

HAYNES<sup>®</sup> HR-160<sup>®</sup> alloy

Creep and Stress-Rupture Strengths

Plate- 2050°F (1121°C) Solution-anneal

Test Temperature			Approximate Initial Stress to Produce Specified Creep in:							
			100 h		1000 h		10,000 h		100,000 h	
°F	°C	%	ksi	MPa	ksi	MPa	ksi	MPa	ksi	MPa
1100	593	1.0	29.4	203	20.4	141	14.4*	100	-	-
-	-	Rupture	45.5	315	32.2	223	22.9	158	16.3	133
1200	649	1.0	18.9	131	12.1	91	9.3*	64	-	-
-	-	Rupture	32.2	223	22.4	154	15.6	108	11.0	76
1300	704	1.0	12.5	86	8.7	60	6.2*	43	-	-
-	-	Rupture	22.9	158	15.7	108	10.8	75	7.4	51
1400	760	1.0	8.5	59	6.0	41	4.2*	29	-	-
-	-	Rupture	16.4	113	11.0	76	7.4	51	5.0	34
1500	816	1.0	5.9	41	4.1	28	2.9*	20	-	-
-	-	Rupture	11.7	81	7.7	53	5.1	35	3.4	23
1600	871	1.0	4.2	29	2.9	20	2.1*	14	-	-
-	-	Rupture	8.4	58	5.5	38	3.6	25	2.4	17
1700	927	1.0	3.0	21	2.1	14	1.5*	10	-	-
-	-	Rupture	6.1	42	3.9	27	2.5	17	1.6	11
1800	982	1.0	2.2	15	1.5	10	1.1*	8	-	-
-	-	Rupture	4.4	30	2.8	19	1.8	12	1.2	8

\*Extrapolation

Sheet, Solution-annealed

Temperature			Approximate Initial Stress to Produce Specified Creep in			
			100 Hours		1,000 Hours	
°F	°C	%	ksi	MPa	ksi	MPa
1200	649	0.5	16	110	12.5	86
		1	18.5	128	15	103
		R	28	193	20	138
1300 <sup>†</sup>	704	0.5	11.5	79	9.2	63
		1	13.9	96	10.8	74
		R	19	131	14.5	100
1400	760	0.5	8.5	59	6.8*	47*
		1	9.9	68	8.2*	57*
		R	13	90	9.9	68
1500	816	0.5	6.2	43	4.9*	34*
		1	8.2	57	6.0*	41*
		R	9.6	66	7.9	54
		0.5	4.7	32	3.4*	23*

1600	871	1	5.2	36	4.3*	30*
		R	6.8	47	5.1	35
1700	927	0.5	3.2	22	2.1*	14*
		1	3.6	25	2.7*	19*
		R	4.6	32	3.2	22
1800	982	0.5	2.1	14	1.2	8.3
		1	2.7	19	1.6	11
		R	3.5	24	2.6	18

\*Significant extrapolation

† Values obtained using Larson-Miller interpolation

### Comparative Stress-Rupture Strengths

Test Temperature		10,000 Hour Rupture Strengths (ksi*)							
°F	°C	HR-160 <sup>®</sup>	RA333 <sup>®</sup>	800HT	RA330 <sup>®</sup>	253 MA	RA85H	309	310
1200	649	15.6	16.5	17.5	11.0	14.0	12.0	16.0	9.3
1300	704	10.8	12.0	11.0	-	8.5	-	-	-
1400	760	7.4	9.2	7.3	4.3	5.2	5.0	5.45	3.9
1500	816	5.1	5.7	5.2	-	3.75	-	-	-
1600	871	3.6	3.1	3.5	1.7	2.5	2.1	1.86	1.65
1700	927	2.5	1.8	1.9	-	1.65	-	-	-
1800	982	1.8	1.05	1.2	0.63	1.15	0.9	0.63	0.69

Test Temperature		100,000 Hour Rupture Strengths (ksi*)							
°F	°C	HR-160 <sup>®**</sup>	RA333 <sup>®</sup>	800HT	RA330 <sup>®</sup>	253 MA	RA85H	309	310
1200	649	11.0	11.5	13.0	7.6	8.7	8.0	11.6	6.5
1300	704	7.4	8.4	8.0	-	4.6	-	-	-
1400	760	5.0	6.5	5.3	2.7	3.9	3.2	3.8	2.6
1500	816	3.4	3.7	3.7	-	2.1	-	-	-
1600	871	2.4	1.9	2.5	1.0	1.45	1.3	1.25	1.06
1700	927	1.6	1.05	1.2	-	0.97	-	-	-
1800	982	1.2	0.58	0.8	0.33	0.7	0.5	0.41	0.42

\*ksi can be converted to MPa (megapascals) by multiplying 6.895.

\*\*Extrapolation.