

X2CrNi18-9 (304L)

Mat. No. 1.4306 / 1.4307 · Austenitic Cr-Ni stainless steel, L-grade

Mat. No.: 1.4306 (high-purity) · 1.4307 (standard L-grade)

EN designation: X2CrNi19-11 (1.4306) · X2CrNi18-9 (1.4307)

ASTM/ASME equiv.: Pipes: A/SA 312 TP304L · Fittings: A/SA 403 WP304L · Flanges: A/SA 182 F304L

Key property: L-grade: C ≤ 0.030 % – weldable without PWHT – no Mo (lower cost than 316L)

PREN value: approx. 18–20 (no Mo)

Temperature range: –196 °C to +400 °C

Standard: EN 10216-5 · EN 10253-4

Delivery forms: Elbows · Tees · Reducers · Caps · Flanges · Pipes

1 Material Equivalents & Comparable Grades

International Equivalents

Standard / Region	Designation	Mat. No. / Grade	Note
EN	X2CrNi19-11	1.4306	High-purity variant, higher Cr/Ni
EN	X2CrNi18-9	1.4307	Standard L-grade variant
ASTM	A/SA 312 TP304L	–	Pipes – most used austenitic stainless worldwide
ASTM	A/SA 403 WP304L	–	Fittings
ASTM	A/SA 182 F304L	–	Flanges
UNS	S30403	–	US material number
JIS	SUS 304L	–	Japanese equivalent

Alternative Materials

Material	Mat. No.	Relation to X2CrNi18-9 (304L)	When to use
316L (1.4404)	1.4404	Mo-alloyed, PREN ~25	For chloride-containing environments
321 (1.4541)	1.4541	Ti-stabilised	For service in sensitisation range 425–815 °C

2 Chemical Composition

Values in mass percent (%). Standard: EN 10216-5.

L-grade: C ≤ 0.030 % prevents Cr carbide formation. No Mo – lower chloride resistance than 316L but significantly cheaper.

Element	Sym.	Min. (Heat)	Max. (Heat)	Max. (Prod.)	Function
Carbon	C	–	0.030	0.035	L-grade: max. 0.03 %
Silicon	Si	–	1.000	1.100	Deoxidation
Chromium	Cr	17.50	19.50	19.70	1.4306: up to 20.0 %
Nickel	Ni	8.00	11.50	11.80	Austenite stabiliser
Nitrogen	N	–	0.110	0.130	Austenite stabilisation

3 Mechanical Properties

Room Temperature – Minimum Requirements

Solution annealed. Most widely used stainless steel globally.

Property	Sym.	Unit	Min. Value	Note
Yield strength	Rp0.2	MPa	≥ 200	Solution annealed
Tensile strength	Rm	MPa	500–700	–
Elongation	A	%	≥ 35	–
Impact (–20 °C)	KV	J	≥ 100	Cryogenic capable
Hardness	HB	–	≤ 215	–

Elevated Temperature Yield Strength Rp0.2 in MPa (indicative values)

Temp.	100 °C	200 °C	300 °C	400 °C
Rp0.2 (MPa)	165	148	135	124

4 Physical Properties

Property	Sym.	20 °C	200 °C	400 °C	Unit
Density	ρ	7.90	7.78	7.66	g/cm ³
Modulus of elasticity	E	200	186	170	GPa
Thermal conductivity	λ	15	18	21	W/(m·K)
Thermal expansion	α	16.0	16.8	17.5	10 ^{–6} /K

5 Corrosion Behaviour

Medium / Environment	Notes	Rating
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Aqueous solutions (neutral)	Broadest application range	++
Nitric acid	Excellent (no Mo needed)	++
Organic acids	Acetic, citric, lactic	+
Chloride solutions (cold, dilute)	No Mo – limited vs. 316L	o
Hot chloride solutions	Pitting risk – 316L preferred	-
Seawater	Not suitable for long-term continuous service	-

++ excellent + good o limited - not suitable

304L (1.4307) is the most widely used stainless steel in the world. No Mo – lower chloride resistance than 316L. L-grade enables welding without PWHT.

6 Typical Applications

Industry / Plant	Typical Application	Operating Conditions
Food / pharma / chemical	Standard for non-chloride environments	Broadest application range of all stainless steels
Cryogenics	-196 °C capable piping	Impact-tested at cryogenic temperatures
General plant engineering	Where 316L is not required	More cost-effective than 316L
Water / utilities	Potable water, treated water systems	pH-neutral media

7 Delivery Forms at Nirotec

Component	Standard (EN)	Standard (ASME/ASTM)	Note
Elbows	EN 10253-4	ASME B16.9 · A/SA 403 WP304L	LR/SR, 90°/45°
Tees	EN 10253-4	ASME B16.9 · A/SA 403 WP304L	Equal and reducing
Reducers	EN 10253-4	ASME B16.9 · A/SA 403 WP304L	Concentric and eccentric
Caps	EN 10253-4	ASME B16.9 · A/SA 403 WP304L	Ellipsoidal
Flanges	EN 1092-1 Type 11	ASME B16.5 · A/SA 182 F304L	PN 10–400
Pipes	EN 10216-5	A/SA 312 TP304L	Seamless

8 Standards, Approvals & Codes

Standard / Code	Title / Application
EN 10216-5	Seamless stainless steel tubes

EN 10253-4	Butt-welding fittings
PED 2014/68/EU	Pressure Equipment Directive
ASME B31.3	Process Piping

9 Fabrication Notes

Weldability

Parameter	Requirement / Recommendation	Note
Preheat	Not required	Austenitic
PWHT	Not required	L-grade prevents sensitisation
Filler	308L (EN ISO 14343)	Low-carbon, composition match
Process	GTAW, SMAW, GMAW	Standard

- Delivery condition: Solution annealed
- Advantage of L-grade: no PWHT required even after welding in sensitisation range
- Pickling and passivation after welding recommended

10 Enquiry & Contact

For a project-specific quotation, please provide:

- Standard and execution (e.g. LR 90° elbow per EN 10253-4)
- Dimensions: DN / NPS and wall thickness or schedule
- Quantity and requested delivery date
- Documentation: EN 10204 Type 3.1 / 3.2, NDT, third-party inspection
- Any project-specific specifications or special requirements

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All information is provided without warranty. Applicable standards and project specifications at time of order are authoritative.