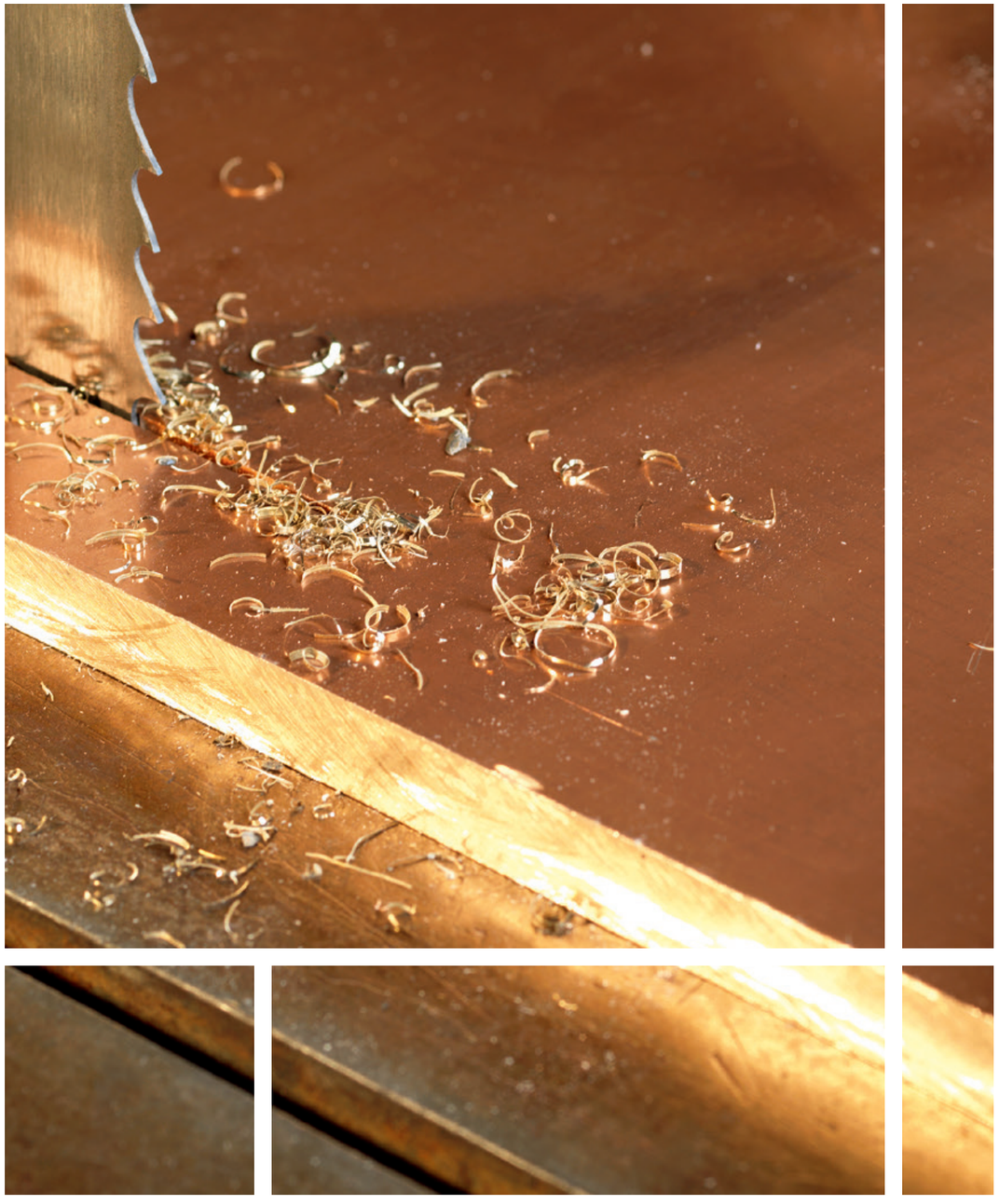
	Rod:	From Ø 2 to Ø 160 mm (from Ø 0.08 to Ø 6.30")
	Hexagon:	From 8 to 55 mm side (from Ø 0.31 to Ø 2.17")
	Square:	From 8x8 mm to 60x60 mm (from 0.31x0.31 to 2.36x2.36")
	Flat:	From 3x20 to 30x90 mm (from 0.12x0.79 to 1.18x3.54")
	Hollow:	From Ø 6.4x13.3 to 196x221.5 mm (from 0.25x0.52 to 7.71x8.72")
		Size list on the website

Physical properties:

These alloys have excellent mechanical properties with very high resistance to wear, friction and heat. They have good strength properties with very high admissible load.

Applications:

General purpose: Transmission shafts, connector parts.



PHOSPHOR BRONZE (ROLLED SHEETS)
CuSn6 / CuSn8 - C52100
EN 1652: CW452K CW453K
ASTM B103

COMPOSITION:

	Cu	Fe	Ni	P	Pb	Sn	Zn	Others
CuSn6 - CW452K	Remainder	≤ 0.1	≤ 0.2	0.01 - 0.4	≤ 0.02	5.5 - 7	≤ 0.2	≤ 0.2
CuSn8 - CW453K	Remainder	≤ 0.1	≤ 0.2	0.01 - 0.4	≤ 0.02	7.5 - 8.5	≤ 0.2	≤ 0.2
ASTM B103	Remainder	≤ 0.1	-	0.03 - 0.35	≤ 0.05	7 - 9	≤ 0.2	-

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Vickers
EN 1652 CuSn6 CW452K	R420	0.1 ≤ thickness ≤ 5	420 - 520	60 - 75	(260)	(38)	20	
	H125	0.1 ≤ thickness ≤ 5						125 - 165
	R500	0.1 ≤ thickness ≤ 5	500 - 590	73 - 86	(450)	(65)	10	
	H160	0.1 ≤ thickness ≤ 5						160 - 190
	R560	0.1 ≤ thickness ≤ 2	560 - 650	81 - 94	(500)	(73)	-	
	H180	0.1 ≤ thickness ≤ 2						180 - 210
EN 1652 CuSn8 CW453K	R450	0.1 ≤ thickness ≤ 5	450 - 550	65 - 80	(280)	41	-	
	H135	0.1 ≤ thickness ≤ 5						135 - 175

(): values between brackets = approximate figures

FORM AND SIZES AVAILABLE:

	Thickness	Format	Cuts: on request
CuSn6 Sheets:	From 0.2 to 25 mm (from 0.008 to 1")	300 x 2000 mm	
	From 2 to 15 mm (from 0.07 to 0.59")	600 x 2000 mm	
CuSn8 Sheets:	From 2 to 5 mm (from 0.008 to 0.20")	600 x 2000 mm and 1000 x 2000 mm	
	From 6 to 25 mm (from 0.24 to 1")	600 x 2000 mm	
	From 25 to 40 mm (from 1 to 1.5")	600 x 1500 mm	

Physical properties:
These alloys have excellent mechanical properties with very high resistance to wear, friction and heat. They have good strength properties with very high admissible load.

Applications:
General purpose: Transmission shafts, connector parts.

COPPER NICKEL ALUMINUM

CuNi14Al2

NFL 14702
GAM MM11/12/13
STF 22/55 B005

COMPOSITION:

	Cu	Al	Mn	Ni	Others
NFL/GAM	Remainder	1.8 - 3.5	≤ 0.5	13 - 15	≤ 0.5

MECHANICAL PROPERTIES:

	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
	mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
NFL/GAM	Ø ≤ 50	780	114	590	85	10	215
	Ø > 50	740	107	540	78	7	205

FORM AND SIZES AVAILABLE:

Rod: From Ø 16 to Ø 220 mm (from Ø 0.63 to Ø 8.7")

Physical properties:

This copper alloy has very high mechanical properties with good crushing, repeated shocks and vibrations resistance. Its high Ni content provides an excellent corrosion resistance. Moreover it is almost anti-magnetic.

Applications:

Aerospace: Landing gear bushings and bearings.
Marine: Pump parts, bolts, nuts, propellers, ship propellers.

Offshore pipes.

BERYLLIUM COPPER

CuBe1.9 - C17200/C17300

EN 12 163: CW101C
NFL 14709
ASTM B196
AMS 4533, 4534, 4535, 4650, 4651

COMPOSITION:

	Cu	Al	Be	Co+Ni	Co+Ni+Fe	Pb	Si	Others
NFL	Remainder	-	1.8 - 2	0.2 ≤	≤ 0.6	-	-	≤ 0.5
ASTM C17200	Remainder	≤ 0.2	1.8 - 2	0.2 ≤	≤ 0.6	-	≤ 0.2	-
ASTM C17300	Remainder	≤ 0.2	1.8 - 2	0.2 ≤	≤ 0.6	0.2 - 0.6	≤ 0.2	

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Vickers
NFL	TB00	5 ≤ Ø ≤ 50	≤ 540	≤ 79	-	-	35	90 - 130
	TF00	5 ≤ Ø ≤ 50	1050	150	850	125	2	320 - 380
	TD2	5 ≤ Ø ≤ 50	510	74	-	-	15	130
	TH2	5 ≤ Ø ≤ 50	1100	160	900	130	1	340
	TD3	5 ≤ Ø ≤ 30	570	80	-	-	5	160
	TH3	5 ≤ Ø ≤ 30	1150	165	950	135	1	360
ASTM/AMS	TB00	All dimensions	410 - 590	60 - 85	140	20	20	-
	TD04	Ø ≤ 1	660 - 900	96 - 130	520	75	8	-
		1 < Ø ≤ 25.4	820 - 860	119 - 125	520	75	8	-
		25.4 < Ø ≤ 76.2	590 - 830	85 - 120	520	75	8	-
ASTM/AMS	TF00	Ø ≤ 76.2	1140 - 1380	165 - 200	1000	145	4	353 - 413
		76.2 < Ø	1140 - 1380	165 - 200	900	130	3	353 - 413
	TH04	Ø ≤ 1	1280 - 1550	185 - 225	1100	160	2	372 - 447
		1 < Ø ≤ 25.4	1240 - 1520	180 - 220	1070	155	2	372 - 436
		25.4 < Ø ≤ 76.2	1210 - 1480	175 - 215	1000	145	4	363 - 436

FORM AND SIZES AVAILABLE:

Rod: From Ø 2 to Ø 160 mm (from Ø 0.08 to Ø 6.5")
Square: On request
Flat: On request
Sheet: Thickness from 0.05 to 250 mm (from 0.002 to 10")
Other sizes on request

Physical properties:

This copper alloy can have the highest mechanical properties of all copper alloys. This alloy also has excellent abrasion and corrosion resistant properties. It has excellent bearing qualities with very high compressive strength for high loading application. Also recommended for exeptional cryogenic characteristics (space application).

Applications:

Aerospace: Landing gear bushings and bearings, flap bushings, actuator parts, strut bushings.
Marine: Pump parts, bolts, nuts, propellers, ship propellers.
General purpose: Bolts, nuts, body pump, mecanical moving or friction parts.

COPPER CHROMIUM ZIRCONIUM/ COPPER NICKEL SILICON

CuCr1Zr - C18150/CuNi2Si - C17510

EN 12163/167/420/EN 1652: CW106C/CW111C - NFL 14701
ASTM C18150

COMPOSITION:

	Cu	Cr	Fe	Mn	Ni	Pb	Si	Zr	Others
CuCr1Zr EN	Remainder	0.5 / 1.2	≤ 0.08	-	-	-	≤ 0.1	0.03 / 0.3	≤ 0.2
CuNi2Si EN	Remainder	-	≤ 0.2	≤ 0.1	1.6 / 2.5	≤ 0.02	0.4 / 0.8	-	≤ 0.3

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
CuCr1Zr EN	M	All diameters	From the press					
	R370	5 ≤ Ø ≤ 100	370	55	250	35	16	
	H120	5 ≤ Ø ≤ 100						120 - 160
	R430	30 ≤ Ø ≤ 50	430	65	350	50	10	
	H135	30 ≤ Ø ≤ 50						135 - 175
	R470	30 ≤ Ø	470	70	420	60	8	
	H150	30 ≤ Ø						150 - 180
CuNi2Si EN	M	All diameters	From the press					
	R550	20 ≤ Ø ≤ 80	550	80	430	62	15	
	H150	20 ≤ Ø ≤ 80						150 - 190
	R600	20 ≤ Ø ≤ 50	600	87	520	75	10	
	H150	20 ≤ Ø ≤ 50						165 - 210
	R640	2 ≤ Ø ≤ 30	640	93	590	86	10	
	H180	2 ≤ Ø ≤ 30						180 - 230

FORM AND SIZES AVAILABLE:

	CuCr1Zr	CuNi2Si
Rod:	From Ø 6 to Ø 300 mm (from Ø 0.24 to Ø 11.81")	From Ø 6 to Ø 170 mm (from Ø 0.24 to Ø 6.69")
Hexagon:	From 14 to 36 mm (from 0.55 to 1.42")	From 17 to 60 mm (from 0.67 x 2.36")
Square:	From 10 x 10 to 200 x 200 mm (from 0.39 x 0.39 to 7.87 x 7.87")	On request
Flat:	From 4 x 15 to 100 x 200 mm (from 0.16 x 0.59 to 3.94 x 7.87")	On request
Sheet:	Thickness from 4 to 120mm (from 0.16 to 4.72")	

Physical properties:

These alloys have excellent electrical and thermical conductivities as well as high mechanical properties. They are stable at high temperatures and they have an excellent resistence to crushing.

Applications:

Electric: Contacts, connections, rotors.
Resistance welding: Electrodes, clamps.

COPPER COBALT BERYLLIUM

CuCo2Be - C17500/CuCoNiBe - C17510

EN 12163/167/420/EN 1652
ASTM B870/B441/B534

COMPOSITION:

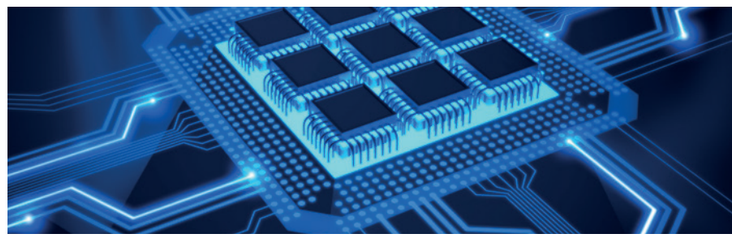
	Cu	Be	Co	Fe	Ni	Others
CuCo2Be CW104C	Remainder	0.4/0.7	2/2.8	≤ 0.2	≤ 0.3	≤ 0.5
CuCoNiBe CW103C	Remainder	0.4/0.7	0.8/1.3	≤ 0.2	0.8/1.3	≤ 0.5

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
CuCo2Be CuCoNiBe	M	All diameters	From the press					
	R680	2 ≤ Ø ≤ 100	680	100	550	80	10	
	H220	2 ≤ Ø ≤ 100						220 - 270
	R730	2 ≤ Ø ≤ 60	730	105	610	90	8	
	H230	2 ≤ Ø ≤ 60						230 - 310

FORM AND SIZES AVAILABLE:

Rod:	From Ø 8 to Ø 112 mm (from Ø 0.31 to Ø 4.4")
Square:	From 15 x 15 to 80 x 80 mm (from 0.59 x 0.59 to 3.15 x 3.15")
Flat:	From 20 x 40 to 20 x 100 mm (from 0.79 x 1.57 to 0.79 x 3.94")



Physical properties:

These alloys have high mechanical properties with good electrical and thermical conductivity and good resistance to wear.

Applications:

General purpose: Spot welding, jointing, end to end, riveting tools, pyrometric devices, injection pistons, conductive parts.

MANGANESE BRONZE/SPECIAL BRASS

CuZn19Al6 - C67000

NFL 14707, GAM MM12, NFA 53703
ASTM B138

COMPOSITION:

	Cu	Al	Fe	Mn	Zn	Others
NFL	Remainder	5.5 / 7.5	2 / 4	4 / 7	16.5 / 21	≤ 0.5

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
NFL	F	Ø ≤ 50	830	120	590	85	10	225
		Ø > 50	780	115	540	80	7	225

FORM AND SIZES AVAILABLE:

Rod:	From Ø 10 to Ø 80 mm (from Ø 0.39 to Ø 3"): Extruded
	From Ø 81 to Ø 200 mm (from 3.1 to 7.9"): Forged
Other forms:	Continuous casting: On request

Physical properties:
This alloy has very high mechanical properties with a good compression resistance and very good resistance to friction under heavy loads.

Applications:
Landing gear components.

MANGANESE BRONZE/SPECIAL BRASS

CuZn23Al4 - C86200

NFL 14708 - GAM MM12 - NFA 53703
ASTM B584

COMPOSITION:

	Cu	Al	Fe	Mn	Ni	Pb	Zn	Others
NFL	Remainder	3.5/5	1/3.5	1.5/3.5	≤ 2.5	≤ 1	20/25	≤ 0.5

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
NFL	F	All diameter	590	85	270	40	15	170

FORM AND SIZES AVAILABLE:

Rod: From Ø 10 to Ø 80 mm (from Ø 0.39 to Ø 3"): Extruded
From Ø 81 to Ø 200 mm (from 3.1 to 7.9"): Forged

Other forms: Continuous casting: On request

Physical properties:

This alloy has high mechanical properties. It has good resistance to friction under heavy loads, resistance to wear and abrasion. And it has a good oxidation resistance under normal conditions.

Applications:

Landing gear components.

SPECIAL BRASS

CuZn35Ni3Mn2AlPb - CW710R/CuZn37Mn3Al2PbSi - CW713R

EN 12163/164/165/167
NFA (CuZn40Al2/CuZn36Ni3), NFL 14711

COMPOSITION:

	Cu	Al	Fe	Mn	Ni	Pb	Si	Sn	Zn	Others
EN 12163 CW710R	58/60	0.3/1.3	≤ 0.5	1.5/2.5	2/3	0.2/0.8	≤ 0.1	≤ 0.5	Remainder	≤ 0.3
EN 12164 CW713R	57/59	1.3/2.3	≤ 1	1.5/3	≤ 1	0.2/0.8	0.3/1.3	≤ 0.4	Remainder	≤ 0.3

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
EN 12163 CW710R	M	All diameters	From the press					
	R490	5 ≤ Ø ≤ 40	490	70	290	45	18	
	H120	5 ≤ Ø ≤ 40						120 - 160
EN 12164 CW713R	M	All diameters	From the press					
	R540	5 ≤ Ø ≤ 80	540	80	280	40	15	
	H130	5 ≤ Ø ≤ 80						130 - 170
	R590	5 ≤ Ø ≤ 80	590	85	370	55	10	
	H150	5 ≤ Ø ≤ 80						150 - 220

FORM AND SIZES AVAILABLE:

	CW710R	CW713R	CuZn40Al2/CuZn36Ni3
Rod:	From Ø 8 to Ø 120 mm (from Ø 0.31 to Ø 4.72")	From Ø 6 to Ø 200 mm (from Ø 0.24 to Ø 7.87")	On request
Hexagon:	From 14 to 60 mm (from 0.55 to 2.36")	From 14 to 60 mm (from 0.55 to 2.36")	
Square:		From 10 x 10 to 100 x 100 mm (from 0.39 x 0.39 to 3.94 x 3.94")	
Flat:		From 10 x 20 to 30 x 130 mm (from 0.39 x 0.79 to 1.85 x 5.12")	

Physical properties:

CW710R has good mechanical properties. It is easy and very fast to machined. It can be hot forged and malleable when it is cold. CW713R has high mechanical properties with good resistance to wear under heavy load conditions and good resistance to atmospheric agents.

Applications:

General purpose: Bolts, rings, protection, sliding parts bearings.

COPPER NICKEL
CuNi10Fe1Mn - C70600
EN 12163/420 EN 1652/53: CW352H
GAM MM11
STF 22/55 T003-A
ASTM B151/B122

COMPOSITION:

	Cu	C	Co	Fe	Mn	Ni	P	Pb	S	Sn	Zn	Others
EN: CW352H	Remainder	≤ 0.05	≤ 0.1	1 / 2	0.5 / 1	9 / 11	≤ 0.02	≤ 0.02	≤ 0.05	≤ 0.03	≤ 0.5	≤ 0.2

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
EN CW352H	M	All diameter	From the press					
	R280	10 ≤ Ø ≤ 80	280	40	90	15	30	
	H070	10 ≤ Ø ≤ 80						70 - 100
	R350	2 ≤ Ø ≤ 20	350	50	150	20	10	
	H100	2 ≤ Ø ≤ 20						100

FORM AND SIZES AVAILABLE:

Rod:	From Ø 2 to Ø 250 mm (from Ø 0.39 to Ø 9.84")
Sheet:	Thickness from 1.5 to 15 mm (from 0.06 to 0.59")

Physical properties:
This alloy has good corrosion resistance especially in saline environment. It is excellent for soldering or brasing and cold bending. Moreover it has good resistance to wear.

Applications:
Boat hulls, tube sheet for salt water service, salt water pipe fitting, piping systems, piling wrap, hot water tanks.

Salt water baffles, propeller sleeves, ship hulls, water hoses.

COPPER NICKEL
CuNi30Mn1Fe - C71500
EN 12163/420 EN 1652/53: CW354H
GAM MM11
STF 22/55 B006 - B007
ASTM B151/B122

COMPOSITION:

	Cu	C	Co	Fe	Mn	Ni	P	Pb	S	Sn	Zn	Others
EN: CW354H	Remainder	≤ 0.05	≤ 0.1	0.4 / 1	0.5 / 1.5	30 / 32	≤ 0.02	≤ 0.02	≤ 0.05	≤ 0.05	≤ 0.5	≤ 0.2

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
EN CW354H	M	All diameters	From the press					
	R340	10 ≤ Ø ≤ 80	340	50	120	20	30	
	H080	10 ≤ Ø ≤ 80						80 - 110
	R420	2 ≤ Ø ≤ 20	420	60	180	25	14	
	H110	2 ≤ Ø ≤ 20						110

FORM AND SIZES AVAILABLE:

Rod:	On request
Sheet:	On request

Physical properties:
This alloy has good corrosion resistance especially in saline environment. It is excellent for soldering or brasing and cold bending. Moreover it has good resistance to wear.

Applications:
Boat hulls, tube sheet for salt water service, salt water pipe fitting, piping systems, piling wrap, hot water tanks.

Salt water baffles, propeller sleeves, ship hulls, water hoses.

TIN BRONZE (CAST ALLOY)

CuSn7Zn4Pb7 - C93200 - CuSn12 - C92500

EN 1982: CC493K - CuSn12P - GAM MM12 - STF - NFA
ASTM B505

COMPOSITION:

		Cu	Al	Fe	Mn	Ni	P	Pb	S	Sb	Si	Sn	Zn
CuSn7Zn4Pb7	EN	81/85	≤ 0.01	≤ 0.2	-	≤ 2	≤ 0.1	5/8	≤ 0.1	≤ 0.3	≤ 0.01	6/8	2/5
	ASTM	81/85	-	≤ 0.2	-	≤ 1	≤ 1.5	6/8	-	-	-	6.3/7.5	2/4
CuSn12	EN	85/88.5	≤ 0.01										
	ASTM	85/88	-	≤ 0.3	-	0.8/1.5	≤ 1.5	1/1.5	-	-	-	10/12	≤ 0.5

MECHANICAL PROPERTIES:

		Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
CuSn7Zn4Pb7	EN	All diameters	260	38	120	18	12	70
	ASTM	All diameters	241	35	138	20	10	-
CuSn12	EN	All diameters	300	43	150	20	6	90
	ASTM	All diameters	276	40	165	24	10	-

FORM AND SIZES AVAILABLE:

	Rod:	From Ø 10 to Ø 403 mm (from Ø 0.39 to Ø 15.87")
	Hexagon:	From Ø 17 to 65 mm (from 0.67 to 2.56")
	Square:	From 22x22 to 262x262 mm (from 0.87x0.87 to 10.31x10.31")
	Flat:	From 7x32 to 152x172 mm (from 0.26x1.26 to 5.98x6.77")
	Hollow:	From Ø OD 25 to Ø OD 352 mm (from Ø out 1 to Ø out 13.86")
		Also rings up to OD 2500 mm

Physical properties:
This alloy has good mechanical properties with low friction, self lubricity offset by its Pb content and good resistance under condition of high speed.

Applications:
Valves for water meters.

HIGH LEADED TIN BRONZE (CAST ALLOW)

CuSn10Pb10/C93700 - CuSn7Pb15/C93800/ CuSn5Pb20/C94100

En 1982: CC495K/CC496K/CC497K
AMS 4842
ASTM B505, 271

COMPOSITION:

	Cu	Al	Fe	Mn	Ni	P	Pb	S	Sb	Sn	Si	Zn
CuSn10Pb10	78/82	≤ 0.01	≤ 0.25	≤ 0.2	≤ 2	≤ 0.1	8/11	≤ 0.1	≤ 0.5	9/11	≤ 0.01	≤ 2
CuSn7Pb15	74/80	≤ 0.01	≤ 0.25	≤ 0.2	≤ 2	≤ 0.1	13/17	≤ 0.1	≤ 0.5	6/8	≤ 0.01	≤ 2
CuSn5Pb20	70/78	≤ 0.01	≤ 0.25	≤ 0.2	0.5/2.5	≤ 0.1	18/23	≤ 0.1	≤ 0.75	4/6	≤ 0.01	≤ 2

MECHANICAL PROPERTIES:

	Standard	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
CuSn10Pb10	EN	All diameters	220	32	110	16	8	70
CuSn7Pb15	EN	All diameters	200	29	90	13	8	65
CuSn5Pb20	EN	All diameters	180	26	90	13	7	50

FORM AND SIZES AVAILABLE:

	Rod:	From Ø 12 to Ø 300 mm (from Ø 0.47 to Ø 11.81")
	Square:	On request
	Flat:	On request
	Hollow:	On request

Physical properties:
The high lead content provides added self lubricity within the family of tin bronzes. It has a good corrosion resistance so it used for high speed and heavy pressure applications.

Applications:
Landing gear bushings and bearings, aircraft components.

LEADED BRASS
CuZn39Pb3/39Pb2/40Pb2/39Pb1.7

EN 12164/167/ EN 1652: CW614N/CW612N/CW617N
ASTM B435
NFL 14710

COMPOSITION:

	Cu	Al	As	Fe	Mn	Ni	Pb	Sn	Zn	Others
CuZn39Pb3	57/59	≤ 0.05	-	≤ 0.3	-	≤ 0.3	2.5/3.5	≤ 0.3	Remainder	≤ 0.2
CuZn39Pb2	59/60	≤ 0.05	-	≤ 0.3	-	≤ 0.3	1.6/2.5	≤ 0.3	Remainder	≤ 0.2
CuZn40Pb2	57/59	≤ 0.05	-	≤ 0.3	-	≤ 0.3	1.6/2.5	≤ 0.3	Remainder	≤ 0.2

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
CuZn39Pb3 CuZn40Pb2	R360	6 ≤ Ø ≤ 80	360	52	320	46	20	90 - 125
	R430	2 ≤ Ø ≤ 40	430	62	220	32	10	110 - 160
	R500	2 ≤ Ø ≤ 14	500	72	350	51	5	135
CuZn39Pb2	R360	6 ≤ Ø ≤ 80	360	52	300	44	20	70 - 100
	R410	2 ≤ Ø ≤ 40	410	60	230	33	12	100 - 145
	R500	2 ≤ Ø ≤ 14	500	72	350	51	8	120

FORM AND SIZES AVAILABLE:

	CuZn39Pb3	CuZn39Pb2/Pb1.7	CuZn40Pb2
Rod:	From Ø 2 to Ø 300 mm (from Ø 0.08 to Ø 11.81")	On special production	On request
Hexagon:	From 3.5 to 100 mm (from 0.14 to 3.94")	On special production	On request
Square:	From 8 x 8 to 100 x 100 mm (from 0.31 x 0.31 to 3.94 x 3.94")		
Flat:	From 3 x 8 to 20 x 100 mm (from 0.12 x 0.31 to 0.79 x 3.94")	On special production	On request
Sheet:	Thickness from 1 to 150 mm (from 0.04 to 5.91") Size from 600 x 2000 to 1000 x 3000 mm		

Physical properties:

Leaded brass have an excellent hot malleability and good friction resistance thanks to lead content which provides self lubricity. These brass are easily machining.

Applications:

Nuts and bolts.
Clockmaking.
Rivets

BRASS
CuZn36/CuZn37

EN 12163/167 EN1652: CW507L/CW508L
ASTM B435

COMPOSITION:

	Cu	As	Al	Fe	Mn	Ni	Pb	Sn	Zn	Others
CuZn36	63.5/65.5	-	≤ 0.02	≤ 0.05	-	≤ 0.3	≤ 0.05	≤ 0.1	Remainder	≤ 0.1
CuZn37	62/64	-	≤ 0.05	≤ 0.1	-	≤ 0.3	≤ 0.1	≤ 0.1	Remainder	≤ 0.1

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
CuZn36 CuZn37	R290	4 ≤ Ø ≤ 80	290	42	230	33	45	70 - 110
	R370	4 ≤ Ø ≤ 40	370	54	240	35	14	105 - 145
	R460	4 ≤ Ø ≤ 8	460	67	330	48	8	140

FORM AND SIZES AVAILABLE:

Rod:	On special production
Hexagon:	On special production
Square:	On special production
Flat:	On special production
Sheet:	Thickness from 0.05 to 10 mm (from 0.002 to 0.39") from 300 x 600 to 1000 x 2000 mm

Physical properties:

This brass is lead free according to new ecologic regulations. It has high cold bending ability and good corrosion resistance.

Applications:

Nuts and bolts.
Clockmaking.
Rivets

COPPER

Cua1/Cub/Cuc1/Cuc2
Cu-ETP/Cu-DHP/Cu-OF/Cu-OFE

EN 13601, EN 12163/165, EN 1653
ASTM B124/152

COMPOSITION:

	Cu	Ag	Bi	O	P	Pb	Others
Cua1/Cu-ETP/C11000/CW004A	≥ 99.9*	-	≤ 0.0005	≤ 0.04	-	≤ 0.005	≤ 0.03
Cub1/Cu-DHP/C12200/CW024A	≥ 99.9	-	-		0.005/0.013	≤ 0.005	-
Cuc1/Cu-OF/C10200/CW008A	≥ 99.95*	-	≤ 0.0005	-	-	≤ 0.005	≤ 0.03
Cuc2/Cu-OFE/C10100/CW009A	≥ 99.99	≤ 0.0025	≤ 0.0002	-	≤ 0.0003	≤ 0.005	≤ 0.006

*Copper + Silver

MECHANICAL PROPERTIES:

	Temper	Dimension	Tensile Strenght ≥		Yield Strenght ≥		Elongation ≥	Hardness ≥
		mm	Mpa	Ksi	Mpa	Ksi	%	Brinell
Cu-ETP Cu-OF Cu-OFE	D	2 ≤ Ø ≤ 160	Cold drawn material without special mechanical properties					
	R200	2 ≤ Ø ≤ 160	200	29	120	17	35	35 - 65
	R230	30 ≤ Ø ≤ 80	230	33	160	23	18	65 - 90
	R250	2 ≤ Ø ≤ 10	250	36	200	29	12	65 - 90
	R250	10 ≤ Ø ≤ 140	250	36	180	26	15	65 - 90
	R260	40 ≤ Ø ≤ 60	260	37	220	32	12	75 - 110
	R280	20 ≤ Ø ≤ 60	280	41	240	35	10	75 - 110
	R300	2 ≤ Ø ≤ 20	300	43	260	37	8	75 - 110
	R350	2 ≤ Ø ≤ 10	350	51	320	46	5	100
Cu-DHP	R200		200	29	40	6	33	-55

FORM AND SIZES AVAILABLE:

	Cu-ETP	Cu-DHP	Cu-OF	Cu-OFE
Rod:	From Ø 3 to Ø 250 mm (from Ø 0.12 to Ø 9.84")		On request	On request
Hexagon:	On request			
Square:	From 4 x 4 to 140 x 140 mm (from 0.16 x 0.16 to 5.51 x 5.51")			
Flat:	From 2 x 10 to 20 x 200 mm (from 0.08 x 0.39 to 0.79 x 7.87")		On request	On request
Sheet:	Thickness from 0.2 to 80 mm (from 0.008 to 3.15") 1000 x 2000 mm	Thickness from 0.3 to 2 mm (from 0.01 to 0.08") 1000 x 2000 mm	Thickness from 1 to 10 mm (from 0.04 to 0.39") 1000 x 2000 mm	

Physical properties:
Copper has a good electrical and thermal conductibility.
It is amagnetic.

Applications:
Nuclear and thermal power plant: condensing unit.
Electronic components.
Weaponry.
Clockmaking.