

# Commercial Proposal for Supply

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## Food-Grade and Chemically Resistant Stainless Steel: Grades, Specifications, and Technical Characteristics



*High-quality stainless steel from Metal-Asia*



*Food-grade stainless steel for industrial vessels*

### Introduction

Food-grade and chemically resistant stainless steel encompasses a group of high-alloy corrosion-resistant alloys engineered for operation in aggressive environments — including acids, alkalis, and chloride-bearing solutions — while ensuring full sanitary and hygienic safety during contact with food products. The primary protective mechanism involves the formation of a passive chromium oxide film ( $\text{Cr}_2\text{O}_3$ ) on the surface, delivering exceptional anti-corrosion performance.

Critical requirements for food-grade grades include: stability in high-concentration acid and alkaline media, resistance to disinfectants and cleaning agents, retention of mechanical strength at elevated temperatures and pressure, and complete inertness during food contact with zero toxic leaching.

### Supply Chain Pain Points and Metal-Asia.pw Solutions

**Pain Point 1: Grade Substitution and Counterfeit Material.** The Chinese market is known for substituting AISI 201 (with elevated manganese content) for specified AISI 304. AISI 201 contains 14-16.5% chromium and 1-1.5% nickel versus 18-20% chromium and 8-10.5% nickel in authentic AISI 304. The result is corrosion initiation within 6-12 months of food-contact service.

**Solution:** Metal-Asia.pw conducts on-site spectrometric analysis of chemical composition at the supplier's facility in China prior to shipment. Every batch is accompanied by a Mill Test Certificate 3.1 per EN 10204 with actual spectrometer data, ensuring full transparency and compliance.

**Pain Point 2: Thickness and Dimensional Non-Conformance.** Cold-rolled sheet with a nominal thickness of 2.0 mm is frequently delivered at an actual thickness of 1.85-1.90 mm (deviation up to 7.5%), which is critical for pressure vessel design calculations and structural integrity.

**Solution:** Independent ultrasonic thickness gauging at all stages — from production through loading. Thickness tolerance is controlled per ASTM A240 and EN 10088-2 standards, with documented inspection reports.

**Pain Point 3: Missing Certificates and Customs Clearance Delays.** Incorrect HS code declaration, absence of material certificates, and non-compliance with destination-market regulations (such as FDA for food contact or ASME for pressure equipment) result in port delays, demurrage charges, and potential rejection.

*Solution:* Full customs documentation support with accurate HS classification, Mill Test Certificates, country of origin documentation, and compliance declarations for EU, North American, Middle Eastern, Southeast Asian, and Latin American markets.

### Chemical Composition of Food-Grade Stainless Steels

Grade AISI	UNS Designation	C, % max	Si, % max	Mn, % max	Cr, % %	Ni, % %	Mo, % %	Ti, % %	Fe	Key Characteristics
AISI 304	S30400	0.08	1.00	2.00	18.0- 20.0	8.0- 10.5	—	—	Balance	Classic food-grade steel, universal application
AISI 304L	S30403	0.03	0.75	2.00	18.0- 20.0	8.0- 12.0	—	—	Balance	Low-carbon, improved weldability
AISI 316	S31600	0.08	1.00	2.00	16.0- 18.0	10.0- 14.0	2.0- 3.0	—	Balance	Acid-resistant, molybdenum-alloyed
AISI 316L	S31603	0.03	1.00	2.00	16.0- 18.0	10.0- 14.0	2.0- 3.0	0.50 max	Balance	Low-carbon acid-resistant grade
AISI 316Ti	S31635	0.08	0.75	2.00	16.0- 18.0	10.0- 14.0	2.0- 3.0	0.70 max	Balance	Titanium-stabilized for welded structures
AISI 321	S32100	0.08	1.00	2.00	17.0- 19.0	9.0- 12.0	—	0.50 max	Balance	Heat-resistant, titanium-stabilized, up to 800 C
AISI 430	S43000	0.12	1.00	1.00	16.0- 18.0	—	—	—	Balance	Nickel-free, magnetic, cost-effective
AISI 310S	S31008	0.08	1.50	2.00	24.0- 26.0	19.0- 22.0	—	—	Balance	High-temperature resistant, up to 1050 C

Grade AISI	UNS Designation	C, % max	Si, % max	Mn, % max	Cr, % %	Ni, % %	Mo, % %	Ti, % %	Fe	Key Characteristics
AISI 904L	N08904	0.02	0.70	2.00	19.0- 21.0	24.0- 26.0	4.0- 5.0	—	Balance	Super- austenitic, maximum corrosion resistance

## Physical and Mechanical Properties

Grade	Density, g/cm <sup>3</sup>	Tensile Strength, MPa	Yield Strength, MPa	Elongation, %	Hardness HRB	Elastic Modulus, GPa	Magnetic Properties
AISI 304	7.93	515-620	205-290	40-50	70-90	193	Non- magnetic
AISI 316	8.00	515-620	205-290	40-50	79	193	Non- magnetic
AISI 321	7.93	515-620	205-290	40-50	80	193	Non- magnetic
AISI 430	7.75	450-600	205-310	22-25	75-85	200	Magnetic
AISI 310S	7.98	515-620	205-290	40-50	85	200	Non- magnetic

## Most Demanded Grades: Technical Description

### AISI 304 (UNS S30400) — "The Classic Food-Grade Steel"

Austenitic stainless steel containing 18-20% chromium and 8-10.5% nickel. Non-magnetic and fully weldable by all conventional methods (TIG, MIG, SMAW). Service temperature range from -196 C to +800 C. Density 7.93 g/cm<sup>3</sup>. Applications include milk, wine, and beer tanks; confectionery equipment; kitchen utensils; meat processing tables; and architectural cladding.

### AISI 316 (UNS S31600) — "The Acid-Resistant Grade"

An enhanced variant of AISI 304 with 2-3% molybdenum addition. Molybdenum increases pitting and crevice corrosion resistance in chloride environments by a factor of 3-5. Chromium content 16-18%, nickel 10-14%. Used in vinegar production, salt brine handling, seawater applications, pharmaceutical reactors, and chemical processing equipment.

### AISI 321 (UNS S32100) — "The Heat-Resistant Grade"

Contains titanium up to 0.5%, preventing chromium carbide precipitation during welding and intergranular corrosion. Serviceable up to 800 C, briefly to 900 C. Applied in exhaust collectors, welded structures subject to cyclic thermal loading, and heat exchangers.

### AISI 430 (UNS S43000) — "The Nickel-Free Economical Grade"

Ferritic steel with 16-18% chromium, zero nickel content. Magnetic, with thermal conductivity 15-20% higher than austenitic grades. Density 7.75 g/cm<sup>3</sup>. Suitable for mild environments, decorative elements, and domestic appliances. Cost is 25-30% lower than AISI 304.

### AISI 310S (UNS S31008) — "The High-Temperature Grade"

High-alloy austenitic steel with 24-26% chromium and 19-22% nickel. Serviceable up to 1050 C under continuous operation. Used in furnaces, thermal processing equipment, and roasting chambers.

### AISI 904L (UNS N08904) — "The Super-Austenitic Premium Grade"

Nickel content 24-26%, chromium 19-21%, molybdenum 4-5%. Maximum resistance to crevice, pitting, and intergranular corrosion. Applied in mineral fertilizer production, chlorine-bearing solutions, seawater desalination, and aggressive chemical environments.



## Metal-Asia.pw Global Procurement Services

Metal-Asia.pw delivers comprehensive stainless steel supply chain solutions from China, designed for international distributors, EPC contractors, and industrial OEMs:

- **Global Procurement Management:** Consolidated sourcing across multiple certified mills with single-point accountability
- **Supply Chain Compliance:** Full adherence to ASTM, EN, ASME, ISO, FDA, and destination-market regulatory requirements
- **Third-Party Quality Assurance:** Independent inspection by SGS, Bureau Veritas, or TUV; NDT (UT, RT, PT, MT), chemical analysis, and dimensional verification
- **Customs & Trade Compliance:** Accurate HS code classification, origin certification, and customs documentation for EU, North America, Middle East, Southeast Asia, and Latin America
- **Logistics & Freight Management:** Multimodal sea/rail/road/air freight with FOB, CIF, DAP, and DDP Incoterms options
- **Technical Documentation:** Mill Test Certificates 3.1/3.2 per EN 10204, material safety data sheets, inspection reports, and compliance declarations

For detailed service specifications, visit [Metal-Asia.pw](https://Metal-Asia.pw).

### HS Codes for Customs Clearance

Product Description	HS Code	Duty Rate (typical)
Cold-rolled sheets AISI 304/316, thickness  mm	7219.33	0-5% (varies by destination)
Hot-rolled sheets AISI 304/316, thickness  mm	7219.24	0-5%
Hot-rolled sheets AISI 304/316, thickness $\geq 3$ mm	7219.24	0-5%
Seamless stainless steel pipes AISI 304/316	7304.41	0-5%
Welded stainless steel pipes	7306.40	0-5%
Bars and rods (round, square, hex) AISI 304/316	7222.40	0-5%

<b>Product Description</b>	<b>HS Code</b>	<b>Duty Rate (typical)</b>
Stainless steel pipe fittings (elbows, tees, reducers)	7307.29	0-5%
Stainless steel wire	7223.00	0-5%
Stainless steel ingots and primary forms	7218.10	0-5%

## FAQ — Frequently Asked Questions

### 1. How can I verify genuine AISI 304 food-grade stainless steel and avoid counterfeit material?

Authentic AISI 304 contains 18–20% chromium and 8–10.5% nickel. Counterfeit products often substitute nickel with manganese (AISI 201 grade). AISI 201 contains only 14–16.5% chromium and 1–1.5% nickel, leading to corrosion within 6–12 months in food-contact environments. Metal-Asia.pw performs on-site spectrometric analysis at the manufacturer's facility in China before shipment. Every batch is accompanied by a Mill Test Certificate 3.1 per EN 10204 with actual chemical composition data.

### 2. Which stainless steel grade is suitable for chloride-containing environments such as salt brine or seawater?

For aggressive chloride environments — including salt solutions, seawater, and vinegar production — AISI 316 (UNS S31600) with 2–3% molybdenum content is the industry standard. Molybdenum enhances pitting and crevice corrosion resistance by a factor of 3–5 compared to AISI 304. For extreme marine or chemical applications, AISI 316L or super-austenitic AISI 904L is recommended.

### 3. What international standards apply to stainless steel procurement and compliance?

Key standards for global supply chains: ASTM A240 (sheet and plate), ASTM A269/A312 (seamless and welded pipes), ASTM A276 (bars and shapes), EN 10088 (European stainless steel grades), EN 10204 (inspection certificates), ISO 7153-1 (surgical instruments), ASME Section VIII (pressure vessels). Metal-Asia.pw ensures full compliance with destination-market standards, including FDA, EHEDG, and 3-A Sanitary Standards for food-contact applications.

### 4. What is the typical lead time for stainless steel deliveries from China?

Standard delivery from order confirmation to arrival at the client's designated port or warehouse ranges from 35–50 days for sea freight. Urgent air freight deliveries for small-gauge or critical components are available within 7–14 days. For large-scale industrial projects, we recommend procurement planning with a 60-day buffer to accommodate production scheduling and ocean freight consolidation.

### 5. What quality control procedures does Metal-Asia.pw implement during procurement?

Our multi-stage quality assurance protocol includes: spectrometric analysis of chemical composition at the mill, ultrasonic testing (UT) for internal defects, visual surface inspection per ASTM A480, dimensional verification with calibrated gauges, and third-party inspection by SGS, Bureau Veritas, or TUV upon client request. All results are documented in the Mill Test Certificate and inspection reports.

### 6. What HS codes apply to stainless steel imports for customs clearance?

Primary HS codes for international trade: 7219.33 (cold-rolled sheets <3mm), 7219.24 (hot-rolled sheets), 7304.41 (seamless pipes), 7306.40 (welded pipes), 7222.40 (bars and rods), 7307.29 (pipe fittings), 8481.80 (valves). Metal-Asia.pw provides full customs documentation support, including correct HS classification, country of origin certificates, and compliance declarations for EU, North American, Middle Eastern, and Southeast Asian markets.

## 7. Can I order custom cutting, forming, and surface finishing?

Yes. Our partner manufacturing facilities in China offer: CNC laser cutting (tolerance +/- 0.1 mm), press brake bending up to 180 degrees, surface polishing to mirror finish (Ra 0.2 micrometers), TIG/MIG welding with argon backing, and electropolishing for pharmaceutical-grade surfaces (Ra <0.4 micrometers). Minimum order quantity for custom fabrication starts at 500 kg per specification.

## 8. What supply chain risks does Metal-Asia.pw mitigate for international buyers?

Common procurement risks from China include: grade substitution (AISI 201 sold as AISI 304), thickness deviation beyond ASTM tolerances, missing or fraudulent certificates, customs delays due to incorrect documentation, and warranty disputes for defective material. Metal-Asia.pw eliminates these risks through direct mill relationships, independent pre-shipment inspection, full documentation compliance, bonded warehousing options, and contractual warranty terms with refund or replacement guarantees.

## Contact Information

For all inquiries regarding food-grade and chemically resistant stainless steel procurement:

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