

NITRONIC 60, UNS S21800, ALLOY 218, TYPE 218

Introduction :

Nitronic 60 is fully austenitic alloy performs well as a high temperature alloy for temperatures around 1800°F. It is known as all-purpose metal. Nitronic 60 has similar oxidation resistance to Stainless Steel 309 and has far superior to Stainless Steel 304. It is best known for its galling and wear resistance. The additions of Silicon and Manganese have given this alloy a transpose to galling, inhibit wear and fretting even in the annealed condition. Nitronic 60 material has corrosion resistance falls between stainless steel 304 and 316. However, expertise shows that in a wear system, a galling or siezure failure happens first, followed by dimensional loss because of wear, and finally corrosion. Wear and galling must be the primary concerns of the design engineer. Although the overall corrosion resistance of NITRONIC 60 is not quite as good as Stainless Steel 316. It does offer better chloride pitting resistance, stress corrosion cracking resistance and crevice corrosion resistance than Stainless Steel 316. Nitronic 60 offers low temperature impact and excellent high temperature oxidation resistance. Nitronic 60 Applications are valve stems, trim and seats, fastening systems, screening, bushings, pins, and roller bearings, rings and pump shafts. Other uses include rails guides, bridge pins and wear plates.

Products Available in forms :

- NITRONIC 60, UNS S21800, ALLOY 218 Plates
- NITRONIC 60, UNS S21800, ALLOY 218 Pipes
- NITRONIC 60, UNS S21800, ALLOY 218 Round Bar
- NITRONIC 60, UNS S21800, ALLOY 218 Tube
- NITRONIC 60, UNS S21800, ALLOY 218 Flanges
- NITRONIC 60, UNS S21800, ALLOY 218 Wire
- NITRONIC 60, UNS S21800, ALLOY 218 Fittings

Standard Available in forms :

- ASTM A193 / ASME SA193
- ASTM A194 / ASME SA194
- ASTM A276 / ASME SA276
- ASTM A479 / ASME SA479
- ASTM A240 / ASME SA240
- ASTM A182 / ASME SA182
- AMS 5848

Chemical Composition

	NITRONIC 60	UNS S21800	ALLOY 218	TYPE 218
Carbon	0.10max	0.10max	0.10max	0.10max
Manganese	7.0-9.0	7.0-9.0	7.0-9.0	7.0-9.0
Chromium	16.0-18.0	16.0-18.0	16.0-18.0	16.0-18.0
Silicon	3.5-4.5	3.5-4.5	3.5-4.5	3.5-4.5
Nitrogen	0.08-0.18	0.08-0.18	0.08-0.18	0.08-0.18
Molybdenum	0.75max	0.75max	0.75max	0.75max
Nickel	8.0-9.0	8.0-9.0	8.0-9.0	8.0-9.0

Mechanical Properties

	NITRONIC 60	UNS S21800	ALLOY 218	TYPE 218
Ultimate Tensile Strength, ksi[Mpa nom]	105(724)	105(724)	105(724)	105(724)
Yield Strength, ksi[Mpa nom]	55(375)	55(375)	55(375)	55(375)
Elongation %, min	50	50	50	50

SPECIFICATION	ASTM	ASME	ASME
BAR	A193, A194, A276,A479	SA193, SA194, SA276, SA479	5848
SHEET & PLATE	A240	SA240	-
CAST	A351, A743	SA351, SA743	-
FORGING	A182, A193, A194, A276,A479	Sa182, SA193, SA194, SA276, SA479	5848

Typical Applications

- Chain link conveyer belts and other components;
- Chain drives;
- Bolts, nuts and other fasteners;
- Valve stems, seats and trim;
- Fittings for pumps and valves in chemical processing industries;
- Bridge pins;
- Pins, bushings and roller bearings;
- Aerospace applications.

Corrosion Resistance

- The uniform corrosion resistance of Nitronic 60 falls between grades 304 and 316.
- However, in a wear system, galling or seizure occurs first, then dimensional loss by wear, and finally corrosion.
- Galling and wear are the first concerns in design.
- Although the uniform corrosion resistance of Nitronic 60 is not quite as good as 316, it offers better pitting resistance to chlorides, stress corrosion cracking resistance and crevice corrosion resistance than grade 316.

Fabrication

- Nitronic 60 can be hot forged.
- After forging the workpiece must be solution annealed.

Machinability

- The alloy is difficult to machine, rated at 50% of 304 and 23% of the free cutting carbon steel AISI B1112.
- Sharp, rigid, carbide tipped tools and well powered machines are recommended, with the use of heavy cuts and slow speeds.

Heat Treatment

- Nitronic 60 is fully austenitic and can not be strengthened by heat treatment.
- Solution annealing is carried out at 1060°C, followed by water quenching

Weldability

- Nitronic 60 is readily welded by all conventional processes.
- Autogenous GTAW welds are sound, with wear characteristics approximating to the base metal.
- GTAW welds in heavy sections are also sound and weld tensile strength is slightly higher than base metal.
- Wear properties are near but below base metal.
- Pure argon is used as shielding gas and AWS A5.9 ER 218 filler metal is used.
- Pre-heating and post heating are not needed.



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