

ALLOY DATA SHEET

KHR35H-HiSi

HEATRESISTANTALLOY

REVISION: 12/95

DESCRIPTION

KHR35H HiSi is an HP base composition modified by an addition of molybdenum to increase long term creep strength. The alloy's oxidation resistance and creep strength are higher than the niobium modified KHR35C HiSi, but its rupture strength is lower. This modification is particularly suited to resist carburizing environments and consequently it is produced with high silicon to enhance this property. The alloy is also produced in a low silicon version, KHR35H, for service in non carburizing atmospheres.

COMPOSITION

	<u>C</u>	<u>Mn</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>	<u>Mo</u>	<u>P</u>	<u>S</u>
Min %	0.37		1.5	24	34	1.0	-	-
Max %	0.47	1.5	2.0	28	37	1.5	<.03	<.03

APPLICATIONS

Ethylene pyrolysis coils and fittings, radiant heaters.

PRODUCT FORMS

Horizontal and vertical centrifugal castings; static castings; formed fittings and sweeps.

PHYSICAL PROPERTIES

Density (lbs/in ³)	0.291
Melting Solidus	2360 °F
Thermal Conductivity (Btu ft/ft ² hr °F)	6.6 @ 212 °F
	14.6 @ 1600 °F
	16.7 @ 1800 °F
Thermal Expansion (x 10 ⁻⁶ in/in °F)	8.8 @ 70-1472 °F
	9.0 @ 70-1652 °F
	9.2 @ 70-1832 °F

CARBURIZATION

RESISTANCE

(Pack-Cyclic tests @ 1560-2100 °F)

Alloy	Wt Gain %
Grade	%
KHR35H Hi-Si	22.6
KHR35C Hi Si	22.7
KHR35CW	20.35
KHR45A	7.5

MECHANICAL PROPERTIES

		Typical Values Centrifugal Castings			Minimum Values
		1700	1800	2000 °F	
U.T.S.	K.S.I.	20	15	70 °F	
Y.S.	K.S.I.	11	9	63.8	
El.	%	45	50	34.0	
				8 (c.c.)	
				6 (Static)	

SERVICE TEMPERATURE

The alloy is suitable for long term service at temperatures up to 2000 °F.

WELDABILITY

Procedures for welding KHR35H HiSi are available from Kubota Metal Corporation.

CREEP-RUPTURE PROPERTIES

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

<u>HOURS</u>		<u>RUPTURE-STRESS-KSI</u>							°F
		<u>1400</u>	<u>1500</u>	<u>1600</u>	<u>1700</u>	<u>1800</u>	<u>1900</u>	<u>2000</u>	
100	AVG	-	-	10.03	7.46	5.38	3.75	2.50	
	MIN	-	-	8.66	6.45	4.66	3.24	2.16	
1,000	AVG	-	10.35	7.61	5.42	3.71	2.42	1.50	
	MIN	-	8.92	6.58	4.32	3.21	2.09	1.28	
10,000	AVG	10.94	7.98	5.62	3.80	2.44	1.48	0.84	
	MIN	9.43	6.90	4.87	3.29	2.10	1.26	0.71	
100,000	AVG	8.59	6.01	4.03	2.56	1.52	0.85	0.46	
	MIN	7.42	5.20	3.49	2.21	1.30	0.72	0.39	

<u>%/HOUR</u>		<u>CREEP-STRESS-KSI</u>							°F
		<u>1400</u>	<u>1500</u>	<u>1600</u>	<u>1700</u>	<u>1800</u>	<u>1900</u>	<u>2000</u>	
0.0001	AVG.					3.12	1.74	1.07	

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

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