

# ALLOY DATA SHEET

## KHR48N HiSi

HEAT RESISTANT ALLOY

REVISION: 06/99

### DESCRIPTION

KHR48N Hi Si is a nickel-chromium-iron alloy with an addition of 5% tungsten, designed for high strength at elevated service temperatures. The alloy is a modification of KHR48N which is adjusted to maximize carburization resistance.

### COMPOSITION

	<u>C</u>	<u>Mn</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>	<u>W</u>	<u>P</u>	<u>S</u>
Min %	0.4		1.0	25	44	4.0	-	-
Max %	0.6	0.8	1.5	30	50	6.0	0.03	0.03

### APPLICATIONS

Radiant heater tubes and fittings, furnace rolls, steel mill skid conveyor systems, heat treatment furnace fixtures.

### PRODUCT FORMS

Horizontal and vertical centrifugal castings; static castings.

### PHYSICAL PROPERTIES

Density (lbs/in <sup>3</sup> )	0.296
Melting Solidus	2390 °F
Thermal Conductivity (Btu/h/ft <sup>2</sup> /ft/°F)	5.98 @ 212 °F 16.9 @ 2012 °F
Thermal Expansion (10 <sup>-6</sup> in/in °F)	7.92 @ 100-800 °F 8.33 @ 100-1100 °F 8.61 @ 100-1600 °F 8.75 @ 100-1800 °F

### CARBURIZATION

#### RESISTANCE

(Gas-100 hours @ 1922°F)

ALLOY	WEIGHT GAIN
GRADE	mg/mm <sup>2</sup>
H K	0.33
KHR35C	0.23
<b>KHR48N HiSi</b>	<b>0.18</b>

### MECHANICAL PROPERTIES (Typical Values)

		Centrifugal Castings				Static Castings
		70	1600	1800	2000 °F	70 °F
U.T.S.	ksi	75	32	19	11	66
Y.S.	ksi	42	-	-	-	36
El.	%	10	27	34	45	10

### SERVICE TEMPERATURE

The combination of high strength and excellent resistance to oxidation and carburization make this alloy suitable for long term service at temperatures up to 2100 °F and for shorter times and less critical loading for temperatures of 2200 °F

### WELDABILITY

KHR48N Hi Si alloy is welded by the SMAW process using filler metal of matching composition.

**CREEP-RUPTURE PROPERTIES**

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

HOURS		RUPTURE-STRESS-KSI								°F
		1500	1600	1700	1800	1900	2000	2100	2200	
100	AVG.	-	9.02	7.09	5.40	3.95	2.74	1.76	1.02	
	MIN.	-	8.65	6.75	5.09	3.67	2.50	1.57	0.88	
1,000	AVG.	9.25	7.21	5.43	3.91	2.66	1.66	0.93	0.45	
	MIN.	8.87	6.86	5.12	3.64	2.43	1.48	0.80	0.38	
10,000	AVG.	7.49	5.61	4.00	2.68	1.64	0.88	0.41	0.23	
	MIN.	7.14	5.29	3.72	2.44	1.46	0.76	0.35	0.22	
100,000	AVG.	5.93	4.21	2.80	1.69	0.89	0.40	0.23	-	
	MIN.	5.60	3.93	2.56	1.51	0.77	0.34	0.22	-	

% / HOUR		CREEP-STRESS-KSI								°F
		1500	1600	1700	1800	1900	2000	2100	2200	
0.001	AVG.	8.3	5.93	4.23	3.03	2.18	1.39	0.89	0.57	
0.0001	AVG.	6.5	4.6	3.23	2.28	1.49	0.93	0.59	-	

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

**HEAD OFFICE, FOUNDRY & INTERNATIONAL SALES**  
**Kubota Metal Corporation, Fahramet Division**  
 25 Commerce Road, P.O. Box 1700,  
 Orillia, Ontario, Canada, L3V 6L6.  
 Phone (705) 325-2781  
 Fax (705) 325 5887