1.3964, X2CrNiMnMoNNb21-16-5-3, S20910, XM-19

Discover the properties of XM-19 (1.3964, X2CrNiMnMoNNb21-16-5-3, S20910) stainless steel, including chemical composition, mechanical performance, welding, and global equivalents.

Applications

- Aerospace components
- Chemical processing equipment
- Marine fasteners & valves
- Nuclear reactor parts
- High-strength structural applications

Equivalent or Similar Grades - Chemical Composition

Element (%)	XM-19 (S20910)	X2CrNiMnMoNNb21-16-5-3 (EN)	1.3964 (DIN)
Carbon (C)	≤0.06	≤0.06	≤0.06
Chromium (Cr)	20.5–23.5	20.5–23.5	20.5–23.5
Nickel (Ni)	11.5–13.5	11.5–13.5	11.5–13.5
Manganese (Mn)	4.0–6.0	4.0–6.0	4.0–6.0
Molybdenum (Mo)	1.5–3.0	1.5–3.0	1.5–3.0
Nitrogen (N)	0.20–0.40	0.20–0.40	0.20–0.40
Niobium (Nb)	0.10–0.30	0.10–0.30	0.10–0.30
Silicon (Si)	≤1.0	≤1.0	≤1.0
Phosphorus (P)	≤0.045	≤0.045	≤0.045
Sulfur (S)	≤0.030	≤0.030	≤0.030

Mechanical Properties

Property	XM-19 (S20910)	X2CrNiMnMoNNb21-16-5-3	1.3964
Tensile Strength (MPa)	690–895	690–895	690–895
Yield Strength (0.2% Offset, MPa)	≥415	≥415	≥415
Elongation (% in 50mm)	≥30	≥30	≥30
Hardness (Rockwell B)	≤100 HRB	≤100 HRB	≤100 HRB

SpecialSteel YOUR TRUSTED PARTNER IN SPECIAL STEEL SOLUTIONS	1.3964, X2CrNiMnMoNNb21-16-5-3, S20910, XM-19

High-Temperature & Creep Performance

- **Oxidation Resistance:** Good up to 925°C (1697°F).
- **Creep Strength:** Superior to standard 300-series stainless steels due to nitrogen strengthening.

Physical Properties

Property	Value
Density (g/cm³)	7.9
Melting Range (°C)	1400–1450
Thermal Conductivity (W/m·K at 20°C)	15
Electrical Resistivity (Ω·m)	0.85×10^{-6}
Magnetic Permeability	Non-magnetic (annealed)

Heat Treatment

- **Solution Annealing:** 1050–1150°C (1922–2102°F), followed by rapid cooling (water or air).
- **Stress Relieving:** Not typically required but can be done at 400–600°C (752–1112°F).

Processing Performance

Fabrication & Welding

- **Machinability:** Similar to 304/316 but harder; use carbide tools.
- **Welding:** Excellent weldability via TIG, MIG, or SAW. No preheating required.