Kubota METAL CORPORATION
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ALLOY DATA SHEET **CORROSION RESISTANT ALLOY**

CA6NM

REVISION: 09/96

DESCRIPTION

CA-6NM is a hardenable Fe-Cr-Ni-Mo alloy based on the 13% chromium stainless steel alloy CA-15. Ductility, impact properties and resistance to salt water corrosion are raised by the addition of nickel and molybdenum. Castability in thick or intricate sections is better than that of the 13% chromium alloy. Similarly the alloy is more readily welded and requires lower preheat temperatures. The alloy is most generally used in the normalized and tempered condition, but variations in heat treatment are used to enhance specific properties.

COMPOSITION

	C	Mn	Si	Cr	Ni	Mo	P	S	Cu+W+V
Min %				11.5	3.5	0.4			
Max %	0.06	1.0	1.0	14.0	4.5	1.0	0.04	0.03	0.50

APPLICATIONS

Pump casings, bowls, impellers and diffusers, valve bodies, water turbine components, ships propellers, concast rolls

PRODUCT FORMS

Horizontal and vertical centrifugal castings; static castings.

PHYSICAL PROPERTIES

Density (lbs/in^3)	0.278
Liquidus(^{o}F)	2715
Solidus(^{o}F)	2670
Thermal Conductivity	14.5 @ 212^{o}F
(Btu/h/ft^2/ft/^{o}F)	16.7 @ 1000^{o}F
Thermal Expansion	6.0 @ 70-212^{o}F
(10^{-6}in/in ^{o}F)	7.0 @ 70-1000^{o}F
Magnetic Permeability	Ferromagnetic

MECHANICAL PROPERTIES (Typical Values -1950^{o}F Air Cool. Tempered 1100-1150^{o}F)

		-200	-100	70	400	600	800	1000^{o}F
U.T.S.	K.S.I.			118	104	102	90	68
Y.S.	K.S.I.			98	92	82	78	65
Elong.	%			20	18	17	16	24
R.A.	%			60	58	57	54	70
Charpy "V"	ft-lbs	30	50	58				

HARDNESS

CA-6NM hardness can be controlled through the amount of carbon used in the material and the type of heat treatment, however ductility and toughness can suffer when hardness is increased.

Carbon (%)	Max. Hardness (BHN)	
0.02	315	
0.03	327	
0.04	338	
0.05	351	
0.06	362	- standard CA-6NM carbon content
0.07	374	
0.08	387	
0.09	400	
0.10	414	
0.11	428	
0.12	443	
0.13	460	
0.14	477	
0.15	496	

WELDABILITY

CA-6NM may be welded by the SMAW or GTAW processes.

Electrodes	Same composition.
Preheat	212 to 300^{o}F
Post weld heat treatment	1100 to 1150^{o}F.

Procedures for welding CA6-NM alloy are available from Kubota Metal Corporation.

CREEP-RUPTURE PROPERTIES

Long term creep-rupture properties were extrapolated from Larson-Miller Parameter versus stress plots

		RUPTURE-STRESS-KSI			
HOURS		800	900	1000	^{o}F
100.	AVG.	-	52	28	
	MIN.	-	47.5	26	
1,000.	AVG.	>50	37	20	
	MIN.	>50	35	18	
10,000.	AVG	54	28	14	
	MIN	50	25	13	
100,000	AVG.	41	20	(10)	
	MIN.	37	18.5		

Note: Creep-rupture stresses are subject to periodic revisions as the results from long term tests become available.

RELATED SPECIFICATIONS

ASTM: A352(CA6NM), A 487(CA6NM); A743(CA-6NM), A757(E3N), UNS J91540
Nearest wrought grade: None

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