

Overview

This sheet summarises two stainless steel grades available through Shapeways CNC machining services. Data is compiled by Shapeways on the basis of EN 10088-3. For full grade data, refer to the individual Material Properties Sheets.

Grade Comparison

Property	EN 1.4301 (304)	EN 1.4404 (316L)
EN Designation	EN 1.4301	EN 1.4404
AISI Equivalent	AISI 304	AISI 316L
Chemical Composition	X5CrNi18-10	X2CrNiMo17-12-2
Key Addition	18% Cr, 10% Ni	18% Cr, 12% Ni, 2% Mo
Tensile Strength (Rm)	500–700 MPa	500–700 MPa
Yield Strength (Rp0.2)	205 MPa min	200 MPa min
Elongation (A)	45% min	40% min
Hardness	≤ 215 HB	≤ 215 HB
Density	7.90 g/cm ³	7.98 g/cm ³
Elastic Modulus	~193 GPa	~193 GPa
Corrosion Resistance	Excellent (general)	Superior (incl. chlorides)
Coeff. Thermal Expansion	$17.2 \times 10^{-6} /K$	$16.5 \times 10^{-6} /K$
Chloride Resistance	Limited	Good — Mo addition
Weldability	Excellent	Excellent (L = no sensitisation)
Machinability	Good	Good (slightly harder)
Primary Use	General purpose	Marine, medical, chemical

Corrosion resistance ratings are relative within this grade set. All mechanical values are EN 10088-3 minimums. CTE values measured over 20–100 °C range.

Grade Selection Guide

Application	Recommended Grade	Rationale
General industrial & structural	1.4301 (304)	Most cost-effective; excellent general corrosion resistance
Marine / offshore / coastal	1.4404 (316L)	Molybdenum provides chloride and pitting resistance
Chemical processing	1.4404 (316L)	Better resistance to acids and process chemicals
Medical / pharmaceutical	1.4404 (316L)	Industry standard for implants and pharma equipment

Food & beverage contact	1.4301 or 1.4404	Both suitable; 316L preferred for salt or acid contact
Welded assemblies	Both grades	316L L-grade avoids sensitisation; 304 excellent weldability
Cost-sensitive applications	1.4301 (304)	Lower raw material cost; adequate for most environments