EN 1.4301 (AISI 304)

Alloy: X5CrNi18-10
EN: EN 10088-3 / Werkstofnummer: 1.4301

Product Description

Stainless steel 1.4301 (AISI 304) is the most widely used austenitic stainless steel grade, accounting for the majority of all stainless steel produced globally. Characterised by an 18% chromium and 10% nickel composition, it offers excellent corrosion resistance in most environments, good formability, and reliable weldability. It is the general-purpose grade for applications that require corrosion resistance without the elevated demands of marine or chemical environments. Note: 1.4301 is susceptible to chloride-induced stress corrosion cracking — for marine or chloride-heavy environments, specify 1.4404 (316L).

Key Characteristics

- Excellent general corrosion resistance in atmospheric and mild chemical environments
- Good machinability — requires sharp tooling and appropriate cutting speeds
- Excellent weldability — all common processes
- Good formability and work-hardening behaviour
- Non-magnetic in annealed condition (may become slightly magnetic after machining)
- Not suitable for chloride or marine environments — use 316L

Mechanical Properties — EN 10088-3

Tensile Strength (Rm)	500–700 MPa
Yield Strength (Rp0.2)	205 MPa (min)
Elongation at Break (A)	45% (min)
Hardness	≤ 215 HB (Brinell, ISO 6506)
Elastic Modulus (E)	~193 GPa
Density	7.90 g/cm³
Thermal Conductivity	~15 W/m·K
Coeff. of Thermal Expansion	17.2×10^{-6} /K (20–100 °C)
Melting Range	1400–1450 °C
Electrical Resistivity	~0.73 µΩ·m

Chemical Composition — EN 10088-3

Chromium (Cr)	17.50–19.50%
Nickel (Ni)	8.00–10.50%
Manganese (Mn)	≤ 2.00%

Silicon (Si)	≤ 1.00%
Carbon (C)	≤ 0.07%
Phosphorus (P)	≤ 0.045%
Sulphur (S)	≤ 0.030%
Nitrogen (N)	≤ 0.10%
Iron (Fe)	Remainder

Machining Notes

Good machinability with carbide tooling at moderate cutting speeds. Stainless steel work-hardens rapidly — use sharp tools, adequate feed rates, and avoid dwelling. Flood coolant recommended for all operations. Lower cutting speeds than aluminium; allow for higher cutting forces and heat generation. Suitable for tapping M3 and above with appropriate lubricant.

Typical Applications

Food processing equipment, kitchen and catering hardware, architectural components, pharmaceutical machinery, chemical processing (non-chloride environments), medical devices, consumer products, industrial fixtures and enclosures.