

Nitronic 60® Stainless Steel (UNS S21800) — Material Data Sheet

ASTM A276 bar · ASTM A193 B8S bolts · UNS S21800 · AISI S21800

Galling-resistant austenitic stainless steel with Si, Mn and N

The anti-galling stainless: silicon and manganese give it a wear-resistant surface, so nuts and threads assemble dry without seizing — for valve stems, nuts and repeatedly assembled joints.

TENSILE, ANNEALED BAR	95 ksi min	SILICON	3.5–4.5 %
YIELD, ANNEALED BAR	50 ksi min	GALLING RESISTANCE	Excellent, no lubricant needed
HARDNESS, ANNEALED	241 HBW max	PRESSURE-FLANGE GRADE	ASTM A193 B8S

Nominal composition



Midpoints of the specification ranges, for orientation only. Limits are in the table.

Chemical composition — Type S21800 (UNS S21800)

Element	Symbol	Min %	Max %
Carbon	C	—	0.10
Manganese	Mn	7.0	9.0
Phosphorus	P	—	0.060
Sulfur	S	—	0.030
Silicon	Si	3.5	4.5
Chromium	Cr	16.0	18.0
Nickel	Ni	8.0	9.0
Nitrogen	N	0.08	0.18

Values per ASTM A276/A276M-17 Tables 1 and 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Physical properties (typical)

DENSITY	0.276 lb/in ³ (7.63 g/cm ³)
MODULUS OF ELASTICITY	26.2 × 10 ⁶ psi (181 GPa)
THERMAL EXPANSION (68–212 °F)	9.1 µin/in·°F
MAGNETIC	No in the annealed condition

Heat treatment

Solution annealed at about 1950 °F and quenched. Not hardenable by heat treatment; cold worked for strength where required.

Bar properties — ASTM A276 Type S21800

Condition and nominal diameter (in.)	Tensile strength, min (ksi)	Yield strength 0.2% offset, min (ksi)	Elongation, min (%)	Reduction of area, min (%)	Hardness
Condition A (annealed) — all	95	50	35	55	241 HBW max

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Applicable standards

ASTM A276 / A479	Stainless steel bars (UNS S21800)
ASTM A193 GRADE B8S	Bolting for high-temperature or high-pressure service
ASTM A194 GRADE 8S	Companion nuts
ASTM G98	Galling resistance test method

Forms we supply in Nitronic 60

- Hex and heavy hex bolts and cap screws
- Full-thread studs and threaded rod
- Socket head cap and set screws
- Hex, jam and lock nuts
- Washers and spacers
- Machined components from certified bar

Typical applications

- Nuts for stainless and Nitronic 50 studs
- Valve stems, seats and bushings
- Pins, bushings and wear plates in food and pharmaceutical machinery
- Nuclear plant fasteners
- Marine hardware and pump wear parts
- Any stainless joint that is assembled repeatedly