

Nitronic 50

Nitronic 50 (UNS S20910/XM-19) is a nitrogen-strengthened austenitic stainless steel that possesses corrosion resistance superior to 316, 316L, 317 and 317L plus approximately twice the yield strength at room temperature. It has very good mechanical properties at both elevated and sub-zero temperatures. The alloy retains low magnetic permeability even after severe cold working or exposure to sub-zero temperatures and excellent mechanical properties up to 650°C.

It is listed in NACE MR 0175 for sour service and has gained ASME Approval for Pressure Vessel applications.

Chemical Composition, %

element	Cr	Ni	Fe	Mo	Nb	V	N	C	Mn	Si	P	S
min.	20.50	11.50	bal.	1.50	0.10	0.10	0.20		4.00			
max.	23.50	13.50		3.00	0.30	0.30	0.40	0.060	6.00	1.00	0.040	0.030

Chemical Composition according to ASTM. Some compositional limits of other specifications may vary slightly.

Designation and standards

National Standards	Material designation	Chemical composition	Forgings	Rod and bar	Plate and sheet	Strip	Seamless tube
ASTM ASME SAE NACE	UNS S20910 XM-19	A959 SA959 MR0175	A182 SA182 AMS5764	A276 SA276 A479 SA479 A193 SA193 A194 SA194 AMS5764	A240 SA240 A412 SA412 AMS5861	A240 SA240 A412 SA412 AMS5861	A269 SA269 A312 SA312

Density 7.88g/cm³

Corrosion resistance

- excellent resistance to nitric acid, humidity, salt spray (NaCl)
- moderate resistance to phosphoric acid, sulfuric acid, sodium hydroxide, sea water, sour oil and gas
- good resistance to acetic acid
- acceptable resistance to sulfide stress cracking at Rockwell C35 maximum hardness per NACE MR0175.

Applications

Typical applications are:

- shafts, stems in valves, chokes and pumps in oil and gas industry
- seawater pump shafts
- pressure vessels
- components in marine industries