

HAYNES® 625SQ® alloy

Principal Features

HAYNES® 625SQ® alloy (UNS N06626) is a solid-solution strengthened superalloy. It is a modification of HAYNES® 625 alloy developed to enhance resistance to fatigue at temperatures up to approximately 1200°F (649°C). The alloy composition is tightly controlled to very low levels of carbon, silicon, and nitrogen.

Primary melting is by vacuum induction melting, followed by consumable electrode practice using electroslag remelting. During processing, the grain size is controlled to ASTM #5 or finer.

HAYNES® 625SQ® alloy is readily fabricated and welded using practices common to HAYNES® 625 alloy. HAYNES® 625SQ® alloy sheet and strip find application in aerospace, automotive, and chemical process industry bellow, expansion joints, and fabrications where fatigue resistance, strength, and corrosion resistance are required.

Nominal Composition

Weight %

Nickel:	62 Balance
Cobalt:	1 max.
Iron:	5 max.
Chromium:	21
Molybdenum:	9
Columbium + Tantalum:	3.7
Manganese:	0.5 max.
Silicon:	0.15 max.
Nitrogen:	0.02 max.
Aluminum:	0.4 max.
Titanium:	0.4 max.
Carbon:	0.03 max.

Physical Properties

Physical Property	British Units		Metric Units	
	Density	RT	0.305lb/in ³	RT
Melting Range	2350-2460°F	-	1290-1350°C	-
Electrical Resistivity	400°F	52.8 μohm-in	200°C	134.0 μohm-cm
	800°F	53.5 μohm-in	400°C	135.6 μohm-cm
	1000°F	54.3 μohm-in	600°C	137.9 μohm-cm
	1200°F	54.3 μohm-in	700°C	137.5 μohm-cm
	1400°F	53.9 μohm-in	800°C	136.5 μohm-cm
	1600°F	53.5 μohm-in	900°C	135.6 μohm-cm
	1800°F	53.1 μohm-in	1000°C	134.8 μohm-cm
Thermal Conductivity	800°F	109 Btu-in/ft ² -hr-°F	400°C	15.3 W/m-°C
	1000°F	121 Btu-in/ft ² -hr-°F	600°C	18.3 W/m-°C
	1200°F	132 Btu-in/ft ² -hr-°F	700°C	19.8 W/m-°C
	1400°F	144 Btu-in/ft ² -hr-°F	800°C	21.5 W/m-°C
	1600°F	158 Btu-in/ft ² -hr-°F	900°C	23.4 W/m-°C
	1800°F	175 Btu-in/ft ² -hr-°F	1000°C	25.6 W/m-°C
Mean Coefficient of Thermal Expansion	70-800°F	7.7 μin/in-°F	20-500°C	14.2 μm/m-°C
	70-1000°F	8.0 μin/in-°F	20-600°C	14.8 μm/m-°C
	70-1200°F	8.2 μin/in-°F	20-700°C	15.4 μm/m-°C
	70-1400°F	8.6 μin/in-°F	20-800°C	16.1 μm/m-°C
	70-1600°F	9.2 μin/in-°F	20-900°C	16.8 μm/m-°C
	70-1800°F	9.6 μin/in-°F	20-1000°C	17.4 μm/m-°C
Dynamic Modulus of Elasticity	70°F	30.2 x 10 ⁶ psi	20°C	208 GPa
	400°F	28.8 x 10 ⁶ psi	200°C	199 GPa
	800°F	26.7 x 10 ⁶ psi	400°C	186 GPa
	1000°F	25.6 x 10 ⁶ psi	600°C	171 GPa
	1200°F	24.3 x 10 ⁶ psi	700°C	163 GPa
	1400°F	22.8 x 10 ⁶ psi	800°C	153 GPa
	1600°F	21.2 x 10 ⁶ psi	900°C	142 GPa
	1800°F	18.7 x 10 ⁶ psi	1000°C	126 GPa

RT=Room Temperature

Tensile Properties

Sheet (AMS 5879)

Test Temperature		0.2% Yield Strength		Ultimate Tensile Strength		Elongation
°F	°C	ksi	MPa	ksi	MPa	%
RT	RT	65.5	895	129.9	452	51.7
600	316	51.1	809	117.4	353	64.1
800	427	49.1	776	112.6	339	60.9
1000	538	49.9	776	112.5	344	60.5
1200	649	46.9	787	114.2	323	81.4
1300	704	44.4	646	93.7	306	103.9
1400	760	46.9	497	72.1	323	88.8

RT= Room Temperature

Heat Treatment

Sheet and Strip, AMS 5879

1600°F (871°C) Minimum/Bright Anneal

Specifications and Codes

Specifications

HAYNES® 625SQ® alloy (N06626)	
Sheet, Plate & Strip	AMS 5879 ASME Code Case 2276
Billet, Rod & Bar	-
Coated Electrodes	-
Bare Welding Rods & Wire	-
Seamless Pipe & Tube	-
Welded Pipe & Tube	ASME Code Case No. 2276 P= 43
Fittings	ASME Code Case No. 2276 P= 43
Forgings	-
DIN	-
Others	-

Codes

HAYNES® 625SQ® alloy (N06626)				
ASME	Section I	-		
	Section III	Class 1	-	
		Class 2	-	
		Class 3	-	
	Section IV	HF-300.2	-	
	Section VIII	Div. 1	Code Case 2276 800°F (427°C) ¹	
		Div. 2	-	
	Section XII	-		
	B16.5	-		
	B16.34	-		
	B31.1	-		
	B31.3	-		

¹Approved material forms: Sheet, fittings, welded pipe/tube