



SUPERALLOY SN251035 SPECIFICATIONS

1. Overview

SN251035 alloy is intensified by means of solution treatment. it has higher antioxidant temperature, its antioxidant temperature can reach above 900°C at standard condition; the plasticity good and shaping is performed by cold pressing; the weldability is good too. The alloy is mainly be used for making complex high temperature component when high oxidation resistance is requested. The most typical component among them is the combustor of the turbine engine working at the 750~800°C condition.

1.1. Material Grade

SN251035

1.2. Similar grades

ХН38ВТ(ЭИ703), ХН38ВТ-ВД(ЭИ703-ВД) (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

GJB 3165-1998 - Specification for hot-rolled and forged heat-resisting superalloy bars for aviation load-bearing parts

1.4. Chemical composition

C	Cr	Ni	W	Al	Ti	Fe	Nb	Ce	Si	Mn	No more than	
											P	S
0.06~0.12	20.0~23.0	35.0~40.0	2.5~3.5	≤0.5	0.7~1.2	Rest	1.2~1.7	≤0.05	≤0.8	≤0.7	0.03	0.02

1.5. Heat Treatment

State	Solution treatment	Aging
Hot/Cold rolled sheets	1100°C~1140°C, air-cooled	
Hot-rolled & forged bars	1080°C, 2h, water cooled	680°C, 16h, air-cooled

1.6. Product Form

These alloys available in bar and sheet.

1.7. Applications

900°C in the following long-term work of the turbine engine combustion chamber and turbine outer ring, exhaust. Also used for parts of hot gas tunnel systems (850°C).



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2. Physical Properties

2.1. Thermal Performance

2.1.1. Thermal Conductivity – $\lambda = 12.6 \text{ W/(m}\cdot\text{°C)}$

2.1.2. Coefficient of linear expansion - $\alpha = 13.7 \cdot 10^{-6} \cdot \text{°C}^{-1}$

2.2. Density – $\rho = 8.17 \text{ g/cm}^3$

3. Mechanical Properties

3.1. Performance of technical standards

Standard	State	Tensile Properties						Hardness [HBW]	high temperature persistent		
		$\theta/\text{°C}$	σ_b/MPa	$\sigma_{0.2}/\text{MPa}$	$\delta_5/\%$	$\varphi/\%$	Impact		$\theta/\text{°C}$	σ/MPa	Time [h]
GB/T 14995	Hot-rolled sheet	20	590	---	35	---	---				
		700	345		35	---	---				
GB/T 14996	Cold-rolled sheet	20	590	---	35	---	---				
		700	345		35	---	---				
GJB 3165	Hot-rolled & forged bar	20	590	345	28	35	---		700	195	50



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3.2. Durability and creep properties

3.2.1. Durability properties

Material	$\theta/^\circ\text{C}$	σ/MPa	Time [hours]
Cold-rolled sheet	800	100	69

3.2.2. High temperature creep properties

Material	$\theta/^\circ\text{C}$	σ/MPa	Time [hours]	$\delta_5/\%$
Cold-rolled sheet	800	20	100	0.2

3.2.3. Fatigue performance

Material	$\theta/^\circ\text{C}$	σ/MPa	N [no. of times]
Cold-rolled plate	900	127	$>10E7$

3.3. Elastic properties

3.3.1. Modulus of elasticity - Dynamic [E_D] modulus of elasticity at different temperatures.

$^\circ\text{C}$	20	900
E_D [GPA]	199	142