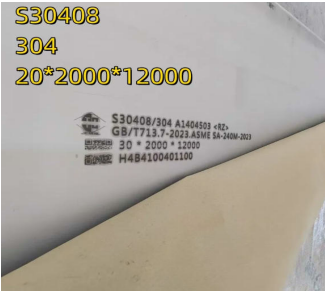
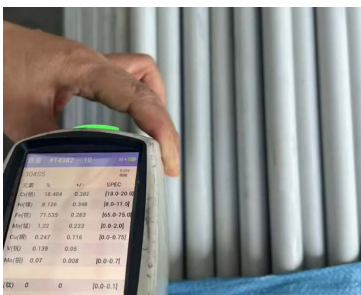


STAINLESS STEEL

SUS304

Equivalent Grades: UNS S30400 | EN 1.4301 | AISI 304 | X5CrNi18-10

PLATE	SHEET	COIL	PIPE	TUBE	BAR
					

Product Catalog & Technical Specification Sheet

Manufacturer & Supplier: GNEE Steel Co., Ltd.

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01

Introduction to SUS304

SUS304 is the most widely used austenitic stainless steel grade, known for its excellent combination of corrosion resistance, formability, and mechanical properties. As a standard 18/8 stainless steel (18% chromium, 8% nickel), SUS304 offers remarkable versatility across numerous industrial applications.

What is SUS304?

SUS304 is a Japanese Industrial Standards (JIS) designation for austenitic chromium-nickel stainless steel. It is non-magnetic in the annealed condition and cannot be hardened by heat treatment — only by cold working. Its balanced chemical composition provides good corrosion resistance in many environments, including atmospheric conditions, freshwater, and mild chemical exposure.

Key Features

- Excellent corrosion resistance in atmospheric and aqueous environments
- Superior formability and drawability for deep-drawing applications
- Good weldability with or without filler materials
- Hygienic surface properties — suitable for food and pharmaceutical industries
- Wide temperature range: from cryogenic to ~870°C continuous service
- Good strength and ductility at room and elevated temperatures
- Non-magnetic in annealed condition (becomes slightly magnetic with cold work)
- Easily fabricated, machined, and cleaned
- 100% recyclable — environmentally sustainable material choice
- Cost-effective balance of performance and price

Typical Applications

SUS304 finds application across virtually every industry where corrosion resistance, hygiene, and aesthetic appearance are required. Major application areas include food processing equipment, chemical processing, pharmaceutical manufacturing, architectural cladding, kitchen equipment, heat exchangers, and general engineering components.

Executive Standards

Standard	Description	Application
JIS G4304 / G4305	Japanese Industrial Standard	Hot/cold rolled stainless steel plate/sheet
ASTM A240 / A240M	American Society for Testing Materials	Pressure vessel and general purpose plate/sheet
ASTM A312	Seamless and welded austenitic steel pipe	High-temperature and general service pipe
ASTM A213 / A269	Seamless and welded austenitic steel tube	Boiler, superheater, and heat exchanger tube

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02

Chemical Composition

The chemical composition of SUS304 defines its fundamental properties. The precise balance of chromium and nickel provides its characteristic corrosion resistance and austenitic microstructure. Low carbon content ensures good weldability and resistance to intergranular corrosion.

Chemical Composition (wt. %) — JIS G4305 / ASTM A240

Element	Symbol	Minimum	Maximum	Typical Value	Purpose
Carbon	C	—	0.08	0.05	Strength & hardness control
Silicon	Si	—	1.00	0.40	Deoxidizer & oxidation resistance
Manganese	Mn	—	2.00	1.20	Austenite stabilizer & strength
Phosphorus	P	—	0.045	0.030	Impurity — controlled for toughness
Sulfur	S	—	0.030	0.010	Impurity — controlled for corrosion resistance
Chromium	Cr	18.00	20.00	18.50	Primary corrosion resistance element
Nickel	Ni	8.00	10.50	8.50	Austenite stabilizer & toughness
Iron	Fe	Balance	Balance	~71.3	Base metal matrix

Notes on Key Elements

- Chromium (Cr): The primary alloying element for corrosion resistance. At 18% minimum, chromium forms a self-healing passive oxide layer (Cr₂O₃) on the steel surface, providing excellent resistance to oxidation and many corrosive environments.
- Nickel (Ni): Stabilizes the austenitic (face-centered cubic) crystal structure at all temperatures, ensuring ductility and toughness. Nickel also enhances corrosion resistance in reducing environments and improves formability.
- Carbon (C): Limited to 0.08% maximum. Lower carbon improves weldability and reduces sensitization (chromium carbide precipitation at grain boundaries) during welding or heat exposure in the 450–850°C range.
- Manganese (Mn): An austenite stabilizer that partially substitutes for nickel while improving strength and hot workability.

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Mechanical Properties

SUS304 exhibits excellent mechanical properties that make it suitable for a wide range of structural and industrial applications. Its austenitic structure provides good ductility and toughness even at cryogenic temperatures. Mechanical properties vary slightly depending on product form, heat treatment, and surface condition.

Room Temperature Mechanical Properties (Annealed)

Property	Symbol	Minimum	Typical	Unit	Test Standard
Tensile Strength	σ_b / Rm	520	600–700	MPa	ASTM E8 / JIS Z2241
Yield Strength (0.2%)	$\sigma_{0.2}$ / Rp0.2	205	250–310	MPa	ASTM E8 / JIS Z2241
Elongation (50mm GL)	δ / A	40	50–60	%	ASTM E8 / JIS Z2241
Hardness (Rockwell B)	HRB	—	70–85	HRB	ASTM E18
Hardness (Brinell)	HB	≤187	150–170	HB	ASTM E10
Hardness (Vickers)	HV	—	160–190	HV	ASTM E92
Modulus of Elasticity	E	—	193	GPa	—
Shear Modulus	G	—	76	GPa	—
Poisson's Ratio	ν	—	0.29	—	—

Property Variations by Temper

Mechanical properties of SUS304 vary significantly with cold working. The following table shows typical values for different tempers of cold-rolled sheet:

Temper Condition	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Hardness (HRB)
Annealed (Soft)	520–650	205–310	45–60	70–85
1/4 Hard	650–780	380–520	20–35	85–90
1/2 Hard	780–930	580–700	10–20	90–95
3/4 Hard	930–1100	760–900	5–12	95–100
Full Hard	1100–1300	950–1100	3–8	100–105

Key Notes

- SUS304 cannot be hardened by heat treatment — only by cold working (strain hardening)
- Cold working increases strength and hardness while reducing ductility and elongation
- The material retains excellent ductility even at cryogenic temperatures (-196°C)
- Impact strength remains high down to very low temperatures — no ductile-brittle transition
- Springback is higher than carbon steels due to lower yield strength and higher ductility

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Physical Properties

The physical properties of SUS304 influence its behavior in thermal, electrical, and magnetic applications. These properties are important for design calculations, thermal expansion analysis, and compatibility with other materials.

Property	Value	Unit	Condition / Note
Density	7.93	g/cm³	At 20°C (room temperature)
Density	0.286	lb/in³	At 20°C (room temperature)
Melting Point Range	1400–1455	°C	Approximate solidus-liquidus
Melting Point Range	2552–2651	°F	Approximate solidus-liquidus
Specific Heat Capacity	500	J/kg·K	At 0–100°C
Thermal Conductivity	16.2	W/m·K	At 100°C
Thermal Conductivity	21.5	W/m·K	At 500°C
Coefficient of Thermal Expansion (CTE)	17.3 × 10 ⁻⁶	/°C	At 0–100°C
Coefficient of Thermal Expansion (CTE)	18.7 × 10 ⁻⁶	/°C	At 0–500°C
Electrical Resistivity	72 × 10 ⁻⁸	Ω·m	At 20°C
Magnetic Permeability	< 1.01	—	In annealed condition (non-magnetic)
Modulus of Elasticity (E)	193	GPa	At room temperature
Poisson's Ratio	0.29	—	At room temperature

Thermal Expansion Coefficient by Temperature

Temperature Range (°C)	Mean CTE (×10 ⁻⁶ /°C)	Temperature Range (°F)	Mean CTE (×10 ⁻⁶ /°F)
0 – 100	17.3	32 – 212	9.6
0 – 200	17.8	32 – 392	9.9
0 – 300	18.2	32 – 572	10.1
0 – 400	18.5	32 – 752	10.3

Temperature Range (°C)	Mean CTE ($\times 10^{-6}$ /°C)	Temperature Range (°F)	Mean CTE ($\times 10^{-6}$ /°F)
0 – 500	18.7	32 – 932	10.4
0 – 600	19.0	32 – 1112	10.6
0 – 700	19.3	32 – 1292	10.7
0 – 800	19.5	32 – 1472	10.8

Note: Thermal expansion values are important for designing assemblies involving dissimilar materials, thermal cycling applications, and high-temperature equipment. SUS304 has a higher CTE than carbon steel, which must be considered in welded joints and structural designs.

Magnetic Properties

SUS304 is essentially non-magnetic in the fully annealed condition. However, cold working (such as bending, drawing, or stretching) can induce partial transformation of austenite to martensite, resulting in slight magnetic permeability. This effect is reversible — annealing restores the non-magnetic state. For applications requiring strictly non-magnetic material, low-temperature annealing or special melting practices may be specified.

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Corrosion Resistance

The corrosion resistance of SUS304 comes from the passive chromium oxide film that forms spontaneously on the surface in the presence of oxygen. This self-healing film provides excellent protection in a wide range of environments. However, corrosion resistance can be compromised by certain conditions such as high chloride concentrations, acidic environments, or sensitization.

Corrosion Resistance Rating by Environment

Environment	Resistance	Notes & Limitations
Atmospheric / Rural	Excellent	Suitable for most indoor and outdoor architectural uses
Atmospheric / Urban	Very Good	May need periodic cleaning in polluted areas
Atmospheric / Marine (coastal)	Moderate	Surface rust staining possible; not for immersion
Fresh Water (potable)	Excellent	Suitable for drinking water applications
Chlorinated Water (≤50 ppm Cl ⁻)	Good	Useful for most municipal water systems
Salt Water / Seawater	Poor	Not recommended; consider SUS316 for marine service
Food Acids (citric, acetic)	Excellent	Widely used in food processing equipment
Dilute Sulfuric Acid	Poor – Fair	Limited to low concentrations and ambient temps
Nitric Acid (dilute/conc.)	Excellent	Good resistance at all concentrations up to boiling
Phosphoric Acid	Good – Fair	Suitable at moderate concentrations and temperatures
Caustic Solutions (NaOH)	Good	Resistant up to ~30% concentration at room temp
Organic Solvents	Excellent	Resistant to most alcohols, esters, ketones, hydrocarbons
Oxidizing Agents	Very Good	Good resistance to most oxidizing chemicals

Common Corrosion Types & SUS304 Performance

Uniform Corrosion

SUS304 exhibits very low uniform corrosion rates in most natural and many industrial environments. Typical corrosion rates in atmospheric exposure are less than 0.002 mm/year, providing decades of service life under normal conditions.

Pitting and Crevice Corrosion

SUS304 is susceptible to pitting and crevice corrosion in chloride-containing environments. The critical pitting temperature (CPT) is approximately 20–30°C in 3.5% NaCl solution. For applications with higher chloride exposure (e.g., seawater, de-icing salts), SUS316 with molybdenum addition is recommended. Pitting Resistance Equivalent Number (PREN) $\approx$ 18–20.

Intergranular Corrosion (Sensitization)

When SUS304 is heated or slowly cooled in the 450–850°C (840–1560°F) range, chromium carbides precipitate at grain boundaries, depleting adjacent areas of chromium and reducing corrosion resistance. This "sensitization" is a concern for welded components. For severe applications, low-carbon grade SUS304L or stabilized grades (SUS321, SUS347) should be considered.

Stress Corrosion Cracking (SCC)

Austenitic stainless steels including SUS304 are susceptible to chloride-induced stress corrosion cracking at temperatures above approximately 60°C (140°F) in the presence of tensile stress and chlorides. Proper stress relief and material selection are important for high-temperature chloride environments.

Galvanic Corrosion

When SUS304 is coupled with less noble metals (e.g., carbon steel, aluminum, zinc) in an electrolyte, the less noble metal will corrode preferentially. Conversely, coupling with more noble metals (e.g., titanium, silver) accelerates attack on SUS304. Insulation or proper material pairing is recommended for dissimilar metal joints.

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Temperature Performance

SUS304 demonstrates excellent performance across a wide temperature range, from cryogenic temperatures well below -196°C to elevated temperatures up to approximately 870°C (1600°F) for continuous service. Its austenitic structure ensures good toughness at low temperatures and reasonable strength at elevated temperatures.

High-Temperature Mechanical Properties

Temperature (°C)	Tensile Strength (MPa)	Yield Strength 0.2% (MPa)	Elongation (%)
20 (Room Temp)	600–700	250–310	50–60
100	570–660	180–230	48–58
200	530–620	150–200	45–55
300	490–580	130–180	42–52
400	460–550	120–170	40–50
500	410–500	110–160	38–48
600	340–420	95–140	35–45
700	220–280	70–100	40–50
800	130–170	50–75	50–60
900	70–90	35–50	60–70

Temperature Comparison: SUS304 vs SUS316 vs 310S

The following comparison highlights the temperature performance differences between three common austenitic stainless steel grades. Higher-alloyed grades offer improved high-temperature strength and oxidation resistance.

Property	SUS304	SUS316	310S (SUS310S)
Maximum Continuous Service Temp	870°C (1600°F)	870°C (1600°F)	1150°C (2100°F)
Maximum Intermittent Service Temp	925°C (1700°F)	925°C (1700°F)	1200°C (2190°F)
Oxidation Resistance (up to)	900°C	925°C	1150°C
Creep Strength (at 600°C, 10 ⁴ h)	~50 MPa	~70 MPa	~100 MPa

Property	SUS304	SUS316	310S (SUS310S)
Hot Strength	Good	Good	Excellent
Thermal Expansion (0–1000°C)	$18.7 \times 10^{-6} / ^\circ\text{C}$	$18.5 \times 10^{-6} / ^\circ\text{C}$	$18.0 \times 10^{-6} / ^\circ\text{C}$
Thermal Conductivity (at 100°C)	16.2 W/m·K	16.2 W/m·K	14.2 W/m·K
Cryogenic Toughness	Excellent	Excellent	Good
Typical High-Temp Applications	Furnace parts, heat exchangers	Chemical processing, marine	Furnace liners, kilns, radiant tubes

Low-Temperature Performance

SUS304 maintains excellent toughness and ductility at cryogenic temperatures, making it one of the most widely used materials for cryogenic storage and handling equipment. Unlike ferritic and martensitic stainless steels, austenitic SUS304 does not exhibit a ductile-brittle transition — it remains tough down to -196°C (-321°F) and below. Charpy V-notch impact values remain above 100 J even at -196°C.

Temperature (°C)	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Charpy V-Notch (J)
20	600–700	250–310	50–60	>300
0	650–750	280–340	48–58	>250
-50	750–850	320–390	45–55	>200
-100	850–950	380–450	40–50	>150
-196 (LN ₂)	1000–1200	450–550	35–45	>100

Note: Values are typical for annealed material. Actual values may vary depending on product form, heat treatment, and testing direction.

07

Product Forms & Standards

GNEE Steel supplies SUS304 in a comprehensive range of product forms to meet diverse industrial requirements. All products are manufactured to internationally recognized standards and undergo rigorous quality inspection before shipment.

Plate & Sheet — ASTM A240 / A240M

ASTM A240 covers chromium and chromium-nickel stainless steel plate, sheet, and strip for pressure vessels and for general applications. SUS304 plate and sheet are available in various thicknesses, widths, and surface finishes for applications ranging from architectural cladding to chemical processing equipment.

Pipe — ASTM A312

ASTM A312 covers seamless, straight-seam welded, and heavily cold-worked welded austenitic stainless steel pipe intended for high-temperature and general corrosive service. Both seamless and welded SUS304 pipes are available in a wide range of sizes and schedules.

Tube — ASTM A213 / A269

ASTM A213: Covers seamless ferritic and austenitic alloy-steel boiler, superheater, and heat-exchanger tubes. SUS304 tubes under this standard are widely used in boiler and heat exchanger applications.

ASTM A269: Covers seamless and welded austenitic stainless steel tubing for general service, with emphasis on smooth interior surfaces suitable for fluid transport.

Bar — ASTM A276

ASTM A276 covers hot-finished or cold-finished bars including rounds, squares, and hexagons; and hot-forged or cold-finished bars of special shapes for use in corrosion-resisting and high-temperature service. SUS304 bars are available in various finishes and sizes for machining, fastener, and structural applications.

Fittings — ASTM A403

ASTM A403 covers wrought austenitic stainless steel fittings for pressure piping applications. Available fittings include elbows, tees, reducers, caps, and flanges in various sizes and pressure ratings. All fittings are manufactured from SUS304 and meet dimensional and material requirements of applicable standards.

Full Product Range Summary

Product Form	Key Standards	Available Types	Typical Applications
Plate / Sheet	ASTM A240, JIS G4304/G4305, EN 10088-2	Hot rolled, cold rolled, coil, strip	Tanks, vessels, cladding, general fabrication
Pipe	ASTM A312, JIS G3459, EN 10216-5	Seamless, welded (ERW/LSAW)	Fluid transport, structural, process piping

Product Form	Key Standards	Available Types	Typical Applications
Tube	ASTM A213, A269, JIS G3463	Seamless, welded, precision, U-bend	Heat exchangers, boilers, instrumentation
Bar / Rod	ASTM A276, JIS G4303, EN 10088-3	Round, square, hexagonal, flat, wire	Fasteners, machining, shafts, structural
Coil / Strip	ASTM A240, JIS G4305, EN 10088-2	Hot rolled coil, cold rolled coil, slit strip	Stamping, deep drawing, roll forming
Fittings	ASTM A403, MSS SP-43, JIS B2311	Elbows, tees, reducers, caps, flanges	Piping systems, process connections
Wire	ASTM A580, JIS G4309, EN 10263-5	Spring wire, welding wire, weaving wire	Springs, welding, wire mesh, fasteners

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Size Range & Specifications

GNEE Steel offers SUS304 products in an extensive range of sizes. Below are our standard size ranges for each product form. Custom sizes are available upon request — please contact our sales team with your specific requirements.

Plate & Sheet Size Range

Parameter	Hot Rolled Plate	Cold Rolled Sheet	Coil / Strip
Thickness	3.0 – 100 mm	0.3 – 3.0 mm	0.2 – 6.0 mm
Thickness (inch)	0.118 – 4.0"	0.012 – 0.118"	0.008 – 0.236"
Width	1000 – 2500 mm	1000 – 1500 mm	20 – 1500 mm
Width (inch)	39.4 – 98.4"	39.4 – 59.1"	0.8 – 59.1"
Length	2000 – 12000 mm	2000 – 3000 mm	Coil weight: up to 25 MT
Length (inch)	78.7 – 472"	78.7 – 118"	—
Standard Sizes	1220×2440, 1500×3000, 1500×6000 mm	1000×2000, 1219×2438, 1220×2440 mm	Width: 1000, 1219, 1220, 1500 mm

Pipe & Tube Size Range

Parameter	Seamless Pipe (ASTM A312)	Welded Pipe (ASTM A312)	Tube (ASTM A213/A269)
Outer Diameter (OD)	6 – 610 mm	12.7 – 2032 mm	1.6 – 114.3 mm
OD (inch)	1/4 – 24"	1/2 – 80"	1/16 – 4.5"
Wall Thickness	1.2 – 60 mm	1.6 – 50 mm	0.5 – 12 mm
Wall Thickness (Sch.)	Sch 5S – Sch 160	Sch 5S – Sch XXS	BWG 8 – BWG 30
Length	Up to 12000 mm (40 ft)	Up to 12000 mm (40 ft)	Up to 12000 mm (40 ft)
Standard Lengths	6000 mm, 12000 mm	6000 mm, 12000 mm	6000 mm, 12000 mm, coils

Bar Size Range

Bar Type	Size Range	Standard Lengths	Finish Options
Round Bar	Ø 3.0 – 500 mm (0.12 – 20")	3000 – 6000 mm (10 – 20 ft)	Hot rolled, cold drawn, polished
Square Bar	3 × 3 – 200 × 200 mm	3000 – 6000 mm	Hot rolled, cold drawn, peeled
Hexagonal Bar	6 – 100 mm A/F	3000 – 6000 mm	Cold drawn, hot rolled
Flat Bar	Thickness: 3 – 100 mm Width: 10 – 500 mm	3000 – 6000 mm	Hot rolled, cold drawn, mill finish
Angle Bar	25×25×3 – 200×200×20 mm	3000 – 6000 mm	Hot rolled, pickled
Wire Rod / Wire	Ø 0.2 – 16 mm	Coils / Cut to length	Annealed, cold drawn, spring temper

Custom Sizes Available

In addition to standard sizes, GNEE Steel provides custom-cut dimensions to meet your exact project requirements. Our advanced cutting facilities include plasma cutting, laser cutting, waterjet cutting, and shearing for precision-cut blanks and components. Custom lengths, widths, thicknesses, and special shapes can all be accommodated with fast turnaround times.

- Precision cutting services: laser, plasma, waterjet, shear, saw
- Custom coil slitting to narrow widths (minimum 20mm strip)
- Cut-to-length sheets and plates to your exact specifications
- Custom tube and pipe lengths from 100mm to 12000mm
- Bar cut-to-length with tight tolerances
- Special profiles and shapes available by request
- Minimum order quantities for custom sizes vary by product form

09

Surface Finish Options

SUS304 is available in a variety of surface finishes, each suited to different applications based on aesthetic requirements, corrosion performance, and functional needs. The surface finish significantly affects appearance, cleanability, and corrosion resistance.

Finish	Description	Ra (µm)	Appearance	Typical Applications
No.1	Hot rolled, annealed & pickled. Scaled surface from hot rolling.	~3.2 – 6.3	Dull, matte silver-gray	Industrial equipment, structural, thick plate
2B	Cold rolled, annealed & pickled, skin-passed. Most common finish.	~0.2 – 0.8	Smooth, moderately reflective	General purpose, kitchenware, appliances, tanks
BA	Bright Annealed. Cold rolled, bright annealed in controlled atmosphere.	~0.05 – 0.2	Bright, highly reflective mirror-like	Architectural trim, automotive, decorative tube
No.4	Brushed / satin finish. Polished with 120-180 grit abrasive.	~0.2 – 0.8	Uniform brushed lines, satin sheen	Kitchen equipment, appliances, architectural panels
HL	Hairline finish. Polished with finer abrasive (180-240 grit).	~0.1 – 0.4	Finer continuous lines, elegant satin	Elevators, architectural cladding, decorative panels
Mirror 8K	Mirror-polished. Polished with fine compounds to mirror finish.	~0.02 – 0.08	Near-perfect mirror reflection	Decorative, reflectors, mirrors, luxury applications

Detailed Finish Specifications

No. 1 Finish (Hot Rolled Annealed & Pickled)

Produced by hot rolling, annealing, and descaling (pickling) the steel. The surface has a dull, non-reflective appearance. This is the standard surface finish for hot-rolled plate and heavy-gauge products where surface aesthetics are not critical.

2B Finish (Cold Rolled — Bright Annealed & Pickled)

The most widely used surface finish for stainless steel. Produced by cold rolling, followed by annealing and pickling, then a final light cold roll (skin pass) for a smooth, moderately reflective surface. 2B is the standard finish for sheet and coil used in general fabrication, food processing, and chemical equipment.

BA Finish (Bright Annealed)

Produced by cold rolling followed by bright annealing in a controlled protective atmosphere (hydrogen/nitrogen mixture), which prevents oxidation during heat treatment. The result is a bright, highly reflective surface that requires no additional polishing. BA finish is commonly used for decorative applications, automotive trim, and household appliances.

No. 4 Finish (Brushed / Satin)

A mechanical polish applied with 120 to 180 grit abrasive belts or brushes, producing a uniform directional brushed pattern with a satin sheen. No. 4 finish is popular for kitchen equipment, restaurant equipment, appliances, and architectural applications where a consistent brushed appearance is desired. It also helps mask minor scratches and fingerprints.

HL Finish (Hairline)

Similar to No. 4 but produced with finer abrasives (typically 180-240 grit), resulting in finer, more uniform hairline-like scratches. HL finish offers a more refined and elegant appearance than No. 4 and is commonly used for high-end architectural applications, elevator interiors, and decorative panels.

Mirror 8K Finish

The highest level of polished finish, achieved through multi-stage mechanical polishing with progressively finer abrasives followed by buffing with polishing compounds. The "8K" designation indicates a high degree of reflectivity and smoothness. Mirror finish is used for decorative applications, reflectors, mirrors, and luxury products where maximum reflectivity is required.

Note: Surface finish availability may vary by product form, thickness, and size. Please consult with our sales team for specific availability and lead times for special surface finishes.

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Quality Control & Testing

At GNEE Steel, quality assurance is integrated into every stage of production — from raw material inspection to final product testing and certification. Our quality management system ensures that every SUS304 product meets or exceeds international standards and customer specifications.

Inspection & Testing Capabilities

Test Method	Description	Standard	Purpose
PMI Test (Positive Material Identification)	X-ray fluorescence (XRF) analysis to verify chemical composition of finished products.	ASTM E1019	Material grade verification, alloy identification, quality traceability
Tensile Test	Mechanical testing to determine tensile strength, yield strength, elongation, and reduction of area.	ASTM E8 / E8M JIS Z2241	Verification of mechanical property compliance
Hardness Test	Rockwell, Brinell, and Vickers hardness testing to verify material temper and hardness.	ASTM E10, E18, E92	Hardness verification, condition confirmation
Ultrasonic Testing (UT)	Non-destructive testing using sound waves to detect internal defects, inclusions, and laminations.	ASTM A388 / A577 EN 10160	Internal soundness, defect detection in plate/bar
Eddy Current Test	Electromagnetic non-destructive testing for surface and near-surface defects in tubes and bars.	ASTM E309 / E426 EN 10246	Surface defect detection, seam/crack detection
Dimensional Inspection	Precision measurement of thickness, width, length, diameter, wall thickness, and tolerances.	ASTM / JIS / EN product standards	Dimensional compliance verification
Surface Inspection	Visual and automated optical inspection for surface defects, scratches, pits, and finish quality.	Customer / standard specifications	Surface quality and finish verification
Hydrostatic Test	Pressure testing of pipes and tubes to verify integrity and leak-tightness under water pressure.	ASTM A312 / A213 EN 10216	Pressure boundary integrity verification
Intergranular Corrosion Test	Testing for sensitization and intergranular corrosion resistance (e.g., Strauss test, Huey test).	ASTM A262 JIS G0571	Verification of corrosion resistance after welding/heating

Certifications & Documents

All GNEE Steel products are accompanied by comprehensive documentation and certifications to provide full traceability and quality assurance for our customers.

Certificate / Document	Description	Applicable Standard
EN 10204 3.1 MTC	Material Test Certificate issued by the manufacturer's authorized inspection representative, independent of manufacturing department. Includes chemical composition, mechanical properties, and test results.	EN 10204 Type 3.1
EN 10204 3.2 MTC	Material Test Certificate with additional verification by an independent third-party inspector (customer-appointed or regulatory authority).	EN 10204 Type 3.2
SGS Inspection	Third-party inspection by SGS — one of the world's leading inspection, verification, testing, and certification companies.	SGS Testing Services
BV Inspection	Third-party inspection by Bureau Veritas — global leader in testing, inspection, and certification services.	Bureau Veritas Standards
TUV Inspection	Third-party inspection by TUV — internationally recognized German testing and certification organization.	TUV Rheinland / TUV SUD
Mill Test Report (MTR)	Comprehensive report including heat number, chemical analysis, mechanical test results, dimensions, and inspection results.	ASTM / JIS / EN mill standards
ISO 9001:2015	Quality Management System certification ensuring consistent product quality and customer satisfaction.	ISO 9001:2015
PED 97/23/EC	Pressure Equipment Directive compliance for products used in pressure vessel applications.	EU PED Directive

Note: Third-party inspections (SGS, BV, TUV) are available upon customer request and are subject to additional fees and lead time. Please specify inspection requirements at the time of order placement.

11

Applications & Industries

SUS304 is the most versatile and widely used stainless steel grade, finding applications across virtually every industry. Its excellent balance of corrosion resistance, formability, strength, and cost-effectiveness makes it the material of choice for countless products and structures.

Industry	Key Applications	Why SUS304?
Food Processing	Stainless steel tanks, conveyors, mixers, slicers, brewing equipment, dairy machinery, food storage containers, piping systems	Hygienic surface, easy to clean, corrosion resistant to food acids, FDA-compliant
Chemical Equipment	Reactors, storage tanks, heat exchangers, piping, valves, pumps, process vessels, centrifuges	Resistant to many chemicals, good weldability, structural strength, durability
Pharmaceutical	Reactors, fermenters, piping systems, cleanroom equipment, tablet presses, storage vessels, medical device components	Hygienic non-porous surface, corrosion resistance, easy sterilization, cleanability
Architecture & Construction	Cladding panels, roofing, handrails, balustrades, window frames, decorative trim, structural elements, curtain walls	Aesthetic appearance, corrosion resistance, low maintenance, design versatility
Kitchen Equipment	Sinks, countertops, commercial cooking equipment, food preparation surfaces, cabinets, utensils, exhaust hoods	Hygienic, corrosion resistant, durable, easy to clean, attractive appearance
Heat Exchangers	Shell and tube heat exchangers, plate heat exchangers, condenser tubes, boiler tubes, cooling coils	Good thermal conductivity, corrosion resistance, temperature resistance, formability
General Engineering	Fasteners, fittings, flanges, shafts, springs, stampings, machined parts, welded structures, equipment components	Good machinability, excellent weldability, versatile properties, cost-effective
Automotive & Transportation	Exhaust systems, trim components, structural parts, fuel system components, rail car components	Corrosion resistance, formability, strength-to-weight ratio, aesthetic appeal
Water Treatment	Desalination equipment, water storage tanks, piping, filtration systems, wastewater treatment components	Corrosion resistance to water and chemicals, hygienic properties, long service life

Additional Application Areas

- Marine Industry: Deck equipment, railings, fittings (above-waterline only; for submerged/marine service use SUS316)
- Paper & Pulp Industry: Digester components, bleaching equipment, process piping, storage tanks
- Textile Industry: Dyeing equipment, fiber processing machinery, finishing equipment

- Petrochemical & Oil & Gas: Refinery equipment, pipeline components, offshore platforms (above water)
- Power Generation: Boiler components, turbine parts, heat exchangers, nuclear power plant auxiliary systems
- Solar & Renewable Energy: Solar water heater tanks, photovoltaic panel frames, concentrated solar power components
- Household Appliances: Refrigerators, dishwashers, washing machines, ovens, cookware, cutlery
- Laboratory & Scientific: Lab benches, fume hoods, autoclaves, research equipment, analytical instruments

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Grade Comparison Guide

Choosing the right stainless steel grade is critical for optimal performance and cost-effectiveness. The following comparisons help you understand how SUS304 stacks up against other common grades and select the most suitable material for your application.

SUS304 vs SUS316

SUS316 is the second most widely used austenitic stainless steel after SUS304. The key difference is the addition of 2–3% molybdenum, which significantly improves corrosion resistance, particularly against chlorides, pitting, and crevice corrosion. SUS316 is often called the "marine grade" stainless steel, though it is not suitable for prolonged seawater immersion.

Property	SUS304	SUS316
Chromium (Cr)	18.0 – 20.0%	16.0 – 18.5%
Nickel (Ni)	8.0 – 10.5%	10.0 – 14.0%
Molybdenum (Mo)	—	2.0 – 3.0%
Carbon (max)	0.08%	0.08%
Tensile Strength (min)	520 MPa	520 MPa
Yield Strength (min)	205 MPa	205 MPa
Elongation (min)	40%	40%
Pitting Resistance (PREN)	~19	~26
Chloride Resistance	Moderate	Good – Excellent
Acid Resistance (organic)	Good	Very Good
Acid Resistance (sulfuric)	Poor	Fair – Good
Marine/Coastal	Not recommended for immersion	Better — but not for prolonged immersion
Cost	Lower	Higher (~25–40% premium)
Key Advantage	Cost-effective, versatile, widely available	Superior corrosion resistance, better at higher temps

SUS304 vs SUS201

SUS201 is a lower-cost austenitic stainless steel developed to substitute for SUS304, particularly in price-sensitive markets. It uses manganese and nitrogen to replace much of the nickel content, resulting in

significant cost savings but with trade-offs in corrosion resistance and formability.

Property	SUS304	SUS201
Chromium (Cr)	18.0 – 20.0%	16.0 – 18.0%
Nickel (Ni)	8.0 – 10.5%	3.5 – 5.5%
Manganese (Mn)	≤ 2.0%	5.5 – 7.5%
Nitrogen (N)	≤ 0.1%	≤ 0.25%
Corrosion Resistance	Good – Very Good	Moderate – Good (lower than 304)
Formability / Ductility	Excellent	Good (lower elongation, more springback)
Weldability	Excellent	Good (more prone to hot cracking)
Magnetic Permeability	Very low (non-magnetic)	Slightly higher than 304
Cold Work Hardening	Moderate	Higher (hardens faster)
Cost	Standard price	Lower (~20–30% less)
Best For	Corrosive environments, food, chemical, outdoor	Indoor decorative, low-corrosion environments, tube/pipe

SUS304 vs 1.4307 (SUS304L)

SUS304L (EN 1.4307) is the low-carbon version of SUS304, with carbon content reduced to a maximum of 0.03%. The "L" designation stands for "low carbon." The primary benefit is improved resistance to intergranular corrosion after welding or exposure to elevated temperatures, as less chromium carbide precipitation occurs in the grain boundaries.

Property	SUS304 (1.4301)	SUS304L (1.4307)
Carbon (max)	0.08%	0.03%
Chromium (Cr)	18.0 – 20.0%	18.0 – 20.0%
Nickel (Ni)	8.0 – 10.5%	9.0 – 12.0%
Tensile Strength (min)	520 MPa	480 MPa
Yield Strength (min)	205 MPa	170 MPa
Elongation (min)	40%	40%

Property	SUS304 (1.4301)	SUS304L (1.4307)
Weld Decay / Sensitization	Susceptible — may require post-weld annealing	Highly resistant — no post-weld annealing needed
Intergranular Corrosion (after weld)	Higher risk	Minimal risk
Use in Welded Fabrications	Thin sections OK; thick sections may need 304L	Preferred for all welded structures
High-Temperature Strength	Slightly higher	Slightly lower
Cost	Slightly lower	Slightly higher (~5–10% premium)
Key Application	General purpose, formed parts, non-welded	Welded equipment, heavy sections, chemical processing

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Purchasing Guide

This purchasing guide helps you make informed decisions when sourcing SUS304 stainless steel products. From selecting the right specification to verifying material authenticity, GNEE Steel is committed to transparent and reliable supply.

How to Choose the Right SUS304 Specification

Selecting the correct specification ensures optimal performance and cost-efficiency. Consider the following factors when specifying SUS304 for your project:

Factor	What to Consider	Guidance
Product Form	Plate, sheet, coil, pipe, tube, bar, fitting?	Choose based on your application and fabrication method
Thickness / Size	What dimensions are required?	Check standard sizes first; custom sizes available but may cost more
Surface Finish	Is appearance important? What finish is needed?	2B for general use; No.4/HL for decorative; Mirror 8K for premium
Corrosion Environment	What chemicals, temperatures, and conditions?	Confirm SUS304 is suitable; upgrade to SUS316 if higher corrosion needed
Temperature Range	Operating temperature range?	SUS304 OK up to 870°C continuous; consider 310S for higher temps
Mechanical Requirements	Strength, hardness, or temper needed?	Specify annealed, 1/4 hard, 1/2 hard, etc. as required
Standard / Specification	Which standard must it comply with?	Specify ASTM, JIS, EN, or GB standard and grade clearly
Certification Needs	What documentation is required?	Specify MTC 3.1, 3.2, third-party inspection (SGS/BV/TUV) at time of order
Quantity & Lead Time	How much and how soon?	Standard sizes in stock ship faster; custom orders require more lead time
Fabrication Method	Welding, forming, machining, stamping?	Consider formability, weldability, and machinability requirements

How to Verify Material Authenticity

Ensuring you receive genuine SUS304 material is essential for product safety and performance. Here are key methods to verify material authenticity:

Verification Method	Description	Reliability
Mill Test Certificate (MTC)	Official document from the mill showing heat number, chemical composition, and mechanical test results. Each heat/lot has a unique number.	□□□□□
PMI Testing (XRF)	Portable X-ray fluorescence analyzer provides instant elemental composition verification on-site without damaging the material.	□□□□□
Spectrochemical Analysis	Laboratory-based optical emission spectroscopy (OES) provides highly accurate chemical analysis of the material.	□□□□□
Heat / Lot Number Traceability	Each coil, sheet, or bundle has a unique heat/lot number that can be traced back to the original mill MTC.	□□□□□
Spark Test	Quick field test — grinding the metal produces sparks whose shape and color indicate the type of steel. Requires experienced operator.	□□□□□
Acid Test (CuSO4)	Copper sulfate solution test — SUS304 will not show copper deposition (unlike carbon steel). Simple but limited accuracy.	□□□□□
Magnet Test	SUS304 is generally non-magnetic in annealed condition. Cold-worked material may show slight magnetism. Not definitive alone.	□□□□□

Required Certificates & Documentation

When purchasing SUS304 stainless steel, ensure you receive the appropriate documentation for quality assurance and regulatory compliance. Common requirements include:

- Mill Test Certificate (MTC) EN 10204 3.1: Standard for every order — includes chemical composition, mechanical properties, and dimensional verification
- EN 10204 3.2 Certificate: For critical applications — third-party witnessed testing and independent verification
- Third-Party Inspection Report: SGS, BV, or TUV inspection report as specified by customer or project requirements
- Heat Treatment Report: Details of annealing/solution treatment process and parameters
- NDT Inspection Report: Ultrasonic, eddy current, or hydrostatic test results as applicable
- Packing List & Commercial Invoice: Standard shipping and customs documentation
- Certificate of Origin: For customs clearance and trade compliance
- ISO 9001 Quality Certificate: Manufacturer quality system certification
- PED / Pressure Equipment Directive Certification: For pressure vessel applications (EU market)

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Frequently Asked Questions

Answers to common questions about SUS304 stainless steel. If you have additional questions, please contact our technical sales team for expert advice.

Q1. What is SUS304 stainless steel equivalent to?

SUS304 has several international equivalents: UNS S30400 (American), AISI 304 (American Iron and Steel Institute), EN 1.4301 / X5CrNi18-10 (European), 06Cr19Ni10 / S30408 (Chinese GB), and SS 2332 (Swedish). All these grades have essentially the same chemical composition and mechanical properties, differing mainly in the standards organization that defines them.

Q2. Is SUS304 food grade?

Yes, SUS304 is widely used in food processing and food contact applications and is generally considered food-safe. Its smooth, non-porous surface resists bacterial growth and is easy to clean and sanitize. However, "food grade" is not a formal material designation — compliance depends on the specific food contact regulations of your country (e.g., FDA 21 CFR in the US, EU Regulation 1935/2004 in Europe, GB 4806.9 in China). Always verify the specific surface finish and compliance requirements for your application.

Q3. What is SUS304 density?

The density of SUS304 is approximately 7.93 g/cm³ (0.286 lb/in³ or 7930 kg/m³) at room temperature. This is slightly lower than carbon steel (7.85 g/cm³) due to the higher chromium and nickel content. Density decreases slightly at elevated temperatures due to thermal expansion.

Q4. What is the difference between SUS304 and SUS316?

The main difference is that SUS316 contains 2–3% molybdenum, which significantly improves corrosion resistance, especially against chlorides, pitting, and crevice corrosion. SUS316 also has slightly higher nickel content (10–14% vs 8–10.5%). While SUS304 is suitable for most general-purpose applications, SUS316 is preferred for more corrosive environments such as coastal areas, chemical processing, and pharmaceutical manufacturing. SUS316 is typically 25–40% more expensive than SUS304.

Q5. Can SUS304 be used in marine environments?

SUS304 is NOT recommended for marine environments where it will be exposed to saltwater immersion or constant salt spray. Chloride ions in seawater cause pitting and crevice corrosion in SUS304. For above-waterline marine applications (e.g., railings, deck fittings), SUS304 may be acceptable with regular cleaning, but SUS316 is strongly recommended. For submerged or highly corrosive marine service, SUS316, duplex stainless steel, or super austenitic grades are preferred.

Q6. What standards apply to SUS304 pipe?

SUS304 pipe is covered by several standards depending on the application: ASTM A312 (seamless and welded pipe for high-temperature and general corrosive service), ASTM A213 (seamless boiler, superheater, and heat-exchanger tubes), ASTM A269 (seamless and welded tube for general service), JIS G3459 (stainless steel pipes), JIS G3463 (stainless steel tubes for boiler and heat exchanger), and EN 10216-5 (seamless steel tubes for pressure purposes — stainless steel tubes).

Q7. Is SUS304 magnetic?

SUS304 is essentially non-magnetic in the fully annealed condition, with magnetic permeability typically less than 1.01. However, cold working (such as bending, drawing, stretching, or machining) can cause partial transformation of austenite to martensite, resulting in slight magnetic permeability. This is normal and does not affect corrosion resistance. For applications requiring strictly non-magnetic material, specify "fully annealed" condition or consider low-magnetic grades.

Q8. Can SUS304 be hardened by heat treatment?

No, SUS304 (and all austenitic stainless steels) cannot be hardened by heat treatment. It is hardened only by cold working (strain hardening). The only heat treatment used is annealing (solution treatment), which softens the material, restores ductility, and maximizes corrosion resistance by dissolving carbides and producing a uniform austenitic structure. Typical annealing temperature is 1010–1120°C (1850–2050°F) followed by rapid cooling.

Q9. What is the maximum temperature for SUS304?

SUS304 can be used continuously at temperatures up to approximately 870°C (1600°F) in oxidizing environments. For intermittent (cyclic) service, the maximum temperature is about 925°C (1700°F). However, prolonged exposure above 450°C can cause sensitization (chromium carbide precipitation), reducing corrosion resistance. For applications where both high temperature and corrosion resistance are critical, consider stabilized grades (SUS321, SUS347) or high-chromium grades (SUS310S).

Q10. How do I clean and maintain SUS304?

Regular cleaning helps maintain the appearance and corrosion resistance of SUS304. Recommended practices: (1) Clean regularly with mild detergent or stainless steel cleaner and warm water, (2) Always wipe in the direction of the grain for brushed finishes, (3) Rinse thoroughly with clean water, (4) Dry with a soft cloth to prevent water spots, (5) Avoid abrasive cleaners, steel wool, or wire brushes that can scratch the surface, (6) Avoid chloride-containing cleaners (bleach, hydrochloric acid), (7) Remove fingerprints with glass cleaner or alcohol, and (8) Treat light rust staining with a stainless steel pickling paste or specialized rust remover.

Q11. What is the difference between SUS304 and SUS304L?

SUS304L is the low-carbon variant of SUS304, with carbon limited to 0.03% maximum (vs 0.08% for SUS304). The "L" stands for "low carbon." The primary benefit is that SUS304L is much more resistant to sensitization (intergranular corrosion after welding or heat exposure in the 450–850°C range). SUS304L is the preferred choice for welded structures, especially thicker sections. SUS304 has slightly higher room-temperature strength, while SUS304L has slightly lower strength but better weldability and corrosion resistance after welding.

Q12. Is SUS304 weldable?

Yes, SUS304 has excellent weldability and can be welded by all common methods including TIG (GTAW), MIG (GMAW), stick (SMAW), and spot welding. Filler metals matching the base material (e.g., ER308, E308) are typically used. For critical applications, 308L filler (low carbon) is recommended to minimize weld decay. Post-weld annealing can restore full corrosion resistance, though it is not always necessary for thin sections. Proper welding technique and heat input control are important to minimize distortion and maintain corrosion resistance.

Q13. What does SUS stand for in SUS304?

"SUS" stands for "Steel Use Stainless" (ステンレス in Japanese). It is the designation prefix used in Japanese Industrial Standards (JIS) for stainless steel grades. The number 304 refers to the specific grade composition, originally from AISI (American Iron and Steel Institute) numbering, which was adopted by JIS and many other standards organizations worldwide.

Q14. How much does SUS304 cost?

SUS304 prices fluctuate based on global nickel and chromium prices, supply and demand, product form, size, and surface finish. As a general reference, SUS304 typically costs 3–5 times more than carbon steel. Plate and sheet prices are usually quoted per kilogram or per square meter/foot. Pipe is priced per meter or per ton. GNEE Steel offers competitive pricing with volume discounts. Please contact our sales team for current pricing and quotes.

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Manufacturer Profile

GNEE Steel Co., Ltd. is a leading supplier and manufacturer of stainless steel products, headquartered in China with global distribution. With over 15 years of industry experience, we specialize in providing high-quality stainless steel materials to customers worldwide, serving industries including oil & gas, petrochemical, food processing, pharmaceutical, architecture, and general manufacturing.

Available Products

- Stainless Steel Plate & Sheet: Hot rolled plate, cold rolled sheet, coil, strip — various finishes from No.1 to Mirror 8K
- Stainless Steel Pipe & Tube: Seamless pipe, welded pipe, precision tube, heat exchanger tube, U-bend tube
- Stainless Steel Bar & Wire: Round bar, square bar, hex bar, flat bar, angle bar, wire rod, wire mesh
- Stainless Steel Fittings & Flanges: Elbows, tees, reducers, caps, flanges (WN, SO, BL, SW, threaded)
- Available Grades: SUS304, 304L, 316, 316L, 321, 310S, 201, 430, 2205, 2507, and more
- Value-Added Services: Cutting, slitting, bending, welding, polishing, surface treatment, custom fabrication

Minimum Order Quantity (MOQ)

Product Form	Standard MOQ	Sample Order MOQ	Note
Plate / Sheet	500 kg	1 – 2 sheets	Small quantities available for stock sizes
Pipe / Tube	500 kg	10 – 50 meters	Small diameter tubes: lower MOQ possible
Bar / Rod	500 kg	10 – 50 kg	Cut-to-length samples available
Coil / Strip	1000 kg	100 – 500 kg	Slit strip: depends on width and gauge
Fittings / Flanges	10 pieces	1 – 5 pieces	Common sizes available from stock
Custom Fabrication	Project-based	—	Discuss with sales for custom requirements

Note: GNEE Steel offers flexible MOQ policies. We understand that every customer has unique requirements. Contact our sales team to discuss your specific needs — we will do our best to accommodate orders of all sizes.

Lead Time

Order Type	Standard Lead Time	Expedited Service	Note
Stock Items (ex-warehouse)	3 – 7 days	1 – 3 days	Ready to ship from inventory
Standard Production	10 – 20 days	7 – 12 days	For common sizes and specifications

Order Type	Standard Lead Time	Expedited Service	Note
Custom Size / Finish	15 – 30 days	—	Custom cutting, slitting, or special surface
Custom Fabrication	20 – 45 days	—	Depends on complexity and quantity
Sea Freight (to port)	20 – 35 days	—	Depending on destination port
Air Freight	5 – 10 days	3 – 5 days	For urgent small orders only
Express Courier (DHL/FedEx)	3 – 7 days	1 – 3 days	For samples and small packages

Contact GNEE Steel

Contact Method	Details
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Factory Location	Henan Province, China
Business Hours	Monday – Saturday: 9:00 – 18:00 (GMT+8)

Your Free Quote Today! Contact our experienced sales team for competitive pricing, technical consultation, and

Thank you for considering GNEE Steel as your stainless steel supplier. We look forward to serving you.