

# ALLOY DATA SHEET CB-7Cu-1

## CORROSION RESISTANT ALLOY

REVISION: 01/90

### DESCRIPTION

CB-7Cu-1 is a precipitation hardening, martensitic stainless steel, known in the wrought form as 17-4PH. Resistance to atmospheric corrosion, organic compounds, sea water and paper mill liquors is intermediate between that of the hardenable CA alloys and the non-hardenable CF alloy grades. The alloy is particularly suited to service combining corrosion resistance and high strength at temperatures up to 700°F. Machining is frequently conducted on castings in the solution annealed condition, followed by hardening at a low temperature thus alleviating distortion and scaling. Service at temperatures below -40°F should be avoided due to poor impact properties at this temperature.

### COMPOSITION

	C	Mn	Si	Cr	Ni	P	S	Cu(i)	Nb(ii)	N <sub>2</sub>
Min %				15.5	3.6			2.5	0.20	
Max %	0.07	0.7	1.0	17.7	4.6	0.035	0.03	3.2	0.35	0.05

Notes: (i) Copper should be less than 3% if the castings require welding.  
 (ii) Niobium should be omitted if the castings are hardened at 900°F.

### APPLICATIONS

Centrifuge components, food mixers and processing machinery, pump and compressor impellers, pump shafts and sleeves, screw conveyors, valve bodies and trim, propeller shafts, and hydraulic cylinders

### PRODUCT FORMS

Horizontal and vertical centrifugal castings; static castings.

### PHYSICAL PROPERTIES

Density (lbs/in<sup>3</sup>) 0.280

Liquidus(°F) 2750

Thermal Conductivity 9.9 @ 212°F  
 (Btu/h/ft<sup>2</sup>/ft/°F) 11.3 @ 500°F  
 13.0 @ 860°F  
 13.1 @ 900°F

		Aged at	
		900°F	1100°F
Thermal Expansion (10 <sup>-6</sup> in/in °F)	70-200°F	6.0	6.6
	70-400°F	6.1	6.9
	70-600°F	6.3	7.1
	70-800°F	6.5	7.2

Magnetic Permeability Ferromagnetic

**MECHANICAL PROPERTIES**

Typical Values at Room Temperature - Solution Annealed 1925°F Air Cooled.

		Aging Temperature						°F
		900	925	1025	1075	1100	1150	
U.T.S.	K.S.I.	187	189	165	155	145	140	
Y.S.	K.S.I.	161	165	158	141	132	120	
Elong.	%	10	11	14	14	15	16	
R.A.	%	21	26	35	35	39	42	
Brinell	H B	412	412	350	319	315	307	
Charpy key'	ft-lbs	7	12	22	27	30	37	

Typical Values at Elevated Temperatures - Solution Annealed at 1925°F,  
Air Cooled, and Aged at 900°F

		Aging Temperature						°F
		200	400	600	700	800	900	
U.T.S.	K.S.I.	181	173	162	158	148	130	
Y.S.	K.S.I.	152	140	128	121	115	100	
Elong.	%	9	8	6	5	6	8	
R.A.	%	21	19	17	15	12	19	

**WELDABILITY**

CB-Cu7-1 may be welded by the SMAW, GTAW or GMAW processes.

Electrodes Same composition or 308

Preheat Not required for section less than 0.75" thick. Heavier sections with substantial welding may be preheated to 500°F.

Post weld heat treatment 900 to 1100°F, Air Cool.

Procedures for welding CB-Cu7-1 alloy are available from Kubota Metal Corporation

**RELATED SPECIFICATIONS**

ASTM: A747(CB7Cu-1 and CB7Cu-2).

Nearest wrought grade: 17-4PH, 15-5PH.

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