



**Standard Properties of Typical  
Brass, Bronze, & Aluminum Alloys**

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## C83470 Biwalite™ Sulphur Tin Bronze

US EPA Registered Antimicrobial

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)											
	Cu	Al	Sb	Fe	Pb	Ni	P	Si	S	Sn	Zn
MIN/MAX	90.0-96.0 <sup>(1,2)</sup>	.01	.20	.50	.09	1.0 <sup>(3)</sup>	.10	0.01	.20-.6	3.0-5.0	1.0-3.0
Nominal	93					.5			.5	4	2

- (1) In determining Cu min., Cu may be calculated as Cu + Ni  
(2) Cu + Sum of Al, Sb, Fe, Pb, Ni, P, Si, S, Sn, Zn = 99.5% min.  
(3) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
28		14		15				75	.314

Mechanical properties measured at room temperature, 68° F  
ksi indicates thousands pounds per square inch  
yield strength .5% extension under load in a gage length of 2 in.

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
		B584	

## C83600 Red Brass

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)											
	Cu	Al	Sb	Fe	Pb	Ni	P	Si	S	Sn	Zn
MIN/MAX	84.0-86.0 <sup>(1,2)</sup>	.005	.25	.30	4.0-6.0	1.0 <sup>(3)</sup>	.05	.005	.08	4.0-6.0	4.0-6.0
Nominal	85				5					5	5

- (1) In determining Cu min., Cu may be calculated as Cu + Ni  
(2) Cu + Sum of Al, Sb, Fe, Pb, Ni, P, Si, S, Sn, Zn = 99.3% min.  
(3) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
30	37	14	17	20	30		60*	84	.318

Mechanical properties measured at room temperature, 68° F  
ksi indicates thousands pounds per square inch  
yield strength .5% extension under load in a gage length of 2 in.  
\*Brinell with 10 mm Ball Indicator 500 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
4855	SB62, B16.15, B16.18, B16.23, B16.24, B16.26, B16.32	B62, B584	J461, J462

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## C86200 Manganese Bronze

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)								
	Cu	Al	Fe	Pb	Mn	Ni	Sn	Zn
MIN/MAX	60.0-66.0 <sup>(1,2)</sup>	3.0-4.9	2.0-4.0	.20	2.5-5.0	1.0 <sup>(3)</sup>	.20	22.0-28.0
Nominal	63	4	3		3			27

(1) In determining Cu min., Cu may be calculated as Cu + Ni

(2) Cu + Sum of Al, Fe, Pb, Mn, Ni, Sn, Zn = 99.0% min.

(3) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
90	95	45	48	18	20		180**	30	.288

Mechanical properties measured at room temperature, 68° F

ksi indicates thousands pounds per square inch

yield strength .5% extension under load in a gage length of 2 in.

\*\*Brinell with 10 mm Ball Indicator 3000 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
		B584, B763/B763M	J461, J462

## C86300 Manganese Bronze

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)								
	Cu	Al	Fe	Pb	Mn	Ni	Sn	Zn
MIN/MAX	60.0-66.0 <sup>(1,2)</sup>	5.0-7.5	2.0-4.0	.20	2.5-5.0	1.0 <sup>(3)</sup>	.20	22.0-28.0
Nominal	61	6	3		3			27

(1) In determining Cu min., Cu may be calculated as Cu + Ni

(2) Cu + Sum of Al, Fe, Pb, Mn, Ni, Sn, Zn = 99.0% min.

(3) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
110	119	60	62	12	18	223**	225**	8	.283

Mechanical properties measured at room temperature, 68° F

ksi indicates thousands pounds per square inch

yield strength .5% extension under load in a gage length of 2 in.

\*\*Brinell with 10 mm Ball Indicator 3000 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
4862		B22, B584, B763/B763M	J461, J462

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# C86500 Manganese Bronze

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)								
	Cu	Al	Fe	Pb	Mn	Ni	Sn	Zn
MIN/MAX	55.0-60.0 <sup>(1,2)</sup>	.5-1.5	.40-2.0	.40	.10-1.5	1.0 <sup>(3)</sup>	1.0	36.0-42.0
Nominal	58	1	1		1			39

(1) In determining Cu min., Cu may be calculated as Cu + Ni

(2) Cu + Sum of Al, Fe, Pb, Mn, Ni, Sn, Zn = 99.0% min.

(3) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
65	71	25	29	20	30		100*_130**	26	.301

Mechanical properties measured at room temperature, 68° F

ksi indicates thousands pounds per square inch

yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

\*\*Brinell with 10 mm Ball Indicator 3000 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
4860		B584, B763/B763M	J461, J462

# C87500 Copper Silicon

US EPA Registered Antimicrobial

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)					
	Cu	Al	Pb	Si	Zn
MIN/MAX	79.0 min <sup>(1,2)</sup>	.50	.09	3.0-5.0	12.0-16.0
Nominal	82			4	14

(1) In determining Cu min., Cu value does not include Ni

(2) Cu + Sum of Al, Pb, Si, Zn = 99.5% min.

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
60	67	24	30	16	21		115*_134**	50	.299

Mechanical properties measured at room temperature, 68° F

ksi indicates thousands pounds per square inch

yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

\*\*Brinell with 10 mm Ball Indicator 3000 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
		B584, B763/B763M	

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## C87600 Copper Silicon

US EPA Registered Antimicrobial

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)						
	Cu	Fe	Pb	Mn	Si	Zn
MIN/MAX	88.0 min <sup>(1,2)</sup>	.20	.09	.25	3.5-5.5	4.0-7.0
Nominal	91				4	5

(1) In determining Cu min., Cu value does not include Ni

(2) Cu + Sum of Pb, Si, Zn = 99.5% min.

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
60	66	30	32	16	20		110*_135**	40	.300

Mechanical properties measured at room temperature, 68° F  
 ksi indicates thousands pounds per square inch  
 yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

\*\*Brinell with 10 mm Ball Indicator 3000 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
		B584, B763/B763M	

## C87850 Copper Silicon

US EPA Registered Antimicrobial

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)										
	Cu	Sb	Fe	Pb	Mn	Ni	P	Si	Sn	Zn
MIN/MAX	74.0-78.0 <sup>(1)</sup>	.10	.10	.09	.10	.20 <sup>(2)</sup>	.05-.20	2.7-3.4	.30	Rem
Nominal	76							3		20.9

(1) Cu + Sum of Sb, Fe, Pb, Mn, Ni, P, Si, Sn, Zn = 99.5% min.

(2) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
59	63	22	26	16	25		78	70	.300

Mechanical properties measured at room temperature, 68° F  
 ksi indicates thousands pounds per square inch  
 yield strength .5% extension under load in a gage length of 2 in.

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
		B584	

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## C89833 Copper Bismuth FederAlloy

US EPA Registered Antimicrobial

**SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)**

	Cu	Al	Sb	Bi	Fe	Pb	Ni	P	Si	S	Sn	Zn
MIN/MAX	86.0-91.0 <sup>(1)</sup>	.005	.25	1.7-2.7	.30	.09	1.0 <sup>(2)</sup>	.050	.005	.08	4.0-6.0	2.0-6.0
Nominal	89			2.2							5	3

(1) Cu + Sum of Al, Sb, Bi, Fe, Pb, Ni, P, Si, S, Sn, Zn = 99.3% min.

(2) Ni value includes Co

**SANDCAST MECHANICAL & PHYSICAL PROPERTIES**

TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
30	37	14	17	16	28		60*	81	.317

Mechanical properties measured at room temperature, 68° F  
 ksi indicates thousands pounds per square inch  
 yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

**SANDCASTING SPECIFICATIONS**

AMS	ASME	ASTM	SAE
		B584	

## C90300 Tin Bronze

**SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)**

	Cu	Al	Sb	Fe	Pb	Ni	P	Si	S	Sn	Zn
MIN/MAX	86.0-89.0 min <sup>(1,2)</sup>	.005	.20	.20	.30	1.0 <sup>(3)</sup>	.05	.005	.05	7.5-9.0	3.0-5.0
Nominal	88									8	4

(1) In determining Cu min., Cu may be calculated as Cu + Ni

(2) Cu + Sum of Al, Sb, Fe, Pb, Ni, P, Si, S, Sn, Zn = 99.4% min.

(3) Ni value includes Co

**SANDCAST MECHANICAL & PHYSICAL PROPERTIES**

TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
40	45	18	21	20	30		70*	30	.318

Mechanical properties measured at room temperature, 68° F  
 ksi indicates thousands pounds per square inch  
 yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

**SANDCASTING SPECIFICATIONS**

AMS	ASME	ASTM	SAE
		B584, B763/B763M	J461, J462

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## C90500 Gun Metal Tin Bronze

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)											
	Cu	Al	Sb	Fe	Pb	Ni	P	Si	S	Sn	Zn
MIN/MAX	86.0-89.0 min <sup>(1,2)</sup>	.005	.20	.20	.30	1.0 <sup>(3)</sup>	.05	.005	.05	9.0-11.0	1.0-3.0
Nominal	88									10	2

- (1) In determining Cu min., Cu may be calculated as Cu + Ni  
 (2) Cu + Sum of Al, Sb, Fe, Pb, Ni, P, Si, S, Sn, Zn = 99.7% min.  
 (3) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
40	45	18	22	20	25		75*	30	.315

Mechanical properties measured at room temperature, 68° F  
 ksi indicates thousands pounds per square inch  
 yield strength .5% extension under load in a gage length of 2 in.  
 \*Brinell with 10 mm Ball Indicator 500 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
4845		B22, B584, B763/B763M	J461, J462

## C90700 Tin Bronze

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)											
	Cu	Al	Sb	Fe	Pb	Ni	P	Si	S	Sn	Zn
MIN/MAX	88.0-90.0 min <sup>(1,2)</sup>	.005	.20	.15	.50	.50 <sup>(3)</sup>	.30	.005	.05	10.0-12.0	.50
Nominal	89									11	

- (1) In determining Cu min., Cu may be calculated as Cu + Ni  
 (2) Cu + Sum of Al, Sb, Fe, Pb, Ni, P, Si, S, Sn, Zn = 99.4% min.  
 (3) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
35	44	17	22	10	20	65*	80*	20	.317

Mechanical properties measured at room temperature, 68° F  
 ksi indicates thousands pounds per square inch  
 yield strength .5% extension under load in a gage length of 2 in.  
 \*Brinell with 10 mm Ball Indicator 500 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
		B427	J461, J462

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## C92200 Navy M Tin Bronze

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)											
	Cu	Al	Sb	Fe	Pb	Ni	P	Si	S	Sn	Zn
MIN/MAX	86.0-90.0 min <sup>(1,2)</sup>	.005	.25	.25	1.0-2.0	1.0 <sup>(3)</sup>	.05	.005	.05	5.5-6.5	3.0-5.0
Nominal	88.0				1.5					6.0	4.5

(1) In determining Cu min., Cu may be calculated as Cu + Ni

(2) Cu + Sum of Al, Sb, Fe, Pb, Ni, P, Si, S, Sn, Zn = 99.3% min.

(3) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
34	40	16	20	22	30		65*	42	.312

Mechanical properties measured at room temperature, 68° F

ksi indicates thousands pounds per square inch

yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
	SB61, SB584, B16.24	B61, B584	J461, J462

## C92700 Tin Bronze

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)											
	Cu	Al	Sb	Fe	Pb	Ni	P	Si	S	Sn	Zn
MIN/MAX	86.0-89.0 min <sup>(1,2)</sup>	.005	.25	.20	1.0-2.5	1.0 <sup>(3)</sup>	.25	.005	.05	9.0-11.0	.7
Nominal	88				2					10	0

(1) In determining Cu min., Cu may be calculated as Cu + Ni

(2) Cu + Sum of Al, Sb, Fe, Pb, Ni, P, Si, S, Sn, Zn = 99.3% min.

(3) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
35	42	18	21	10	20		77*	45	.317

Mechanical properties measured at room temperature, 68° F

ksi indicates thousands pounds per square inch

yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
		B505/B505M	J461, J462

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## C93200 Tin Bronze

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)											
	Cu	Al	Sb	Fe	Pb	Ni	P	Si	S	Sn	Zn
MIN/MAX	81.0-85.0 min <sup>(1,2)</sup>	.005	.35	.20	6.0-8.0	1.0 <sup>(3)</sup>	.15	.005	.08	6.3-7.5	1.0-4.0
Nominal	83				7					7	3

(1) In determining Cu min., Cu may be calculated as Cu + Ni

(2) Cu + Sum of Al, Sb, Fe, Pb, Ni, P, Si, S, Sn, Zn = 99.0% min.

(3) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
30	35	14	18	15	20		65*	70	.322

Mechanical properties measured at room temperature, 68° F

ksi indicates thousands pounds per square inch

yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
		B66, B584, B763/B763M	J461, J462

## C93700 Bearing Bronze

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)											
	Cu	Al	Sb	Fe	Pb	Ni	P	Si	S	Sn	Zn
MIN/MAX	78.0-82.0 min <sup>(1)</sup>	.005	.50	.7	8.0-11.0	.50 <sup>(2)</sup>	.10	.005	.08	9.0-11.0	.8
Nominal	80				10					10	

(1) Cu + Sum of Al, Sb, Fe, Pb, Ni, P, Si, S, Sn, Zn = 99.0% min.

(2) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
30	35	12	18	15	20		60*	80	.320

Mechanical properties measured at room temperature, 68° F

ksi indicates thousands pounds per square inch

yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
4842	SB584	B22, B66, B584, B763/B763M	J461, J462

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## C95200 Aluminum Bronze

US EPA Registered Antimicrobial

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)			
	Cu	Al	Fe
MIN/MAX	86.0 min <sup>(1)</sup>	8.5-9.5	2.5-4.0
Nominal	88	9	3

(1) Cu + Sum of Al, Fe = 99.0% min.

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
65	80	25	27	20	35	110**	125**	20	.276

Mechanical properties measured at room temperature, 68° F  
 ksi indicates thousands pounds per square inch  
 yield strength .5% extension under load in a gage length of 2 in.  
 \*\*Brinell with 10 mm Ball Indicator 3000 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
	SB148	B148, B763/B763M	J461, J462

## C95400 Aluminum Bronze

US EPA Registered Antimicrobial

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)					
	Cu	Al	Fe	Mn	Ni
MIN/MAX	83.0 min <sup>(1)</sup>	10.0-11.5	3.0-5.0	.50	1.5 <sup>(2)</sup>
Nominal	85	11	4		

(1) Cu + Sum of Al, Fe, Mn, Ni = 99.5% min

(2) Ni value includes Co

SANDCAST MECHANICAL & PHYSICAL PROPERTIES									
TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
75	85	30	35	12	18	150**	170**	60	.269

Mechanical properties measured at room temperature, 68° F  
 ksi indicates thousands pounds per square inch  
 yield strength .5% extension under load in a gage length of 2 in.  
 \*\*Brinell with 10 mm Ball Indicator 3000 kgf load

SANDCASTING SPECIFICATIONS			
AMS	ASME	ASTM	SAE
	SB148	B66, B148, B763/B763M	J461, J462

## C95500 Aluminum Bronze

US EPA Registered Antimicrobial

**SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)**

	Cu	Al	Fe	Mn	Ni
MIN/MAX	78.0 min <sup>(1)</sup>	10.0-11.5	3.0-5.0	3.5	3.0-5.5 <sup>(2)</sup>
Nominal	81	11	4		4

(1) Cu + Sum of Al, Fe, Mn, Ni = 99.5% min.

(2) Ni value includes Co

**SANDCAST MECHANICAL & PHYSICAL PROPERTIES**

TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
90	100	40	44	6	12	190**	195**	50	.272

Mechanical properties measured at room temperature, 68° F  
ksi indicates thousands pounds per square inch  
yield strength .5% extension under load in a gage length of 2 in.

\*\*Brinell with 10 mm Ball Indicator 3000 kgf load

**SANDCASTING SPECIFICATIONS**

AMS	ASME	ASTM	SAE
	SB148	B148, B763/B763M	J461, J462

## C95800 Aluminum Bronze

US EPA Registered Antimicrobial

**SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)**

	Cu	Al	Fe	Pb	Mn	Ni	Si
MIN/MAX	79.0 min <sup>(1)</sup>	8.5-9.5	3.5-4.5 <sup>(2)</sup>	.03	.8-1.5	4.0-5.0 <sup>(2)</sup>	.10
Nominal	81.3	9.0	4.0		1.2	4.5	

(1) Cu + Sum of Al, Fe, Pb, Mn, Ni, Si = 99.5% min.

(2) Fe content shall not exceed Ni content

**SANDCAST MECHANICAL & PHYSICAL PROPERTIES**

TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
85	95	35	38	15	25		159**	20	.276

Mechanical properties measured at room temperature, 68° F  
ksi indicates thousands pounds per square inch  
yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

**SANDCASTING SPECIFICATIONS**

AMS	ASME	ASTM	SAE
	SB148	B148, B763/B763M	J461, J462

Values listed herein are for general reference only. Alu-Bra Foundry, Inc. assumes no responsibility for its use by any person or organization. See applicable engineering specifications.

## C96200 90-10 Copper-Nickel

US EPA Registered Antimicrobial

**SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)**

	Cu	C	Fe	Pb	Mn	Ni	Nb	P	Si	S
MIN/MAX	Rem <sup>(1)</sup>	.10	1.0-1.8	.01	1.5	9.0-11.0 <sup>(2)</sup>	1.0 <sup>(3)</sup>	.02	.50	.02
Nominal	87.5		1.5		.9	10			.1	

(1) In Cu + Sum of C, Fe, Pb, Mn, Ni, Nb, P, Si, S = 99.5% min.

(2) Ni value includes Co

(3) When product or casting is intended for subsequent welding applications and so specified by the purchaser, the Nb shall be .40% max

**SANDCAST MECHANICAL & PHYSICAL PROPERTIES**

TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
45		25		20				10	.323

Mechanical properties measured at room temperature, 68° F  
ksi indicates thousands pounds per square inch  
yield strength .5% extension under load in a gage length of 2 in.

**SANDCASTING SPECIFICATIONS**

AMS	ASME	ASTM	SAE
		B369	J461, J462

## C96400 70-30 Copper-Nickel

US EPA Registered Antimicrobial

**SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)**

	Cu	C	Fe	Pb	Mn	Ni	Nb	P	Si	S
MIN/MAX	Rem <sup>(1)</sup>	.15	.25-1.5	.01	1.5	28.0-32.0 <sup>(2)</sup>	.50-1.5 <sup>(3)</sup>	.02	.50	.02
Nominal	67		.7		.8	30	1		.5	

(1) Cu + Sum of C, Fe, Pb, Mn, Ni, Nb, P, Si, S = 99.5% min

(2) Ni value includes Co

(3) When product or casting is intended for subsequent welding applications and so specified by the purchaser, the Nb shall be .40% max

**SANDCAST MECHANICAL & PHYSICAL PROPERTIES**

TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
60	68	32	37	20	28		140**	20	.323

Mechanical properties measured at room temperature, 68° F  
ksi indicates thousands pounds per square inch  
yield strength .5% extension under load in a gage length of 2 in.

\*\*Brinell with 10 mm Ball Indicator 3000 kgf load

**SANDCASTING SPECIFICATIONS**

AMS	ASME	ASTM	SAE
		B369	

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## C97600 Nickel Silver

**SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)**

	Cu	Al	Sb	Fe	Pb	Mn	Ni	P	Si	S	Sn	Zn
MIN/MAX	63.0-67.0 min <sup>(1)</sup>	.005	.25	1.5	3.0-5.0	1.0	19.0-21.5 <sup>(2)</sup>	.05	.15	.08	3.5-4.5	3.0-9.0
Nominal	64				4		20				4	8

(1) Cu + Sum of Al, Sb, Fe, Pb, Mn, Ni, P, Si, S, Sn, Zn = 99.7% min.

(2) Ni value includes Co

**SANDCAST MECHANICAL & PHYSICAL PROPERTIES**

TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
40	45	17	24	10	20		80*	70	.321

Mechanical properties measured at room temperature, 68° F

ksi indicates thousands pounds per square inch

yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

**SANDCASTING SPECIFICATIONS**

AMS	ASME	ASTM	SAE
	SB584	B584, B763/B763M	

## C99500 NDZ-S

US EPA Registered Antimicrobial

**SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)**

	Cu	Al	Fe	Pb	Mn	Ni	Si	Zn
MIN/MAX	Rem <sup>(1,2)</sup>	.50-2.0	3.0-5.0	.09	.50	3.5-5.5	.50-2.0	.50-2.0
Nominal	87	1.7	4.0			4.5	1.3	1.5

(1) Cu + Sum of Al, Fe, Pb, Mn, Ni, Si, Zn = 99.7% min.

(2) Ni value includes Co

**SANDCAST MECHANICAL & PHYSICAL PROPERTIES**

TENSILE STRENGTH (ksi)		YIELD STRENGTH (ksi)		ELONGATION (%)		BRINELL HARDNESS		MACHINABILITY	DENSITY
MIN	TYP	MIN	TYP	MIN	TYP	MIN	TYP	FREE CUT YB =100	LBS PER CU IN
70		40		12			145*_50**	50	.300

Mechanical properties measured at room temperature, 68° F

ksi indicates thousands pounds per square inch

yield strength .5% extension under load in a gage length of 2 in.

\*Brinell with 10 mm Ball Indicator 500 kgf load

\*\*Brinell with 10 mm Ball Indicator 3000 kgf load

**SANDCASTING SPECIFICATIONS**

AMS	ASME	ASTM	SAE
		B763/B763M	

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## 700XX

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)								
	Cu	Al	Fe	Pb	Mn	Ni	Si	Zn
MIN/MAX	Rem	8.5-10.5	.8-1.0	.15	.15	14-16	.15	7.5-9.5

## 700XX with Silicon

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)								
	Cu	Al	Fe	Pb	Mn	Ni	Si	Zn
MIN/MAX	Rem	8.5-10.5	.8-1.0	.15	.15	14-16	.9-1.1	7.5-9.5

## APPLICATIONS

glass container industry  
neck rings  
bottom plates

## ANSI 319.0 (Sand - ASTM B26/B26M)

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)											
	Al	Cu	Fe	Mg	Mn	Ni	Si	Ti	Zn	OTHER	
										Each	Total
MIN/MAX	Rem	3.0-4.0	1.0	.10	.50	.35	5.5-6.5	.25	1.0	-	.50
Nominal	Rem	3.5		.10			6.0		1.0		

SANDCAST MECHANICAL & PHYSICAL PROPERTIES								
TEMPER	ULTIMATE TENSILE (KSI)	YIELD STRENGTH (0.2% offset) (KSI)	ELONGATION % in 2 inches	COMPRESSIVE YIELD (KSI)	BRINELL HARDNESS 10MM 500KGF	SHEARING STRENGTH (KSI)	ENDURANCE LIMIT (KSI)	DENSITY LB/IN <sup>3</sup>
F	23.0 min 27 typ	13.0 min 18.0 typ	1.5 min 2.0 typ	19 typ	70	22 typ	10.0 typ	.101
T5	25.0 min 30 typ	Not required 26 typ	Not required 1.5 typ	27 typ	80	24 typ	11 typ	.101
T6	31.0 min 36 typ	20.0 min 24 typ	1.5 min 2.0 typ	25 typ	80	29 typ	11 typ	.101

Mechanical properties measured at room temperature, 68° F  
ksi indicates thousands pounds per square inch

CHARACTERISTICS							
PRESSURE TIGHTNESS	ELEVATED TEMP STRENGTH	CORROSION RESISTANCE	MACHINABILITY	ELECTROPLATING	ANODIZING QUALITY (APPEARANCE)	CHEMICAL OXIDE COATING (PROTECTION)	SUITABILITY FOR WELDING
2	3	3	3	2	4	3	2

1 = EXCELLENT 2 = VERY GOOD 3 = GOOD 4 = FAIR 5 = POOR



## ANSI A356.0 (Sand - ASTM B26/B26M)

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)										
	Al	Cu	Fe	Mg	Mn	Si	Ti	Zn	OTHER	
									Each	Total
MIN/MAX	Rem	.20	.20	.25-.45	.10	6.5-7.5	.20	.10	.05	.15
Nominal	Rem									

SANDCAST MECHANICAL & PHYSICAL PROPERTIES								
TEMPER	ULTIMATE TENSILE (KSI)	YIELD STRENGTH (0.2% offset) (KSI)	ELONGATION % in 2 inches	COMPRESSIVE YIELD (KSI)	BRINELL HARDNESS 10MM 500KGF	SHEARING STRENGTH (KSI)	ENDURANCE LIMIT (KSI)	DENSITY LB/IN <sup>3</sup>
F	23	12	6.0					.097
T6	34.0 min 40 typ	24.0 min 30 typ	3.5 min 6.0 typ		70-105 75 typ	20.7 calculated		.097

Mechanical properties measured at room temperature, 68° F  
ksi indicates thousands pounds per square inch

CHARACTERISTICS							
PRESSURE TIGHTNESS	ELEVATED TEMP STRENGTH	CORROSION RESISTANCE	MACHINABILITY	ELECTROPLATING	ANODIZING QUALITY (APPEARANCE)	CHEMICAL OXIDE COATING (PROTECTION)	SUITABILITY FOR WELDING
1	3	2	4	2	4	2	2

1 = EXCELLENT 2 = VERY GOOD 3 = GOOD 4 = FAIR 5 = POOR

## ANSI 535.0 (Sand - ASTM B26/B26M)

SANDCAST CHEMICAL COMPOSITION - % MAX EXCEPT AS INDICATED (per UNS registration)										
	Al	Be	B	Cu	Fe	Mg	Mn	Si	Ti	OTHER Each Total
MIN/MAX	Rem	.003-.007	.005	.05	.15	6.2-7.5	.10-.25	.15	.10-.25	.05 <sup>(1)</sup> .15
Nominal	Rem	.005		.05		6.9		.15		

SANDCAST MECHANICAL & PHYSICAL PROPERTIES								
TEMPER	ULTIMATE TENSILE (KSI)	YIELD STRENGTH (0.2% offset) (KSI)	ELONGATION % in 2 inches	COMPRESSIVE YIELD (KSI)	BRINELL HARDNESS 10MM 500KGF	SHEARING STRENGTH (KSI)	ENDURANCE LIMIT (KSI)	DENSITY LB/IN <sup>3</sup>
F	35 min 40 typ	18 min 20 typ	9 min 13 typ	23.5 min 35 typ	60-90 70 typ	27 typ	10 typ	.095

Mechanical properties measured at room temperature, 68° F  
ksi indicates thousands pounds per square inch

The T5 temper imparts improved mechanical properties and dimensional stability. Mechanical properties are the same for both the F and T5 tempers

(1) Contains beryllium 0.003-0.007%, boron 0.005% max

CHARACTERISTICS							
PRESSURE TIGHTNESS	ELEVATED TEMP STRENGTH	CORROSION RESISTANCE	MACHINABILITY	ELECTROPLATING	ANODIZING QUALITY (APPEARANCE)	CHEMICAL OXIDE COATING (PROTECTION)	SUITABILITY FOR WELDING
5	3	1	1	5	1	1	4

1 = EXCELLENT 2 = VERY GOOD 3 = GOOD 4 = FAIR 5 = POOR





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