S.N. VITA ltd
21 Ha'Mesila street, Nesher 3688521, Israel
Tel: +972-73-247-1052, Fax: +972-77-444-8532,
e-mail: snvita@013net.net, web-site: www.skynet-vita.com

SUPERALLOY SN253039 SPECIFICATIONS

1. Overview

SN253039 is a single-phase solid solution strengthening Ni-base alloy below 800 ℃ with medium heat resistance and good thermal fatigue resistance, good oxidation resistance below 1000 ℃. Long-term use of organizational stability, but also has good cold formability and weldability. 850 ℃ or less suitable for long-term use of aero-engine combustion chamber and afterburner parts. The alloy can be used to produce plate, bar, wire, tube and forgings.

1.1.Material Grade

SN253039

1.2.Similar grades

ХН75МБГЮ, ЭИ602 (Russia)

1.3.Technical Standard material

GB/T 14992-2005 - Classification and designation for superalloys and high temp. intermetallic materials
GB/T 14995-2010 - Hot-rolled superalloy sheets
GB/T 14996-2010 - Cold-rolled heat-resisting superalloy sheets
GB/T 15062-2008 - Superalloy tube for general application
GJB 3165-1998 - hot-rolled and forged heat-resisting superalloy bars for aviation load-bearing parts
GJB 3318-1998 - Specification for cold-rolled strips of heat-resisting superalloy for aviation
GJB 2297A-2008 - Specification for cold drawn (rolled) superalloy seamless tube for aviation

1.4.Chemical composition

C	Cr	Ni	Mo	Al	Ti	Nb	No more than				
							Fe	Mn	Si	P	S
≤0.08	19.0~22.0	Rest	1.80~2.30	0.35~0.75	0.35~0.75	0.90~1.30	3.0	0.40	0.80	0.020	0.012

1.5.Heat Treatment

State	Solution treatment
Hot/Cold rolled sheet & strip	1050℃~1090℃, air-cooled
Bar & tube	1050℃~1080℃, air or water cooled

1.6.Product Form

These alloys available in bar, sheet, strip, pipe & wire.

1.7.Melting and casting process

SN253039 alloy melting and casting process using arc melting, vacuum induction furnace and electric arc furnace or remelting or vacuum arc remelting and vacuum induction furnace and electroslag or vacuum arc remelting process.

1.8.Applications

Alloy material produced by the combustion engine and afterburner aviation parts. Material shows excellent performance after long-term production and use.

S.N. VITA ltd
21 Ha'Mesila street, Nesher 3688521, Israel
Tel: +972-73-247-1052, Fax: +972-77-444-8532,
e-mail: snvita@013net.net, web-site: www.skynet-vita.com

2. Physical Properties

2.1.Thermal Performance

2.1.1. Thermal Conductivity

℃	100	200	300	400	500	600	700	800	900
λ [W/(m·℃)]	13.8	15.5	17.2	18.8	20.5	21.8	23.4	25.1	26.8

2.1.2. Specific heat capacity

℃	150	200	300	400	500	600	700	800
Cp [J/(kg·℃)	544	574	636	645	762	779	921	1047

2.1.3. Coefficient of linear expansion

°C	20~100	20~200	20~300	20~400	20~500	20~600	20~700	20~800	20~9 00	20~1000
α [10^{-6}·°C^{-1}]	11.5	12.4	13.2	13.5	13.8	14.3	14.9	15.3	15.8	16.4

2.2.Density – ρ = 8.3 g/cm^3

2.3.Electrical properties

2.3.1.Electrical Resistivity – ρ = 0.61×10-6Ω·m

2.4.Magnetic – Non magnetic alloy

3. Mechanical Properties

3.1.Performance of technical standards

Standard	State	Tensile Properties					
		θ/℃	σ_b/ MPa	$\sigma_{0.2}$/ MPa	δ_5/%	φ/%	Impact
GB/T 14995	Hot-rolled sheet	20	735	---	40	45	---
		800	245	---	40	50	---
GB/T 14996	Cold-rolled sheet	20	735	---	40	---	---
		800	245	---	40	---	---
GB/T 15062	Cold drawn tube	20	635	---	35	---	---
GJB 3165	Hot-rolled & forged bars	20	735	---	40		---
		800	245	---	40	40	
GJB 3318	Cold-rolled strip	20	735	---	40		
GJB 2297A	Cold drawn seamless tube	20	685	---	40		
		800	245		40		

S.N. VITA ltd
21 Ha'Mesila street, Nesher 3688521, Israel
Tel: +972-73-247-1052, Fax: +972-77-444-8532,
e-mail: snvita@013net.net, web-site: www.skynet-vita.com

3.2.Durability and creep properties

3.2.1. Durability properties

Material	θ/℃	σ/MPa	Time [hours]
Cold rolled plate	800	100	81

3.2.2. High temperature creep properties

Material	θ/℃	σ/MPa	Time [hours]	δ_5/%
Cold rolled plate	700	66.7	100	0.2

3.2.3. Fatigue performance

Material	θ/℃	σ/MPa	N [no. of times]
Cold rolled plate	700	235	>10E7

3.3.Elastic properties

3.3.1. Modulus of elasticity

Tensile [E], & dynamic [E_D] modulus of elasticity at different temperatures.

℃	20	400	500	600	700	800	900
E [GPA]	196	162	160	147	134	98	---
E_D [GPA]	211	182	176	169	162	155	147

4. Process performance and requirements

4.1.Formability

4.1.1. Forging - forged alloy with good thermal processing of plastic, good deformation properties. Forging heating temperature of 1170 ~ 1190
℃, the final forging temperature is not lower than 900 ℃, the deformation amount of the first heating is 50%.

4.1.2. Rolling - shortage rolled sheet rolling temperature 1100 ~ 1140 ℃, finishing temperature 1050 ~ 1100 ℃, finishing temperature not lower than 850 ℃.
When rolling by electroslag or vacuum consumable alloy remelting, finishing temperature should be slightly lower than the arc melting alloys. Final Finishing pass deformation should not be less than 13%, the amount of deformation of cold-rolled sheet by 30% to 55%.