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ALLOY DATA SHEET
HT

HEAT RESISTANT ALLOY

REVISION : 08/95

DESCRIPTION

HT alloy is an austenitic 17-35 Cr-Ni-Fe heat resisting steel. It has good long term resistance to oxidation, carburization and thermal cycling at temperatures up to 2000 °F or to 2100 °F for shorter times. This alloy is widely used for fixtures and components in heat treatment equipment.

COMPOSITION

	C	Mn	Si	Cr	Ni	Mo	P	S
Min %	0.40	0.35	0.35	15	33	-	-	-
Max %	0.50	2.0	2.0	19	37	0.5	0.04	0.04

APPLICATIONS

Heat treatment furnace conveyor belts, trays and fixtures, resistor grids, radiant heater assemblies, rails, fan blades, dampers, feed screws, burner nozzles and tube supports.

PRODUCT FORMS

Horizontal and vertical centrifugal castings; static castings.

PHYSICAL PROPERTIES

Density (lbs/in^3)	0.286	
Melting Point(°F)	2450	
Thermal Conductivity	7.0	@ 212°F
(Btu/h/ft^2/ft/°F)	14.0	@ 1600°F
	15.3	@ 1800°F
Thermal Expansion	9.6	@ 70-1600°F
(10^{-6}in/in °F)	9.8	@ 70-1800°F
	10.0	@ 70-2000°F

CARBURIZATION RESISTANCE

(Gas-1064 hours @ 1760°F)

ALLOY GRADE	WEIGHT GAIN mg/mm^2
H H	0.58
H K	0.56
H T	**0.38**
H U	0.24

MECHANICAL PROPERTIES

		Typical Values - Static Castings					ASTM A297
		70	1400	1600	1800	2000 °F	70 °F
U.T.S.	K.S.I.	71	35	19	11	6	65 Min.
Y.S.	K.S.I.	40	26	15	8	-	
El.	%	13	10	26	28	-	4 Min.

SERVICE TEMPERATURE

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

COMPARATIVE OXIDATION RATES (mm / year)
(500 hour cyclic tests)

GRADE	1832	1922	2012	2102 °F
H H	<0.1	0.22	0.92	3.9
H T	**0.2**	**0.54**	**1.4**	**3.2**
H U	0.1	0.24	0.54	1.0

WELDABILITY

HT alloy has good weldability by the SMAW, GTAW and GMAW processes.

CREEP-RUPTURE PROPERTIES

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

RUPTURE-STRESS-KSI

HOURS		1400	1500	1600	1700	1800	1900	2000	2100	°F
100.	AVG.			8.6	6.7	5.1	3.55	2.15	1.23	
	MIN.			7.8	6.1	4.7	3.1	1.9	1.2	
1,000.	AVG.		8.45	6.45	4.8	3.1	1.9	1.13	0.66	
	MIN.		7.7	5.9	4.4	2.7	1.7	1.0	0.6	
10,000.	AVG.	8.6	6.45	4.7	2.95	1.71	1.0	0.57		
	MIN.	7.75	5.95	4.3	2.6	1.52	0.9	0.52		
100,000	AVG.	6.58	4.75	2.92	1.66	0.93	0.52			
	MIN.	6.0	4.4	2.55	1.47	0.84	0.48			

CREEP-STRESS-KSI

%/HOUR		1400	1500	1600	1700	1800	1900	2000	2100	°F
0.01	AVG.	11.0	9.55	8.0	6.35	4.4	2.65	1.36	0.69	
0.001	AVG.	9.95	8.3	6.55	4.65	2.68	1.4	0.71		
0.0001	AVG.	8.8	7.0	5.0	3.0	1.5	0.73	0.3		

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

RELATED SPECIFICATIONS

ASTM: A 297 (HT); A 351 (HT30); A608 (HT50)

Nearest wrought grade: AISI 330 - The composition of the wrought grade differs from that of the cast alloy and has different properties. The cast alloy designation should always be used to identify castings.

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