

N50 ASTM A276 Stainless Steel – Annealed Condition

N50 Stainless Steel is an austenitic, nitrogen strengthened steel providing a combination of corrosion resistance and strength not found in types 316 and 317. Unlike many other austenitic stainless steels, N50 remains non-magnetic even after severe forming operations or when it is cooled to sub zero temperatures.

N50 is generally used for applications requiring high strength and corrosion resistance such as downhole equipment in the oil and gas industry, valves, fittings and pumps in the marine and pulp and paper industries.

National Specifications

Material may also be released to Customer Specifications, subject to enquiry.

ASTM	UNS	SAE AMS	British Standard	Other
A276	S20910	–	–	Type XM-19 Annealed

Technical Data

Chemical Composition

	C	Mn	Cr	Ni	Mo	N	Nb	Fe
Min %	-	4.0	20.5	11.5	1.50	0.20	0.10	-
Max %	0.06	6.0	23.5	13.5	3.0	0.40	0.30	Bal

Typical Tensile Properties at Ambient Temperature

Yield Strength MPa min.	UTS MPa min.	Elongation min %	Reduction of Area min %
380	690	35	55

Physical Properties

Density	7880 kg/m ³
Magnetic Permeability	< 1.01
Electrical resistivity at 20°C	0.82μΩm
Thermal Conductivity at 20°C	13.3 W.m ⁻¹ .k ⁻¹
Mean Coefficient of Thermal Expansion 20 – 100°C	17.9 X 10 ⁻⁶ / °K

Hot Working

Heat to 1090°C, soak to equalise, then heat to 1175°C and equalise prior to forging.

Heat Treatment

Anneal at 1066°C - 1121°C for a time dependent on section thickness followed by either air or water cooling. Annealing towards the lower end of the temperature range provides a higher level of mechanical properties along with excellent corrosion resistance.

Machining

N50 is more susceptible to cold work hardening than types 304 and 316 stainless steel. Slow speeds, positive feeds, coated carbides, rigid tool and work holders and plenty of resulphurised lubricant are essential.

Condition	Tool Type	Cut Depth mm	Speed m/min.	Feed mm/rev.
Annealed	Carbide	3.0 roughing	27 – 42	0.2 – 0.38
		0.5 finishing	35 – 60	0.13 – 0.20

The data presented herein are not intended for specification purposes, and should be considered as typical or average values only. Applications suggested for the materials described herein are made solely to allow the reader to make his own evaluation, and are not to be construed as warranties, either limited or express, or fitness for these or other applications. Materials must be tested under actual service conditions to determine their suitability for a particular purpose.