

HAYNES® 625 alloy

CHEMISTRY: Weight %

Ni	Co	Fe	Cr	Mo	Cb+Ta	Mn	Si	Al	Ti	C
62 ^a	1*	5*	21	9	3.7	0.5*	0.5*	0.4*	0.4*	0.10*

^a As Balance

*Maximum

ALLOY DESCRIPTION:

HAYNES 625 alloy is a solid-solution-strengthened superalloy that has excellent strength up to about 1400°F (760°C) and good oxidation resistance. It is widely used for forged or fabricated parts in gas turbine engines, chemical plants, and other industrial applications. It is also used in lower temperature applications requiring aqueous corrosion resistance, although it is normally not as good as HASTELLOY® C-22® or G-30® alloys. 625 alloy has relatively poor thermal stability in the temperature range from about 1200 to 1600°F (650 to 870°C), and consequently is being largely replaced by more modern materials, such as HAYNES® 230® alloy (ask for document H-3135). 625 alloy may be cold- or hot-formed by various techniques, and is readily weldable by most standard methods.

PHYSICAL PROPERTIES:

	Temp., °F	British Units	Temp., °C	Metric Units
Density	Room	0.305 lb/in ³	Room	8.44 g/cm ³
Melting Range	2350-2460		1290-1350	
Thermal Conductivity	800	109 BTU-in/ft ² -hr-°F	400	15.3 W/m-K
	1000	121 BTU-in/ft ² -hr-°F	600	18.3 W/m-K
	1200	132 BTU-in/ft ² -hr-°F	700	19.8 W/m-K
	1400	144 BTU-in/ft ² -hr-°F	800	21.5 W/m-K
	1600	158 BTU-in/ft ² -hr-°F	900	23.4 W/m-K
	1800	175 BTU-in/ft ² -hr-°F	1000	25.6 W/m-K
Mean Coefficient of Thermal Expansion	70-800	7.7 μin/in-°F	20-500	14.2 μm/m-°C
	70-1000	8.0 μin/in-°F	20-600	14.8 μm/m-°C
	70-1200	8.2 μin/in-°F	20-700	15.4 μm/m-°C
	70-1400	8.6 μin/in-°F	20-800	16.1 μm/m-°C
	70-1600	9.2 μin/in-°F	20-900	16.8 μm/m-°C
	70-1800	9.6 μin/in-°F	20-1000	17.4 μm/m-°C
Electrical Resistivity	400	52.8 μohm-in	200	134.0 μohm-cm
	800	53.5 μohm-in	400	135.6 μohm-cm
	1000	54.3 μohm-in	600	137.9 μohm-cm
	1200	54.3 μohm-in	700	137.5 μohm-cm
	1400	53.9 μohm-in	800	136.5 μohm-cm
	1600	53.5 μohm-in	900	135.6 μohm-cm
	1800	53.1 μohm-in	1000	134.8 μohm-cm

HEAT TREATMENT, SHEET AND STRIP (AMS 5599):

1925°F (1050°C)/Bright Anneal

HAYNES® 625 alloy

DYNAMIC MODULUS OF ELASTICITY:

Temp., °F	10 ⁶ psi	Temp., °C	GPa	Temp., °F	10 ⁶ psi	Temp., °C	GPa
70	30.2	20	208	1200	24.3	700	163
400	28.8	200	199	1400	22.8	800	153
800	26.7	400	186	1600	21.2	900	142
1000	25.6	600	171	1800	18.7	1000	126

TYPICAL TENSILE PROPERTIES, SHEET (AMS 5599):

Test Temperature		Ultimate Tensile Strength		0.2% Yield Strength		Elongation in 2 in (51mm)
°F	°C	Ksi	MPa	Ksi	MPa	%
ROOM	ROOM	131.1	905	71.1	490	48.5
1000	540	111.6	770	53.7	370	54.0
1200	650	110.1	760	53.7	370	55.6
1400	760	87.2	600	50.2	345	53.1
1600	870	50.0	345	29.7	205	45.9
1800	980	24.1	165	12.1	83	43.8
2000	1095	13.7	94	5.6	39	44.7

TYPICAL STRESS-RUPTURE STRENGTH, SHEET (AMS 5599):

Test Temperature		Approximate Initial Stress, Ksi (MPa) to Produce Rupture in:					
°F	°C	10 Hours		100 Hours		1000 Hours	
1200	650	-	-	77.0	(530)	55.0	(380)
1300	705	70.0	(485)	49.5	(340)	32.0	(220)
1400	760	45.0	(310)	29.0	(200)	17.8	(125)
1500	815	26.5	(185)	16.2	(110)	9.1	(63)
1600	870	15.3	(105)	8.6	(59)	4.2	(29)
1700	925	8.3	(57)	4.1	(28)	2.7	(19)
1800	980	4.1	(28)	2.7	(19)	-	-

The data and information in this publication are based upon work conducted principally by Haynes International, Inc. and occasionally supplemented by information from open literature, and are believed to be reliable. However, Haynes International, Inc. does not make any warranty or assume any legal liability or responsibility for its accuracy, complete-ness, or usefulness. Haynes also makes no warranty of results to be obtained for any particular use of the information herein contained. Material safety data sheets are available from Haynes International, Inc.

®HAYNES is a registered trademark of Haynes International, Inc