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SUPERALLOY SN252696 SPECIFICATIONS

1. Overview

SN252696 austenitic alloy has a long-term temperature usage, good resistance to oxidation and good heat resistant corrosion performance below 650ºC, while the temperature of short-term usage can reach 750ºC.It has high yield strength, lasting and creep strength. The alloy is often used to make turbine, fastener of gas compressor, blade, turbine shell and so on. The main products include bars, forgings, rings, plates, strips and wires.

1.1.Material Grade

SN252696

1.2. Similar grades

10Х11Н23Т3МР-ВД, ЭП33-ВД (Russia)

1.3.Technical Standard material

GB/T 14992-2005 - Classification and designation for superalloys and high temp. intermetallic materials
GB/T 14994-2008 - Superalloy cold drawn bars

1.4.Chemical composition

C	Cr	Ni	Mo	Al	Ti	Fe	B	No more than			
								Mn	Si	P	S
≤0.1	10.0~12.5	21.0~25.0	1.0~1.6	≤0.8	2.6~3.2	Rest	≤0.02	0.60	0.60	0.02	0.01

1.5.Heat Treatment

Process No.	State	Solution treatment	Aging
I			750 ℃, 16 h, furnace cooling 650 ℃, 16 h, air-cooled
II			750 ℃, 16 h, furnace cooling 650 ℃, 16 h, air-cooled
III	General state of cold-drawn bar	1100℃,1h~2h, oil-cooled	780 ℃, 16 h, air-cooled
IV	Cold Drawn bar + solid solution	1100℃~1120℃, 3h~5h,oil-cooled	840℃~850℃, 3h~5h, air-cooled 700℃~730℃, 16h~25h, air-cooled

1.6.Product Form

These alloys available in bar, sheet, strip, forgings, rings & wire.

1.7.Applications

The alloy is often used to make turbine, fastener of gas compressor, blade, turbine shell and so on. It has a high yield strength, durability and creep strength.

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2. Physical Properties

2.1.Thermal Performance

2.1.1. Thermal Conductivity

℃	20	100	200	300	400	500	600	700	800
λ [W/(m·℃)]	12.6	13.8	15.9	17.6	18.8	20.5	22.2	23.9	26.0

2.1.2. Coefficient of linear expansion

°C	20~100	20~200	20~300	20~400	20~500	20~600	20~700	20~800
α [10^{-6}·°C^{-1}]	16.0	16.7	16.9	17.2	17.5	17.7	18.2	19.9

2.2.Density – ρ = 7.93 g/cm^3

2.3.Electrical properties

2.3.1.Electrical Resistivity

°C	100	200	300	400	500	600	700	800	900
ρ [10^{-6}Ω·m]	1.30	1.34	1.37	1.38	1.39	1.38	1.35	1.33	1.31

3. Mechanical Properties

3.1.Performance of technical standards

		Tensile Properties						Impact [J]	Hardness [HBW]	high temperature persistent		
Standard	State	Process No.	θ/℃	σ_b/ MPa	$\sigma_{0.2}$/ MPa	δ_5/ %	φ/ %			θ/℃	σ/ MPa	Time [h]
GB/T 14994	Cold drawn bar	I	20	1250	1050	10	35		302~229	600	570	Measured
		II	20	1300	1100	10	30		229~143			Measured
		III	20	980	685	10	12	24	341~285			≥50
		IV	20	930	635	10	12	24	341~285			≥50

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3.2.Durability and creep properties

3.2.1. Durability properties

Material	θ/℃	σ/MPa	Time [hours]
Cold drawn bar	700	100	391-412

3.2.2. High temperature creep properties

Material	θ/℃	σ/MPa	Time [hours]	δ_5/%
Cold rolled plate	700	333	100	0.2

3.2.3. Fatigue performance

Material	θ/℃	σ/MPa	N [no. of times]
Cold rolled plate	750	255	>10E7

3.3.Elastic properties

3.3.1. Modulus of elasticity

Dynamic [E_D] modulus of elasticity at different temperatures.

℃	20	600	900
E_D [GPA]	198	159	134