

ALLOY DATA SHEET KHR35CW

HEAT RESISTANT ALLOY

REVISION: 10/96

DESCRIPTION

Additions of tungsten and molybdenum to KHR35C base alloy are used to further increase carburization resistance in service at temperatures up to 2000 °F.

COMPOSITION

	<u>C</u>	<u>Mn</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>	<u>Nb</u>	<u>P</u>	<u>S</u>	<u>W</u>	<u>Mo</u>	<u>Nb+W+Mo</u>
Min %	0.4			24	34	1.1	-	-	0.5	0.3	
Max %	0.5	1.5	2.0	28	37	1.7	<.03	<.03	1.5	0.8	3.0

APPLICATIONS

Ethylene pyrolysis coils and fittings.

PRODUCT FORMS

Horizontal and vertical centrifugal castings; static castings.

PHYSICAL PROPERTIES

Density (lbs/in ³)	0.291
Melting Point(°F)	2460 °F
Thermal Conductivity (Btu/h/ft ² /ft/°F)	6.6 @ 212°F
	14.6 @ 1600°F
	16.7 @ 1800°F
Thermal Expansion (10 ⁻⁶ in/in °F)	9.5 @ 68-1652 °F
	9.7 @ 68-1832°F

CARBURIZATION

RESISTANCE

(Pack-cyclic tests @ 1560-2100 °F)

Alloy Wt Gain

Grade %

KHR35CL 23.81

KHR35C Hi-Si 22.7

KHR35CW 20.35

KHR45A 7.5

MECHANICAL PROPERTIES (Typical Values)

		Centrifugal Castings					Static	Minimum Values
		70	1400	1600	1800	2000 °F	70 °F	70 °F
U.T.S.	K.S.I.	75	46	29	16	10	68	64
Y.S.	K.S.I.	40	23	16	9	6.5	38	34
El.	%	11	26	40	50	60	10	8 (c.c.), 6 (St)

SERVICE TEMPERATURE

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

WELDABILITY

Procedures for welding KHR35CW 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>	<u>2100</u>	
1,000.	AVG.	-	9.6	7.32	5.33	3.77	2.42	1.54	0.85	
	MIN.	-	8.53	6.40	4.69	3.27	2.13	1.31	0.76	
10,000.	AVG.	9.96	7.61	5.47	3.77	2.49	1.49	0.82	0.43	
	MIN.	8.75	6.68	4.84	3.34	2.18	1.29	0.71	0.37	
100,000	AVG.	8.18	5.90	3.98	2.56	1.56	0.85	0.43		
	MIN.	7.18	5.19	3.56	2.25	1.33	0.74	0.37		

<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.				3.2	2.0	1.3	0.78	

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

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