HAYNES® 282® alloy (Single-Step Age-hardening Treatment)

Principal Features

HAYNES® 282® alloy (UNS N07208) is a wrought, gamma-prime strengthened superalloy developed for high temperature structural applications. It possesses a unique combination of creep strength, thermal stability, weldability, and fabricability not found in currently available commercial alloys. The excellent creep strength in the temperature range of 1200 to 1700°F (649 to 927°C) surpasses that of Waspaloy alloy, and approaches R-41 alloy without sacrificing weldability.

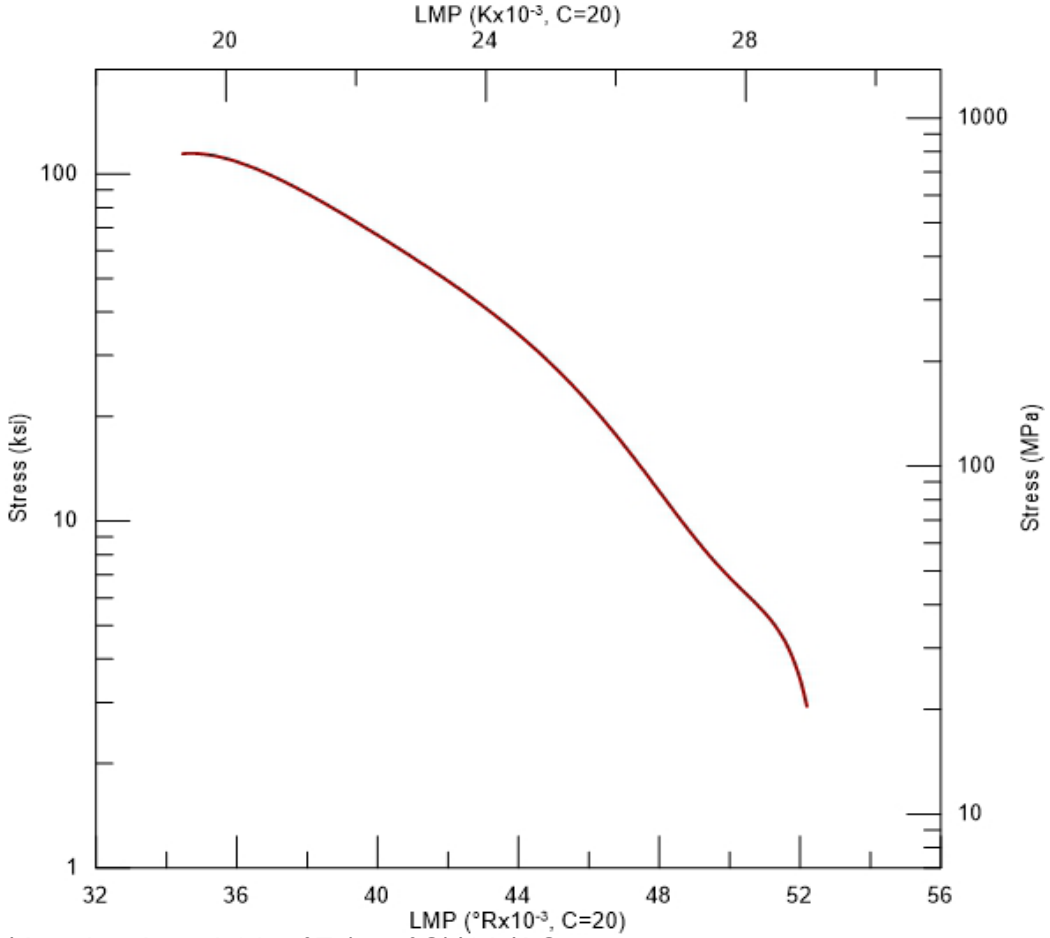
For use in Advanced-Ultra Super Critical (A-USC), Supercritical CO_2, and other ASME Boiler Code applications, a single-step age-hardening treatment has been developed, which is covered by ASME Code Case 3024 and consists of heating to 1472°F (800°C) for four hours and water quenching or rapid air cooling. Characteristics of the single-step age-hardened 282® alloy for A-USC boiler code applications are provided in this brochure.

Nominal Composition

	Weight %
Nickel:	Balance
Chromium:	20
Cobalt:	10
Molybdenum:	8.5
Titanium:	2.1
Aluminum:	1.5
Iron:	1.5 max.
Manganese:	0.3 max.
Silicon:	0.15 max.
Carbon:	0.06
Boron:	0.005

Creep and Stress-Rupture Strength

Larson-Miller Plot (Rupture) of Single-Step Age-hardened HAYNES® 282® alloy*
Temperature Range 1100 to 1700°F (593 to 927°C)



*Age-hardened 1472°F (800°C)/4 h/AC

Creep-Rupture Properties of Single-Step Age-hardened HAYNES® 282® alloy*

Test Temperature		Approximate Initial Stress to Produce Rupture in:			
		100 h		1,000 h	
°F	°C	ksi	MPa	ksi	MPa
1200	649	104	715	86	591
1300	704	80	550	62	428
1400	760	58	401	43	298
1500	816	41	280	27	189
1600	871	26	179	15	102
1700	927	14	97	7	51

*Age-hardened 1472°F (800°C)/4 h/AC

Tensile Properties

Average Tensile Properties of HAYNES® 282® alloy* Plate

Temperature		0.2% Yield Strength		Ultimate Tensile Strength		Elongation
°F	°C	ksi	MPa	ksi	MPa	%
RT	RT	106.3	733	169.7	1170	34
200	93	99.7	687	163.3	1126	34
400	204	95.0	655	158.7	1094	35
600	316	92.7	639	152.7	1053	35
800	427	91.7	632	147.0	1014	36
1000	538	90.3	623	143.7	991	35
1200	649	89.7	618	147.7	1018	29
1300	704	90.0	621	137.3	947	22
1400	760	89.7	648	121.7	839	16
1500	816	81.3	561	102.7	708	15
1600	871	72.3	499	85.0	586	20
1700	927	46.3	319	55.3	382	40

*Age-hardened 1472°F (800°C)/4 h/AC

Average Tensile Properties of HAYNES® 282® alloy* Plate – Metric Units [INTERPOLATED]

Temperature (°C)	0.2% Yield Strength (MPa)	Ultimate Tensile Strength (MPa)	Elongation (%)
RT	733	1170	34
100	684	1123	34
200	655	1095	35
300	640	1060	35
400	639	1021	36
500	628	998	36
600	626	1002	32
700	620	952	23
800	577	745	16
900	406	480	30

*Age-hardened 800°C/4 h/AC

Average Tensile Properties of HAYNES® 282® alloy* Tube

Temperature		0.2% Yield Strength		Ultimate Tensile Strength		Elongation
°F	°C	ksi	MPa	ksi	MPa	%
RT	RT	103.2	712	162.1	1118	33
1400	760	93.2	643	117.0	806	13

*Age-hardened 1472°F (800°C)/4 h/AC

Hardness

Average Room Temperature Hardness of HAYNES® 282® alloy

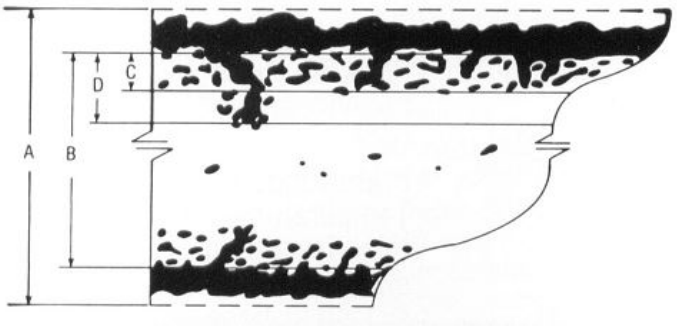
Form	Mill Annealed	Age-Hardened*
Sheet	91 HRBW	32 HRC
Plate	94 HRBW	31 HRC
Bar	88 HRBW	35 HRC

*Age-hardened 1472°F (800°C)/4 h/AC

Oxidation Resistance

Static Oxidation Testing

Metal Loss = (A-B)/2
Avg. Internal Penetration = C
Max. Internal Penetration = D
Avg. Metal Affected = Metal Loss + Avg. Internal Pen.
Max. Metal Affected = Metal Loss + Max. Internal Pen.
Environment: Flowing Air
Test Length: 1008 hours
No. Cycles: 6
Cycle Length: 168 h
Temperatures: 1600, 1700, 1800°F (871, 927, 982°C)



1600°F (871°C)

Alloy	Metal Loss		Average Internal Penetration		Maximum Internal Penetration		Average Metal Affected		Maximum Metal Affected	
	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm
282® alloy	0.2	5	0.4	10	1.2	30	0.6	15	1.4	35
R-41 alloy	0.2	5	0.6	15	1.1	28	0.8	20	1.3	33
Waspaloy alloy	0.3	8	1.1	28	1.4	36	1.4	36	1.7	44
263 alloy	0.1	3	0.3	8	1.7	43	0.4	11	1.8	46

1700°F (927°C)

Alloy	Metal Loss		Average Internal Penetration		Maximum Internal Penetration		Average Metal Affected		Maximum Metal Affected	
	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm
282® alloy	0.1	3	1	25	1.8	46	1.1	28	1.9	49
R-41 alloy	0.2	5	1.3	33	1.6	41	1.5	38	1.8	46
Waspaloy alloy	0.3	8	3.1	79	3.4	86	3.4	86	3.7	94
263 alloy	0.2	5	0.6	15	2.9	74	0.8	20	3.1	79

1800°F (982°C)

Alloy	Metal Loss		Average Internal Penetration		Maximum Internal Penetration		Average Metal Affected		Maximum Metal Affected	
	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm
282® alloy	0.2	5	1.6	41	2.1	53	1.8	46	2.3	58
R-41 alloy	0.2	5	2.7	69	3.1	79	2.9	74	3.3	84
Waspaloy alloy	0.9	23	4.3	109	4.9	124	5.2	132	5.8	147
263 alloy	1.1	28	3.2	81	4.8	122	4.3	109	5.9	150

Thermal Stability

Room Temperature Tensile Properties of Thermally Exposed 282® alloy* (Sheet)

Exposure Temperature		Exposure Duration	0.2% Yield Strength		Ultimate Tensile Strength		Elongation
°F	°C	h	ksi	MPa	ksi	MPa	%
RT	RT	0	109	752	169	1165	32
1200	649	100	113	779	174	1200	32
1200	649	1000	113	779	174	1200	27
1200	649	4000	123	848	181	1248	26
1200	649	10,000	124	855	182	1255	19
1200	649	16,000	122	841	182	1255	20
1400	760	100	95	655	176	1213	28
1400	760	1000	109	752	177	1220	21
1400	760	4000	105	724	170	1172	16
1400	760	10,000	105	724	165	1138	12
1400	760	16,000	122	841	160	1103	12
1600	871	100	87	600	164	1131	34
1600	871	1000	78	538	159	1096	32
1600	871	4000	72	496	150	1034	32
1600	871	10,000	39	269	140	965	26
1600	871	16,000	66	455	142	979	35

*Thermal exposure was applied to samples in the age-hardened condition (1472°F (800°C)/4 h/AC)

Comparative 1600°F (871°C) Thermal Stability Data of Several HAYNES® Gamma-Prime Strengthened alloys (Sheet)

Room Temperature Tensile Data – Exposed* at 1600°F (871°C) for 1000 hours

Alloy	0.2% Yield Strength**		Ultimate Tensile Strength**		Elongation**
	ksi	MPa	ksi	MPa	%
263 alloy	55	379	125	863	41
282® alloy	87	600	159	1096	32
Waspaloy alloy	81	561	141	972	13
R-41 alloy	102	704	151	1046	3

*Thermal exposure was applied to samples in the age-hardened condition (*263 alloy:* 1472°F (800°C)/8h/AC, *Waspaloy alloy:* 1825°F (996°C)/2h/AC + 1550°F (843°C)/4h/AC + 1400°F (760°C)/16h/AC, *R-41 alloy:* 1650°F (900°C)/4h/AC, *282® alloy:* 1472°F (800°C)/4 h/AC

**Average of 2 tests

Physical Properties

Physical Property	British Units		Metric Units	
Density (mill annealed)	0.299 lb/in^3		8.27 g/cm^3	
Density (age-hardened*)	0.300 lb/in^3		8.30 g/cm^3	
Melting Range	2370-2510°F		1300-1375°C	
Gamma-Prime Solvus	1827°F		997°C	
Specific Heat	RT	0.101 BTU/lb-°F	RT	435 J/kg-°C
	200°F	0.108 BTU/lb-°F	100°C	452 J/kg-°C
	300°F	0.111 BTU/lb-°F	200°C	473 J/kg-°C
	400°F	0.114 BTU/lb-°F	300°C	494 J/kg-°C
	500°F	0.116 BTU/lb-°F	400°C	507 J/kg-°C
	600°F	0.118 BTU/lb-°F	500°C	519 J/kg-°C
	700°F	0.120 BTU/lb-°F	600°C	557 J/kg-°C
	800°F	0.122 BTU/lb-°F	700°C	594 J/kg-°C
	900°F	0.124 BTU/lb-°F	800°C	674 J/kg-°C
	1000°F	0.125 BTU/lb-°F	900°C	755 J/kg-°C
	1100°F	0.131 BTU/lb-°F	1000°C	699 J/kg-°C
	1200°F	0.145 BTU/lb-°F	1100°C	666 J/kg-°C
	1300°F	0.143 BTU/lb-°F	-	-
	1400°F	0.145 BTU/lb-°F	-	-
	1500°F	0.170 BTU/lb-°F	-	-
	1600°F	0.176 BTU/lb-°F	-	-
	1700°F	0.185 BTU/lb-°F	-	-
	1800°F	0.199 BTU/lb-°F	-	-
	1900°F	0.158 BTU/lb-°F	-	-
	2000°F	0.161 BTU/lb-°F	-	-

Physical Properties Continued

Physical Property	British Units		Metric Units	
Thermal Conductivity	RT	5.9 BTU/ft-hr-°F	RT	0.037 W/m-°C
	200°F	6.6 BTU/ft-hr-°F	100°C	0.042 W/m-°C
	300°F	7.2 BTU/ft-hr-°F	200°C	0.049 W/m-°C
	400°F	7.7 BTU/ft-hr-°F	300°C	0.054 W/m-°C
	500°F	8.2 BTU/ft-hr-°F	400°C	0.060 W/m-°C
	600°F	8.7 BTU/ft-hr-°F	500°C	0.065 W/m-°C
	700°F	9.2 BTU/ft-hr-°F	600°C	0.071 W/m-°C
	800°F	9.6 BTU/ft-hr-°F	700°C	0.076 W/m-°C
	900°F	10.1 BTU/ft-hr-°F	800°C	0.079 W/m-°C
	1000°F	10.6 BTU/ft-hr-°F	900°C	0.081 W/m-°C
	1100°F	11.1 BTU/ft-hr-°F	1000°C	0.082 W/m-°C
	1200°F	11.6 BTU/ft-hr-°F	1100°C	0.088 W/m-°C
	1300°F	12.1 BTU/ft-hr-°F	-	-
	1400°F	12.5 BTU/ft-hr-°F	-	-
	1500°F	12.7 BTU/ft-hr-°F	-	-
	1600°F	12.8 BTU/ft-hr-°F	-	-
	1700°F	12.8 BTU/ft-hr-°F	-	-
	1800°F	12.9 BTU/ft-hr-°F	-	-
	1900°F	13.1 BTU/ft-hr-°F	-	-
	2000°F	13.8 BTU/ft-hr-°F	-	-
Thermal Diffusivity	RT	0.111 ft²/h	RT	0.0286 cm²/s
	200°F	0.119 ft²/h	100°C	0.0309 cm²/s
	300°F	0.125 ft²/h	200°C	0.0339 cm²/s
	400°F	0.131 ft²/h	300°C	0.0365 cm²/s
	500°F	0.138 ft²/h	400°C	0.039 cm²/s
	600°F	0.144 ft²/h	500°C	0.0417 cm²/s
	700°F	0.148 ft²/h	600°C	0.0444 cm²/s
	800°F	0.154 ft²/h	700°C	0.0468 cm²/s
	900°F	0.160 ft²/h	800°C	0.0481 cm²/s
	1000°F	0.165 ft²/h	900°C	0.048 cm²/s
	1100°F	0.171 ft²/h	1000°C	0.0477 cm²/s
	1200°F	0.175 ft²/h	1100°C	0.0508 cm²/s
	1300°F	0.182 ft²/h	-	-
	1400°F	0.190 ft²/h	-	-
	1500°F	0.187 ft²/h	-	-
	1600°F	0.182 ft²/h	-	-
	1700°F	0.185 ft²/h	-	-
	1800°F	0.186 ft²/h	-	-
	1900°F	0.186 ft²/h	-	-
	2000°F	0.195 ft²/h	-	-

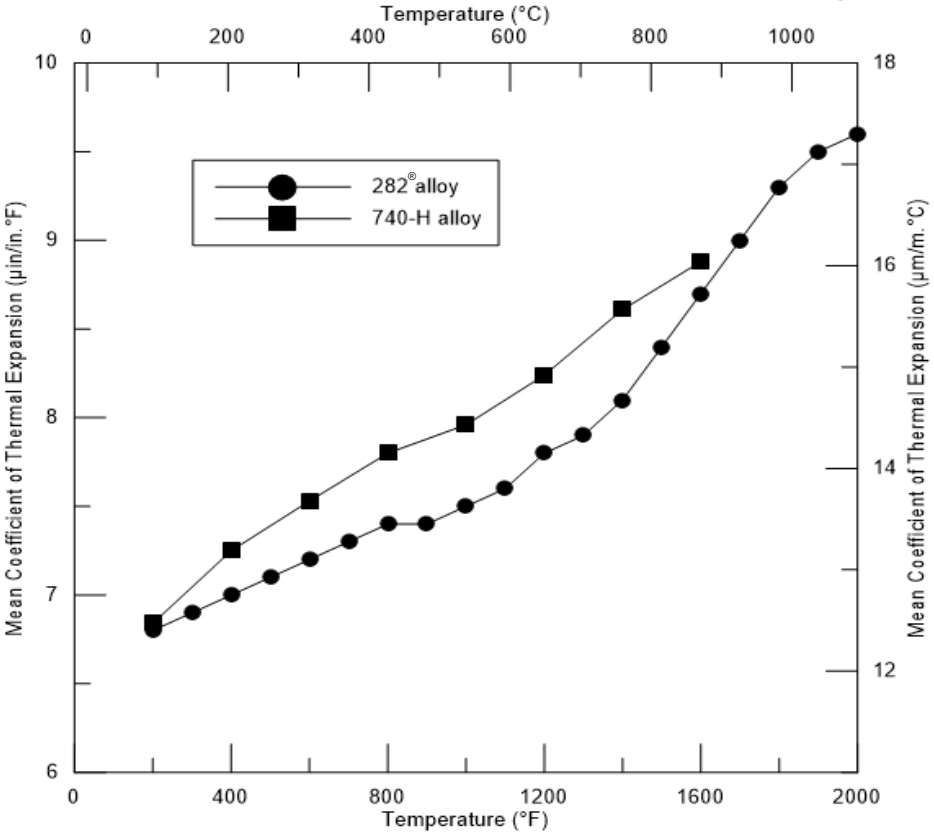
Physical Properties Continued

Physical Property	British Units		Metric Units	
Electrical Resistivity	RT	49.6 microhms-in	RT	126 microhms-cm
	200°F	50.3 microhms-in	100°C	127 microhms-cm
	300°F	50.7 microhms-in	200°C	129 microhms-cm
	400°F	51.2 microhms-in	300°C	131 microhms-cm
	500°F	51.6 microhms-in	400°C	132 microhms-cm
	600°F	51.9 microhms-in	500°C	134 microhms-cm
	700°F	52.3 microhms-in	600°C	136 microhms-cm
	800°F	52.6 microhms-in	700°C	136 microhms-cm
	900°F	52.9 microhms-in	800°C	135 microhms-cm
	1000°F	53.4 microhms-in	900°C	134 microhms-cm
	1100°F	53.6 microhms-in	1000°C	132 microhms-cm
	1200°F	53.4 microhms-in	1100°C	130 microhms-cm
	1300°F	53.3 microhms-in	-	-
	1400°F	53.2 microhms-in	-	-
	1500°F	53.0 microhms-in	-	-
	1600°F	52.6 microhms-in	-	-
	1700°F	52.1 microhms-in	-	-
	1800°F	51.5 microhms-in	-	-
	1900°F	51.2 microhms-in	-	-
	2000°F	51.3 microhms-in	-	-
Mean Coefficient of Thermal Expansion	RT	-	RT	-
	200°F	6.8 µin/in-°F	100°C	12.3 µm/m-°C
	300°F	6.9 µin/in-°F	200°C	12.6 µm/m-°C
	400°F	7.0 µin/in-°F	300°C	12.9 µm/m-°C
	500°F	7.1 µin/in-°F	400°C	13.2 µm/m-°C
	600°F	7.2 µin/in-°F	500°C	13.5 µm/m-°C
	700°F	7.3 µin/in-°F	600°C	13.8 µm/m-°C
	800°F	7.4 µin/in-°F	700°C	14.3 µm/m-°C
	900°F	7.4 µin/in-°F	800°C	15.0 µm/m-°C
	1000°F	7.5 µin/in-°F	900°C	16.0 µm/m-°C
	1100°F	7.6 µin/in-°F	1000°C	17.0 µm/m-°C
	1200°F	7.8 µin/in-°F	1100°C	17.3 µm/m-°C
	1300°F	7.9 µin/in-°F	-	-
	1400°F	8.1 µin/in-°F	-	-
	1500°F	8.4 µin/in-°F	-	-
	1600°F	8.7 µin/in-°F	-	-
	1700°F	9.0 µin/in-°F	-	-
	1800°F	9.3 µin/in-°F	-	-
	1900°F	9.5 µin/in-°F	-	-
	2000°F	9.6 µin/in-°F	-	-

Physical Properties Continued

Physical Property	British Units		Metric Units	
Dynamic Modulus of Elasticity (Young's Modulus)	RT	31.6 msi	RT	218 GPa
	200°F	31.0 msi	100°C	214 GPa
	300°F	30.6 msi	200°C	208 GPa
	400°F	30.1 msi	300°C	202 GPa
	500°F	29.6 msi	400°C	196 GPa
	600°F	29.2 msi	500°C	189 GPa
	700°F	28.7 msi	600°C	182 GPa
	800°F	28.1 msi	700°C	172 GPa
	900°F	27.6 msi	800°C	161 GPa
	1000°F	27.0 msi	900°C	148 GPa
	1100°F	26.3 msi	1000°C	132 GPa
	1200°F	25.6 msi	1100°C	114 GPa
	1300°F	24.8 msi	-	-
	1400°F	23.9 msi	-	-
	1500°F	23.0 msi	-	-
	1600°F	22.0 msi	-	-
	1700°F	20.9 msi	-	-
	1800°F	19.7 msi	-	-
	1900°F	18.3 msi	-	-
	2000°F	16.6 msi	-	-
	2100°F	14.7 msi	-	-

Coefficient of Thermal Expansion of Gamma-Prime Strengthened Alloys*



*Age-hardened (282® alloy: 1472°F (800°C)/4 h/AC; 740-H alloy: 1472°F (800°C)/4 hrs minimum/AC)

Haynes International - HAYNES® 282® alloy (Single-Step Age-hardening Treatment)

Weld Data

Welded Transverse Tensile Data For 1/2” (12.7 mm) Plate

Temperature	0.2% Yield Stregth		Ultimate Tensile Strength		Elongation
°F (°C)	ksi	MPa	ksi	MPa	%
As Welded, GMAW					
RT	91.1	628	135.9	937	24.6
As Welded, GTAW					
RT	93.2	643	138.1	952	25.2
As Welded, GMAW/Age-hardened*					
RT	111.6	770	170.7	1177	22.7
As Welded, GTAW/Age-hardened*					
RT	109.5	755	171.8	1184	27.7

*Age-hardened 1472°F/4 h/AC

Comparative Creep-Rupture Properties of 282®* Base Metal vs 282® Weld**

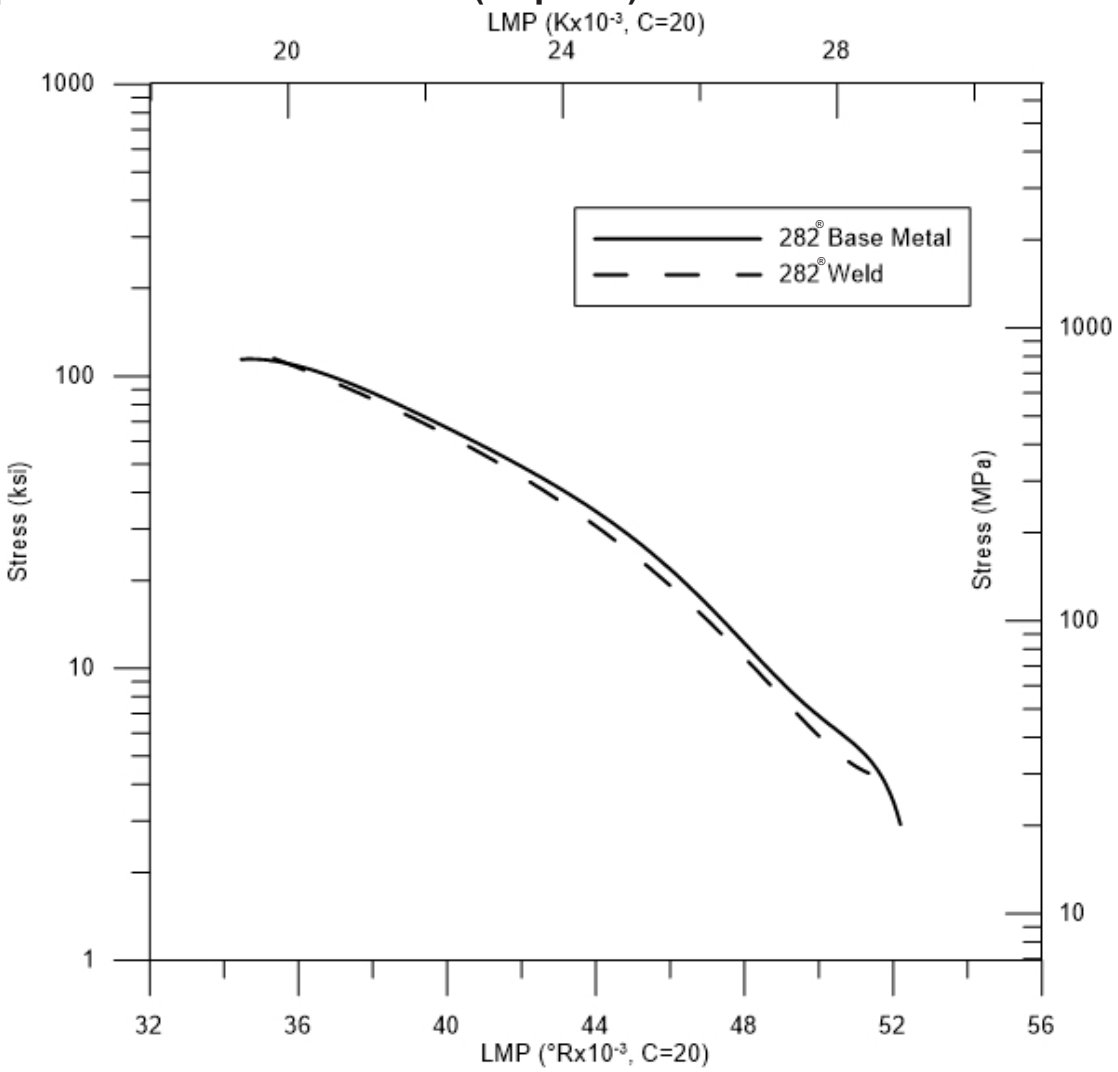
Property	Test Temperature		282 Alloy Base		282 Alloy Weld	
	°F	°C	ksi	MPa	ksi	MPa
Stress-to-Produce Rupture, in 100 h	1200	649	104	715	101	693
	1300	704	80	550	76	522
	1400	760	58	401	54	375
	1500	816	41	280	37	253
	1600	871	26	179	23	156
	1700	927	14	97	13	87
Stress-to-Produce Rupture, in 1000 h	1200	649	86	591	82	562
	1300	704	62	428	58	403
	1400	760	43	298	39	271
	1500	816	27	189	24	166
	1600	871	15	102	13	90
	1700	927	7	51	6	44

*Age-hardened 1472°F/4 h/AC

**Weld data represents GTAW and GMAW

Weld Data Continued

Comparative Larson-Miller Plot (Rupture) of 282* Base Metal vs Weld**



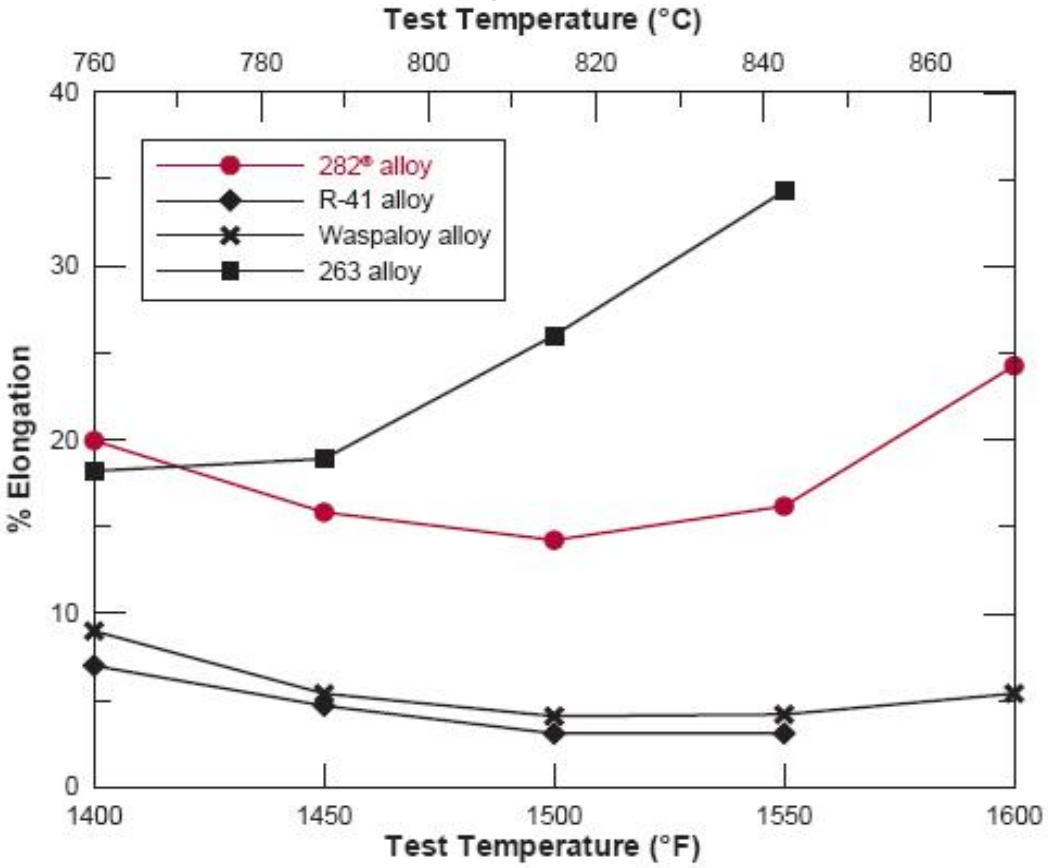
*Age-hardened 1472°F/4 h/AC

**Weld data represents GTAW and GMAW

Strain Age Cracking Resistance

Resistance to strain-age cracking is a major attribute of HAYNES® 282® alloy. As indicated in the chart below, 282® alloy approaches the well-known 263 alloy in this regard, and possesses much higher resistance to strain-age cracking than other nickel superalloys in its strength class (Waspaloy and R-41 alloys).

Resistance to Strain-age Cracking as Measured by the Controlled Heating-Rate Tensile (CHRT) Test



The CHRT test is an excellent measure of the resistance of gamma-prime strengthened superalloys to strain-age cracking. Samples of thickness 0.063" (1.6 mm), originally in the solution annealed condition, are heated to the test temperature at a rate of 25-30°F (14-17°C) per minute, this being representative of a typical post-weld heat treatment. Tests are performed for each alloy over a range of temperatures. The susceptibility to strain-age cracking is related to the minimum tensile elongation observed within that temperature range (the higher the minimum elongation, the greater is the resistance to strain-age cracking).

For further information regarding this test, please refer to:

1. R.W. Fawley, M. Prager, J.B. Carlton, and G. Sines, WRC Bulletin No. 150, Welding Research Council, New York, 1970.
2. M.D. Rowe, "Ranking the Resistance of Wrought Superalloys to Strain-Age Cracking", Welding Journal, 85 (2), pp. 27-s to 34-s, 2006.

Cold Forming

Hot and Cold Working

HAYNES® 282® alloy has excellent forming characteristics. It may be hot-worked at temperatures in the range of about 1750-2150°F (955-1177°C) provided the entire piece is soaked for a time sufficient to bring it uniformly to temperature. Initial breakdown is normally performed at the higher end of the range, while finishing is usually done at the lower temperatures to afford grain refinement.

As a consequence of its good ductility, 282® alloy is also readily formed by cold-working. Intermediate annealing may be performed at 2050 to 2100°F (1121 to 1149°C) for a time commensurate with section thickness and rapidly cooled or water-quenched, to ensure maximum formability. All hot- or cold-worked parts should normally be annealed prior to age-hardening (as described in the “Heat Treatment” section) in order to develop the best balance of properties.

Cold Forming Characteristics

Average Room-temperature Hardness and Tensile Properties of Solution Annealed HAYNES® 282® alloy

Form	Hardness	0.2% Yield Strength		Ultimate Tensile Strength		Elongation	Reduction of Area
-	HRBW	ksi	MPa	ksi	MPa	%	%
Sheet	90	56	384	122	839	59	-
Plate	93	56	384	120	830	60	61
Bar	86	51	348	118	816	62	69

Hardness vs. Cold Work (Sheet)

Alloy	0%	10%	20%	30%	40%	50%
282®	**93 HRBW**	**26 HRC**	**33 HRC**	**38 HRC**	**41 HRC**	**43 HRC**
R-41	96 HRBW	30 HRC	36 HRC	39 HRC	41 HRC	42 HRC
Waspaloy	94 HRBW	26 HRC	32 HRC	37 HRC	39 HRC	41 HRC
263	89 HRBW	19 HRC	27 HRC	33 HRC	37 HRC	39 HRC
625	97 HRBW	32 HRC	37 HRC	40 HRC	42 HRC	45 HRC

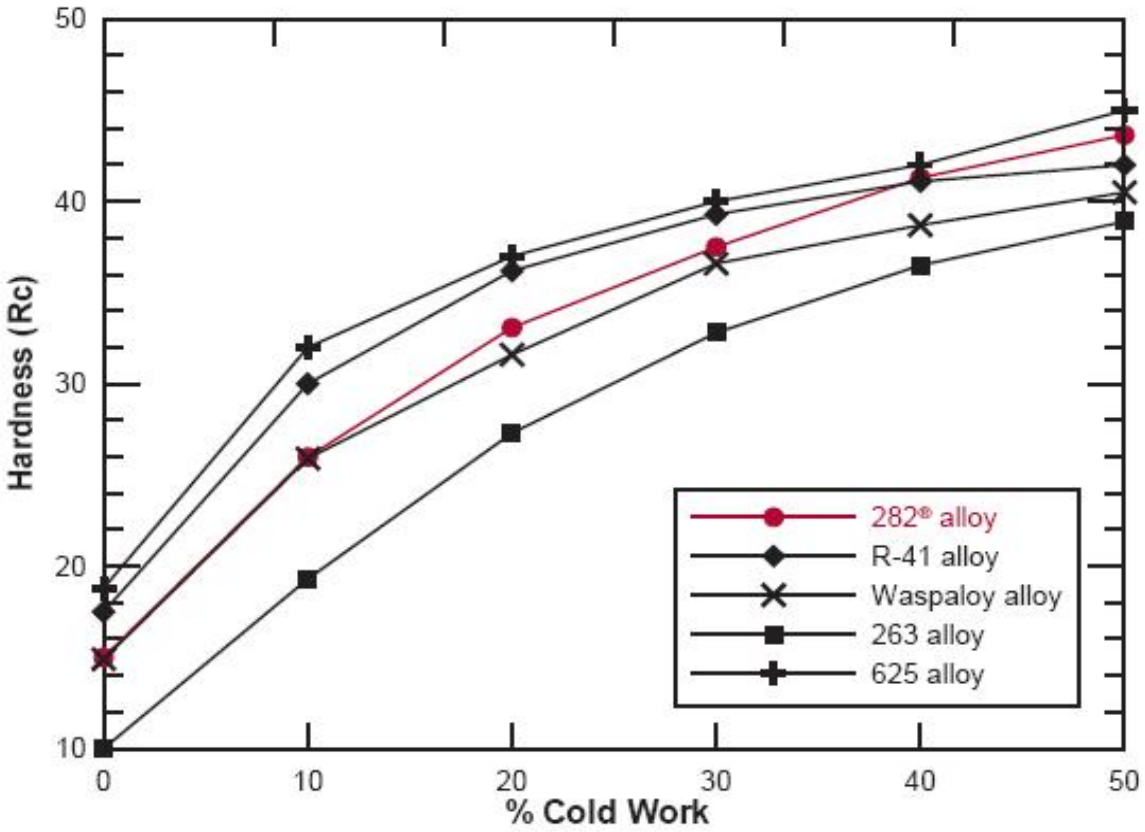
Cold Forming Continued

Effect of Cold Reduction on Room-Temperature Tensile Properties*

Cold Reduction	0.2% Yield Strength		Ultimate Tensile Strength		Elongation
%	ksi	MPa	ksi	MPa	%
0	55.5	383	121.0	834	58.0
10	87.8	605	131.8	909	46.7
20	114.5	790	144.9	999	31.5
30	139.7	963	165.4	1141	15.5
40	158.5	1093	184.2	1270	8.9
50	174.7	1204	200.4	1382	6.6
60	190.4	1312	215.4	1485	5.6

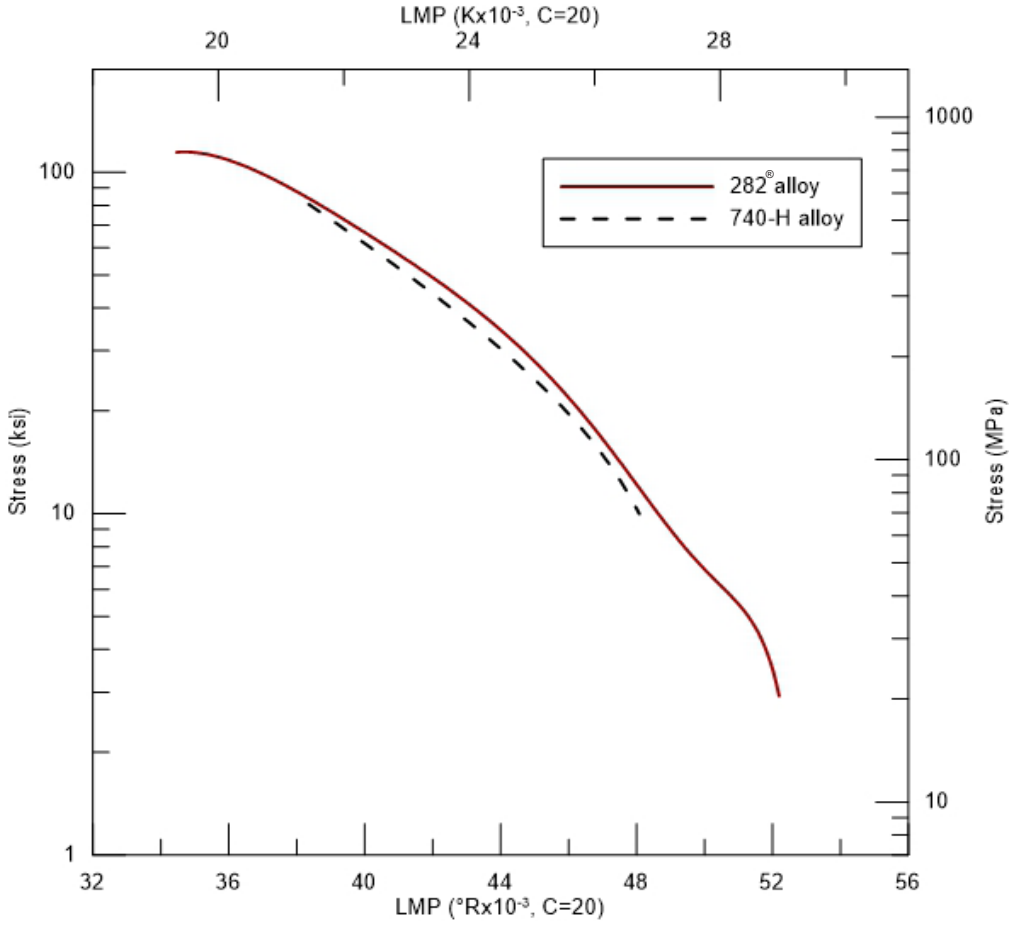
*Based upon rolling reductions taken upon a solution annealed 0.125” (3.2 mm) thick sheet

Hardness of Solution Annealed Sheet Versus % Cold Work



Comparative Data

Comparative Larson-Miller Plot (Rupture) of Gamma-Prime Strengthened Alloys*



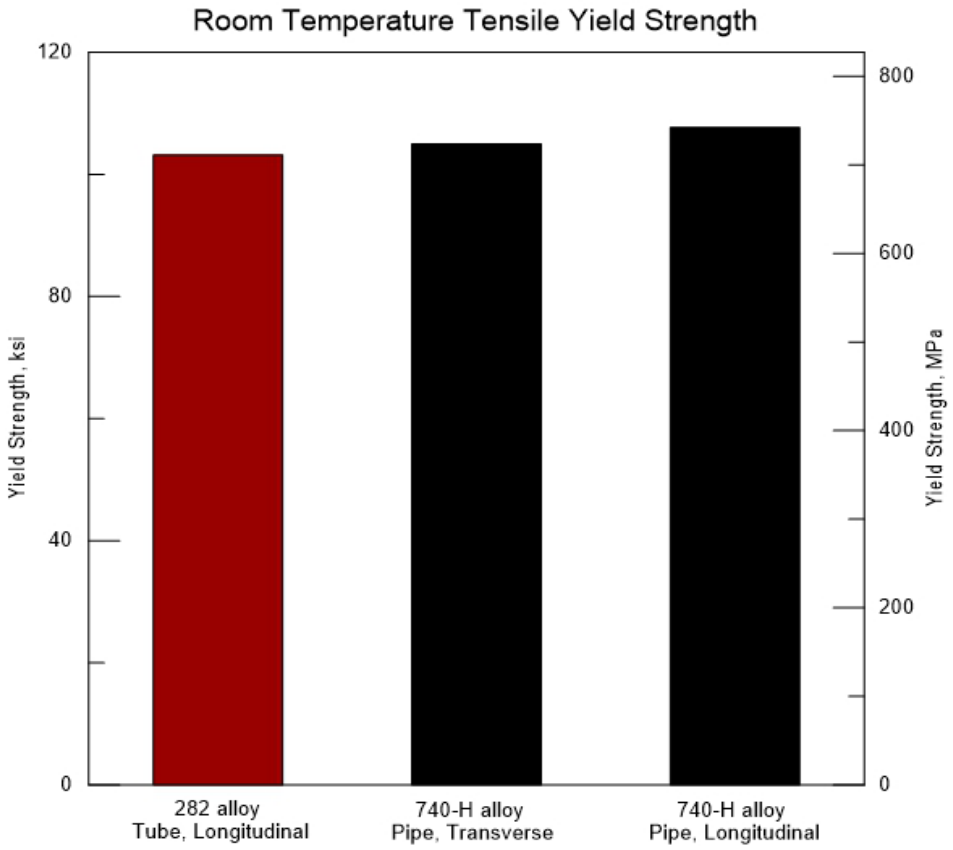
Comparative Creep-Rupture Properties of Gamma-Prime Strengthened Alloys*

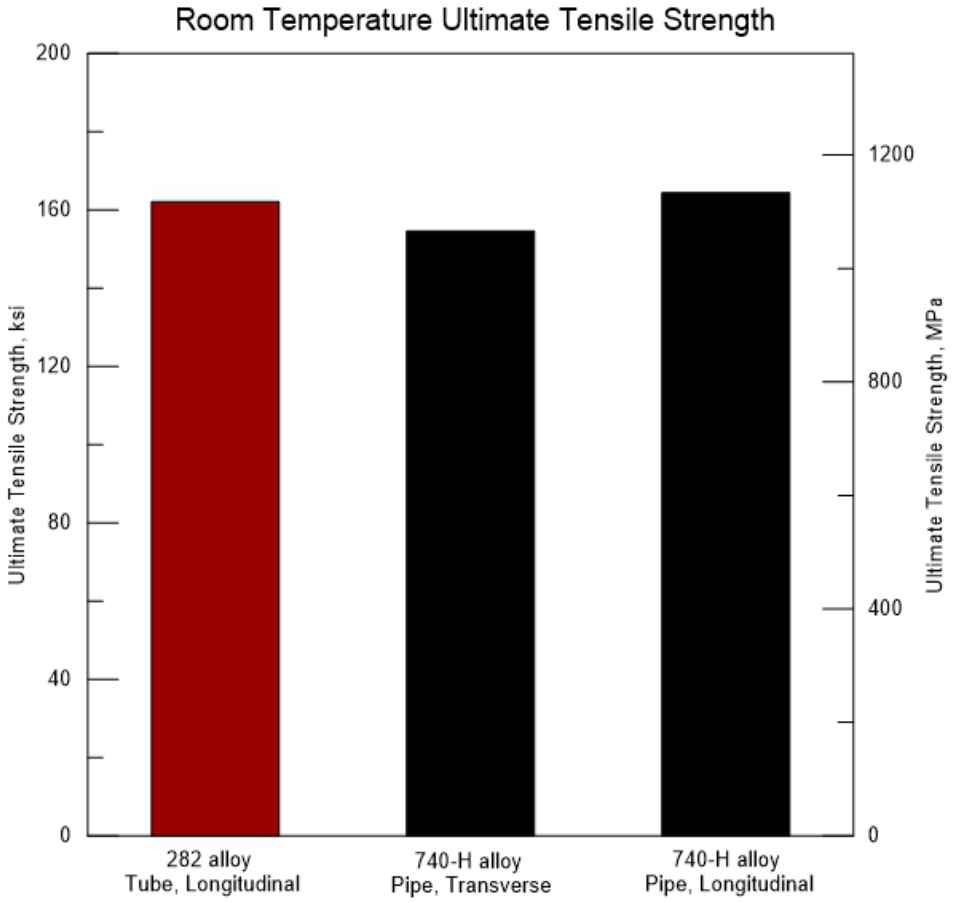
Property	Test Temperature		282® alloy		740-H alloy	
	°F	°C	ksi	MPa	ksi	MPa
Stress-to-Produce Rupture, in 100 h, ksi (MPa)	1200	649	104	715	107	735
	1300	704	80	550	76	524
	1400	760	58	401	53	366
	1500	816	41	280	36	248
	1600	871	26	179	23	159
	1700	927	14	97	12	86
Stress-to-Produce Rupture, in 1000 h, ksi (MPa)	1200	649	86	591	83	571
	1300	704	62	428	57	394
	1400	760	43	298	38	264
	1500	816	27	189	24	167
	1600	871	15	102	13	90
	1700	927	7	51	3	19

*Age-hardened (282 alloy: 1472°F (800°C)/4 h/AC; 740-H alloy: 1472°F (800°C)/4 hrs minimum/AC)

Comparative Data Continued

Comparative Room Temperature Tensile Data for Gamma-Prime Strengthened Alloys*

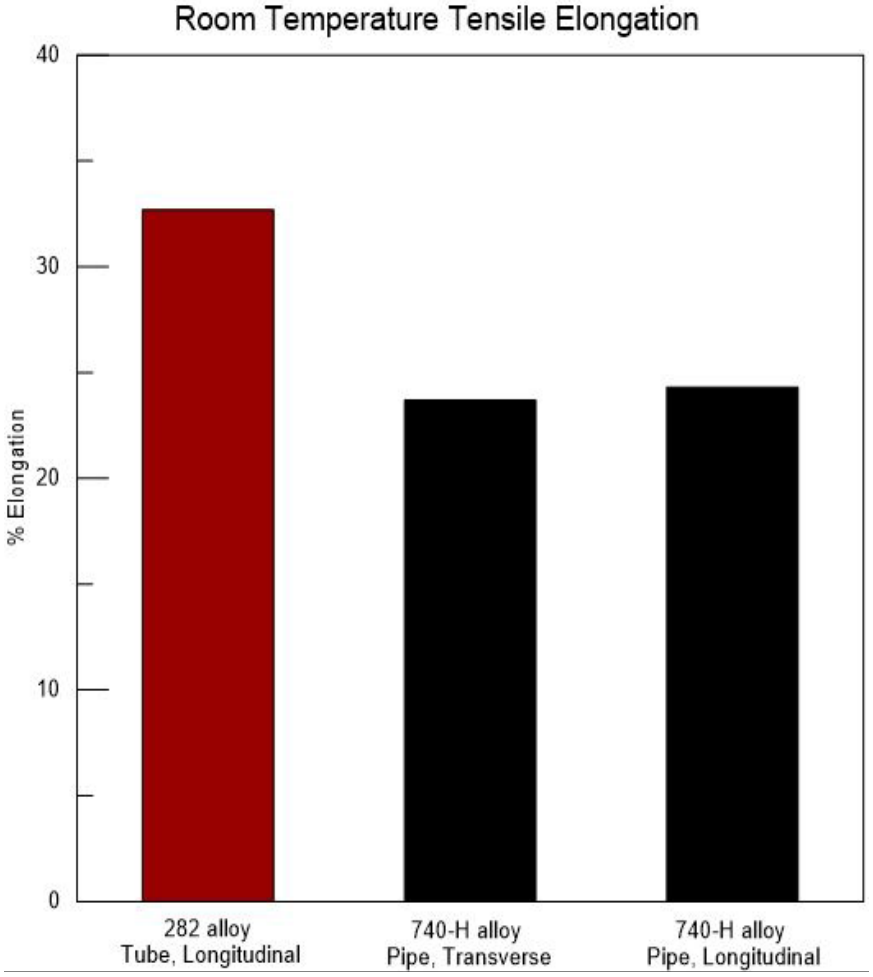




*Age-hardened (282® alloy: 1472°F (800°C)/4 h/AC; 740-H alloy: 1472°F (800°C)/4 hrs minimum/AC)

Comparative Data Continued

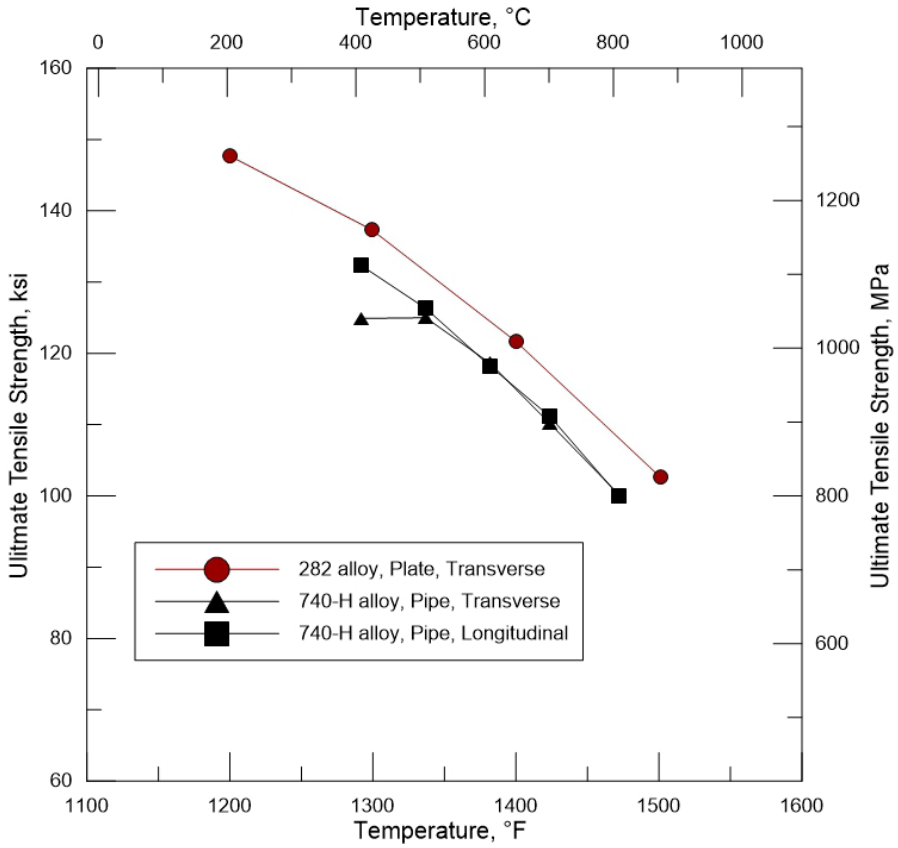
Comparative Room Temperature Tensile Data for Gamma-Prime Strengthened Alloys*

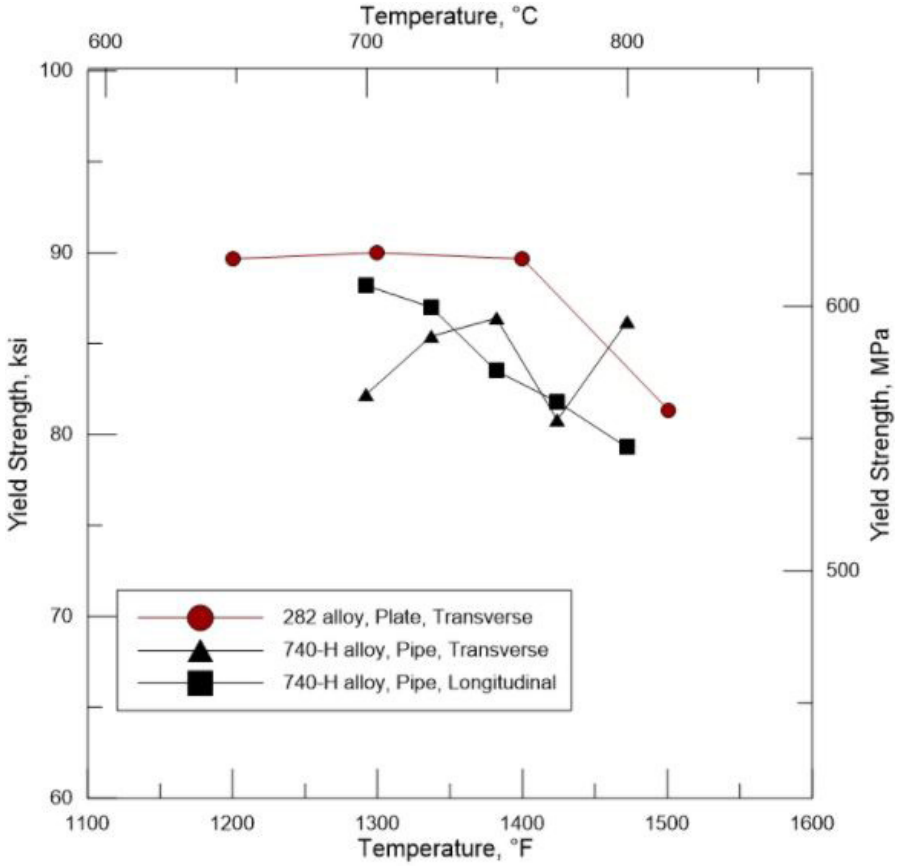


*Age-hardened (282® alloy: 1472°F (800°C)/4 h/AC; 740-H alloy: 1472°F (800°C)/4 hrs minimum/AC)

Comparative Data Continued

Comparative Elevated Temperature Tensile Data for Gamma-Prime Strengthened Alloys*

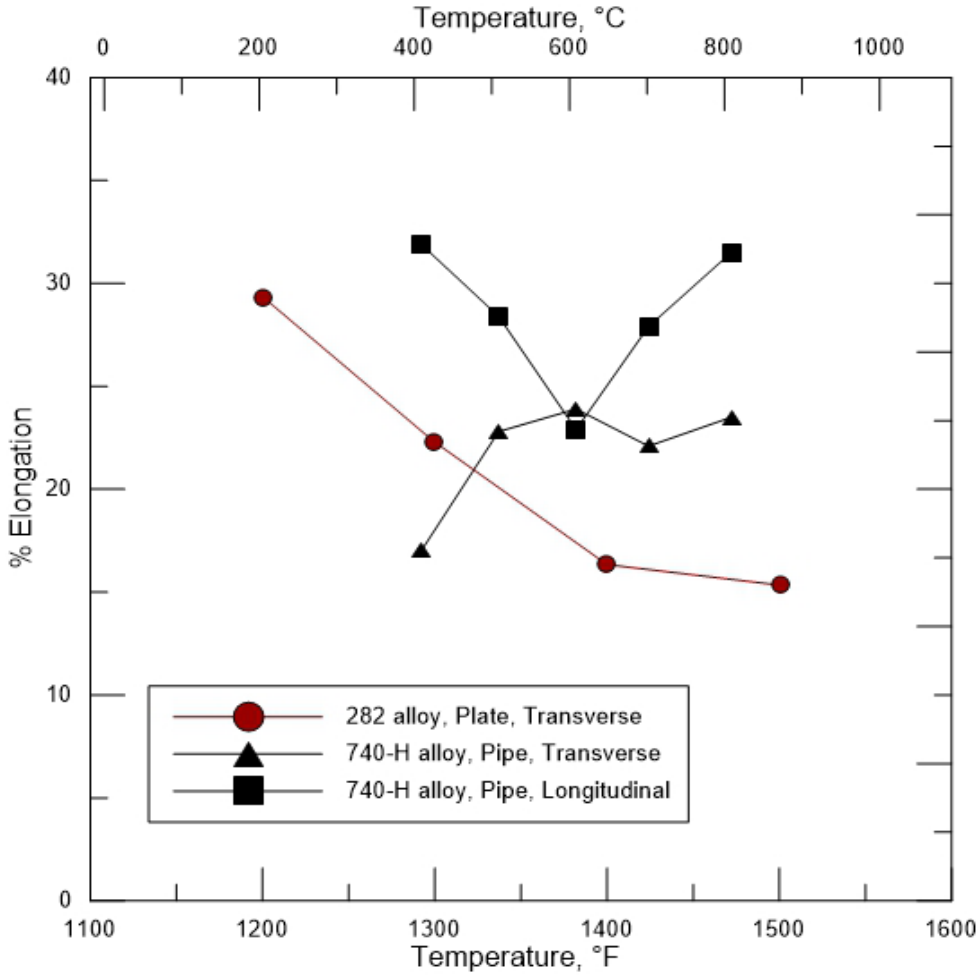




*Age-hardened (282® alloy: 1472°F (800°C)/4 h/AC; 740-H alloy: 1472°F (800°C)/4 hrs minimum/AC)

Comparative Data Continued

Comparative Elevated Temperature Tensile Data for Gamma-Prime Strengthened Alloys*



*Age-hardened (282® alloy: 1472°F (800°C)/4 h/AC; 740-H alloy: 1472°F (800°C)/4 hrs minimum/AC)

For information regarding ASME code related applications, please contact Brett Tossey (BTossey@haynesintl.com).