HAYNES® 75 alloy

Principle Features

HASTELLOY® 75 alloy (UNS N06075) is a solution-strengthened nickel-chromium alloy with moderate strength to 1200 °F (650 °C). It is principally used in low stress elevated temperature application requiring reasonable oxidation resistance, and is approximately equivalent to alloy 600 in performance. Alloy 75 is used in a number of fabricated part applications in the gas turbine and aerospace industries in Europe, and is also employed in general industrial heating uses. The alloy is readily formed and fabricated using conventional techniques.

Nominal Composition

	Weight, %
Nickel:	76 Balance
Cobalt:	1 max.
Chromium:	20
Iron:	5 max
Titanium:	0.4
Manganese:	1 max.
Silicon:	1 max.
Aluminum:	0.4 max.
Titanium:	0.4
Carbon:	0.11

Physical Properties

Physical Property	British Units		Metric Units	
Density	RT	0.302 lb/in^3	RT	8.37 g/cm^3
Melting Range	2445-2515°F	-	1340-1380°C	-
Electrical Resistivity	400°F	44.1 µohm-in	200°C	112µohm-cm
	800°F	46.0 µohm-in	400°C	117 µohm-cm
	1000°F	45.5 µohm-in	600°C	115 µohm-cm
	1200°F	45.3 µohm-in	700°C	115 µohm-cm
	1400°F	45.3 µohm-in	800°C	115 µohm-cm
	1600°F	45.3 µohm-in	900°C	115 µohm-cm
	1800°F	45.6 µohm-in	1000°C	116 µohm-cm
Thermal Conductivity	800°F	133 Btu-in/ft^2-h-°F	400°C	18.6 W/m-°C
	1000°F	149 Btu-in/ft^2-h-°F	600°C	22.7 W/m-°C
	1200°F	164 Btu-in/ft^2-h-°F	700°C	24.7 W/m-°C
	1400°F	179 Btu-in/ft^2-h-°F	800°C	26.5 W/m-°C
	1600°F	193 Btu-in/ft^2-h-°F	900°C	28.4 W/m-°C
	1800°F	207 Btu-in/ft^2-h-°F	1000°C	30.1 W/m-°C

RT= Room Temperature

Physical Properties Continued

Mean Coefficient of Thermal Expansion	70-800°F	7.9 µin/in -°F	20-500°C	14.3 µm/m-°C
	70-1000°F	8.2 µin/in -°F	20-600°C	15.0 µm/m-°C
	70-1200°F	8.5 µin/in -°F	20-700°C	15.4 µm/m-°C
	70-1400°F	8.9 µin/in -°F	20-800°C	16.5 µm/m-°C
	70-1600°F	9.4 µin/in -°F	20-900°C	17.1 µm/m-°C
	70-1800°F	10.3 µin/in -°F	20-1000°C	18.2 µm/m-°C
Dynamic Modulus of Elasticity	70°F	32.0 x 10^6 psi	20°C	221 GPa
	400°F	30.5 x 10^6 psi	200°C	210 GPa
	800°F	28.2 x 10^6 psi	400°C	197 GPa
	1000°F	27.0 x 10^6 psi	600°C	181 GPa
	1200°F	25.5 x 10^6 psi	700°C	173 GPa
	1400°F	24.6 x 10^6 psi	800°C	165 GPa
	1600°F	22.6 x 10^6 psi	900°C	153 GPa
	1800°F	20.5 x 10^6 psi	1000°C	140 GPa

RT= Room Temperature

Heat Treatment, Sheet and Strip

1925°F (1050°C)/Bright Anneal

Tensile Properties, Sheet

1925 °F (1050 °C)/Bright Anneal

Form	Test Temperature		0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation
	°F	**°C**	**ksi**	**MPa**	**ksi**	**MPa**	**%**
Sheet	RT	RT	59.4	407	114.4	792	31
	1000	538	51.9	363	105.6	726	27
	1200	649	40	275	69.3	473	32
	1400	760	22	152	41.4	286	75
	1600	871	9.9	68	20.2	139	90
	1800	982	4.4	31	9.7	66	91

RT= Room Temperature

Typical Stress-Rupture Strength, Sheet

1925 ºF (1050 ºC) Anneal

Test Temperature		Approximate Initial Stress to Produce Rupture in:					
		10 h		100 h		1000 h	
°F	°C	ksi	MPa	ksi	MPa	ksi	MPa
1200	650	27	185	18.5	130	12	83
1300	705	16	110	10.2	70	6.8	47
1400	760	9.5	66	6	41	3.8	26
1500	815	5.8	40	3.7	26	2.2	15
1600	870	3.6	25	2	14	1.2	8.3