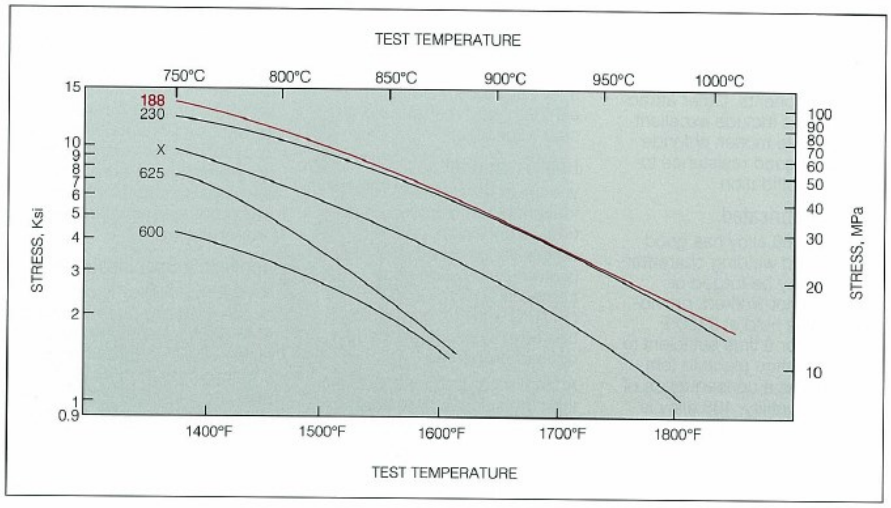
HAYNES® 188 alloy

Creep and Stress-Rupture Strength

HAYNES 188 alloy is a solid-solution- strengthened material which combines excellent high-temperature strength with good fabricability at room temperature. It is particularly effective for very long-term applications at temperatures of 1200°F (650°C) or more. It is stronger than nickel-base solid-solution-strengthened alloys, and far stronger than simple nickel chromium or iron-nickel-chromium heat-resistant alloys. This can allow for significant section thickness reduction when it is substituted for these materials.

Comparision of Sheet Materials: Stress to Produce 1% Creep in 1000 Hours



188 Plate, Solution-Annealed

Temperature		Creep	Approximate Initial Stress to Produce Specified Creep in							
			10 h		100 h		1,000 h		10,000 h	
°F	°C	%	ksi	MPa	ksi	MPa	ksi	MPa	ksi	MPa
1200	649	0.5	--	--	--	--	--	--	--	--
		1	--	--	--	--	35*	241*	--	--
		R	--	--	78	538	59	407	45*	310*
1300	704	0.5	41	283	28	193	18*	124*	--	--
		1	44	303	31.5	217	22	152	--	--
		R	73*	503*	54	372	40	276	28	193
1400	760	0.5	26	179	17	117	11.5	79	--	--
		1	29	200	20.5	141	14.5*	100*	--	--
		R	51	352	37	255	26	179	18.5*	128*
1500	816	0.5	16	110	11.0	76	7.7*	53*	--	--
		1	19	131	13.5	93	9.3	64	--	--
		R	36	248	25	172	17.5	121	12.0	83
1600	871	0.5	11.5	79	7.5	52	5.5*	38*	--	--
		1	13.0	90	9.0	62	6.4*	44*	--	--
		R	25	172	17.0	117	11.6	80	7.8	54
		0.5	8.0	55	5.2	36	3.6*	25*	--	--

1700	927	1	9.2	63	6.0	41	4.3*	30*	--	--
		R	16.5	114	11.1	77	7.3	50	4.5*	31*
1800	982	0.5	5.6	39	3.6	25	2.3	16	1.35	9.3
		1	6.3	43	4.2	29	2.5	17	1.42	9.8
		R	11.5	79	7.0	48	4.0	28	2.2*	15*
1900	1038	0.5	3.7	26	2.3*	16*	--	--	--	--
		1	4.2	29	2.5*	17*	--	--	--	--
		R	7.2*	50*	4.4	30	2.2*	15*	--	--
2000	1093	0.5	2.3	16	1.35	9.3	--	--	--	--
		1	2.6	18	1.42	9.8	--	--	--	--
		R	4.7	32	2.3	16	1.10*	7.6*	--	--

*Significant extrapolation

188 Sheet, Solution-Annealed

Temperature		Creep	Approximate Initial Stress to Produce Specified Creep in					
			10 h		100 h		1,000 h	
°F	°C	%	ksi	MPa	ksi	MPa	ksi	MPa
1400	760	0.5	22.5	155	16.4	113	11.7	81
		1	25.5	176	18.5	128	13.3	92
		R	43.0*	296*	32.0	221	23.0	159
1500	816	0.5	15.5	107	11.1	77	7.8	54
		1	17.6	121	12.6	87	8.8	61
		R	31.0	214	21.7	150	15.0	103
1600	871	0.5	10.7	74	7.5	52	5.0	34
		1	12.2	84	8.4	58	5.7	39
		R	21.0	145	14.4	99	9.4	65
1700	927	0.5	7.3	50	4.9	34	3.1	21
		1	8.2	57	5.6	39	3.6	25
		R	14.3	99	9.1	63	5.5*	38*
1800	982	0.5	4.9	34	3.1	21	1.8	12
		1	5.6	39	3.6	25	2.1	14
		R	9.1	63	5.4	37	3.0	21
1900	1038	0.5	3.1	21	1.9	13	1.2	8.3
		1	3.6	25	2.2	15	1.4	9.7
		R	5.5	38	3.2	22	2.0	14
2000	1093	0.5	2.0*	14*	1.2	8.3	0.70	4.8
		1	2.3*	16*	1.4	9.7	0.90	6.2
		R	3.3*	23*	2.0	14	1.2	8.3

*Significant extrapolation