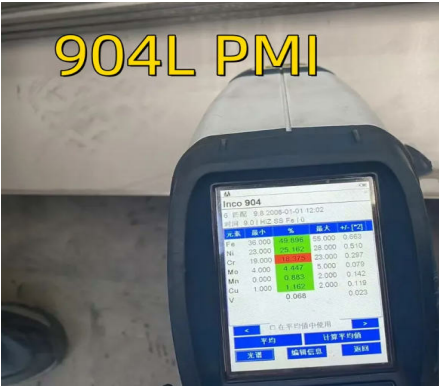
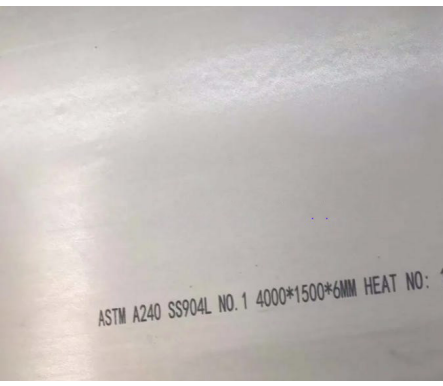
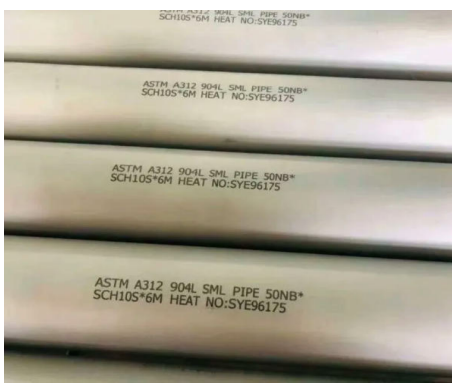


STAINLESS STEEL
SUS904L

Equivalent Grades: UNS N08904 | EN 1.4539 | AISI 904L | X1NiCrMoCu25-20-5

PLATE	SHEET	COIL	PIPE	TUBE	BAR
					
					
					

Product Catalog & Technical Specification Sheet

Manufacturer & Supplier: GNEE Steel Co., Ltd.

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01

Introduction to SUS904L

SUS904L is a super-austenitic stainless steel with exceptionally high alloy content — 19–23% chromium, 23–28% nickel, 4–5% molybdenum, and 1–2% copper — designed for service in the most aggressive corrosive environments. The addition of copper is particularly significant, providing outstanding resistance to sulfuric acid at all concentrations and temperatures. With a Pitting Resistance Equivalent Number (PREN) of approximately 35–40, SUS904L far exceeds the chloride corrosion resistance of SUS316L (PREN ~24–27) and approaches the performance of much more expensive nickel-based alloys. SUS904L is the preferred choice for sulfuric acid processing, seawater cooling, flue gas desulfurization, and chemical processing where standard austenitic grades would rapidly fail.

What is SUS904L?

SUS904L (UNS N08904, EN 1.4539) is a low-carbon, high-alloy super-austenitic stainless steel. The term "super-austenitic" refers to its alloy content being significantly higher than standard grades like SUS304 or SUS316L. The very high nickel (23–28%) ensures a fully stable austenitic structure, while the 4–5% molybdenum provides exceptional resistance to pitting and crevice corrosion in chloride environments. The unique 1–2% copper addition enhances resistance to reducing acids, particularly sulfuric acid, setting SUS904L apart from other high-alloy grades. The ultra-low carbon content (max 0.02%) provides excellent resistance to intergranular corrosion after welding, eliminating the need for post-weld annealing in most applications.

Key Features

- Super-austenitic grade — PREN ~35–40, far superior to SUS316L (PREN ~24–27)
- Excellent resistance to chloride pitting, crevice corrosion, and stress corrosion cracking
- Outstanding resistance to sulfuric acid at all concentrations and temperatures — copper addition is key
- Ultra-low carbon (max 0.02%) — excellent intergranular corrosion resistance after welding
- High chromium (19–23%), nickel (23–28%), molybdenum (4–5%), and copper (1–2%) content
- Superior to SUS316L in virtually all corrosive environments
- Excellent resistance to seawater, brackish water, and chloride-bearing solutions
- Good resistance to phosphoric acid, acetic acid, and other organic acids
- Excellent weldability — post-weld annealing generally not required for corrosion resistance
- Fully austenitic structure — excellent ductility and toughness at all temperatures
- Non-magnetic in annealed condition (may become slightly magnetic after heavy cold work)
- Good formability despite high alloy content (requires more power than standard grades)
- Resistant to chloride-induced stress corrosion cracking (SCC) up to higher temperatures than SUS316L
- Cost-effective alternative to nickel alloys (Hastelloy, Inconel) for many applications
- 100% recyclable — environmentally sustainable material choice

Typical Applications

Executive Standards

Standard	Description	Application
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 corrosive service pipe
ASTM A213 / A269	Seamless and welded austenitic steel tube	Boiler, superheater, and heat exchanger tube
ASTM A276	Stainless steel bars and shapes	Hot/cold finished bars for general use
EN 10088-1/2/3	European Norm (Material No. 1.4539)	Stainless steel — semi-finished, sheet/plate, bar
SEW 400	German Iron & Steel Standards	Super-austenitic stainless steel flat products
VdTÜV 421	German Technical Code	High-alloy austenitic steel for pressure vessels
GB/T 24511	Chinese National Standard (022Cr25Ni7Mo4N)	Stainless steel for pressure applications

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02

Chemical Composition

The chemical composition of SUS904L is designed for maximum corrosion resistance in aggressive environments. The exceptionally high chromium (19–23%), nickel (23–28%), molybdenum (4–5%), and copper (1–2%) content distinguishes it from standard austenitic grades. The ultra-low carbon content (max 0.02%) provides excellent resistance to intergranular corrosion. Each element plays a specific role in the overall corrosion resistance strategy.

Chemical Composition (wt. %) — ASTM A240 / EN 10088

Element	Symbol	Minimum	Maximum	Typical Value	Purpose
Carbon	C	—	0.020	0.010	Ultra-low carbon for weld decay resistance
Silicon	Si	—	1.000	0.35	Deoxidizer & oxidation resistance
Manganese	Mn	—	2.000	1.20	Austenite stabilizer & strength
Phosphorus	P	—	0.045	0.025	Impurity — controlled for toughness
Sulfur	S	—	0.035	0.010	Impurity — controlled for corrosion resistance
Chromium	Cr	19.00	23.00	20.50	Primary corrosion & oxidation resistance
Nickel	Ni	23.00	28.00	25.00	Austenite stability & reducing acid resistance
Molybdenum	Mo	4.00	5.00	4.50	Pitting, crevice & chloride corrosion resistance
Copper	Cu	1.00	2.00	1.50	Sulfuric acid resistance — unique to 904L
Iron	Fe	Balance	Balance	~45.0	Base metal matrix

Notes on Key Elements

Chromium (Cr): At 19–23%, chromium provides the foundation of corrosion resistance by forming the self-healing passive oxide layer (Cr₂O₃). The higher chromium content compared to SUS316L (16–18.5%) provides improved resistance to oxidizing acids and enhances the stability of the passive film in aggressive environments.

Nickel (Ni): At 23–28%, nickel is the most abundant alloying element after iron. This exceptionally high nickel content ensures complete austenitic stability, provides excellent resistance to reducing acids (sulfuric, hydrochloric, phosphoric), and enhances resistance to chloride-induced stress corrosion cracking. The high nickel content is a major factor in the superior performance and cost of SUS904L.

Molybdenum (Mo): At 4–5%, molybdenum provides outstanding resistance to pitting and crevice corrosion — the primary corrosion failure mode in chloride environments. This is significantly higher than SUS316L (2–3%)

and is the primary reason for the much higher PREN value (~35–40 vs ~24–27). Each 1% of molybdenum contributes approximately 3.3 to the PREN calculation.

Copper (Cu): At 1–2%, copper is the unique distinguishing element of SUS904L. Copper dramatically improves resistance to reducing acids, particularly sulfuric acid, by enhancing the stability of the passive film in reducing environments. This makes SUS904L the premier grade for sulfuric acid service — no other standard stainless steel grade contains copper as an intentional alloying element at this level.

Carbon (C): Limited to 0.02% maximum — even lower than SUS316L (0.03%). This ultra-low carbon content virtually eliminates the risk of sensitization (chromium carbide precipitation at grain boundaries) during welding or high-temperature exposure. Post-weld annealing is generally not required for intergranular corrosion resistance.

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Mechanical Properties

SUS904L exhibits mechanical properties typical of fully austenitic high-alloy stainless steels. Its high alloy content provides good strength at both room and elevated temperatures, while the fully austenitic structure ensures excellent ductility and toughness even at cryogenic temperatures. The ultra-low carbon content results in slightly lower yield strength compared to standard SUS316L, but this is offset by its superior corrosion resistance in the most demanding environments.

Room Temperature Mechanical Properties (Annealed)

Property	Symbol	Minimum	Typical	Unit	Test Standard
Tensile Strength	σ_b / Rm	490	520–680	MPa	ASTM E8 / JIS Z2241
Yield Strength (0.2%)	$\sigma_{0.2}$ / Rp0.2	216	220–280	MPa	ASTM E8 / JIS Z2241
Elongation (50mm GL)	δ / A	35	35–45	%	ASTM E8 / JIS Z2241
Hardness (Rockwell B)	HRB	—	70–85	HRB	ASTM E18
Hardness (Brinell)	HB	≤220	150–175	HB	ASTM E10
Hardness (Vickers)	HV	—	155–180	HV	ASTM E92
Modulus of Elasticity	E	—	190	GPa	—
Shear Modulus	G	—	74	GPa	—
Poisson's Ratio	ν	—	0.29	—	—

Property Variations by Temper

Like other austenitic grades, SUS904S can be strengthened by cold working. The high alloy content results in a higher work hardening rate than SUS304, which can be both beneficial (higher achievable strength) and challenging (requires more forming power).

Temper Condition	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Hardness (HRB)
Annealed (Soft)	490–680	216–280	35–45	70–85
1/4 Hard	680–800	400–500	20–30	85–90
1/2 Hard	800–950	580–700	10–20	90–95
3/4 Hard	950–1100	750–880	5–10	95–100

Temper Condition	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Hardness (HRB)
Full Hard	1100–1250	920–1050	3–6	100–104

Key Notes

- SUS904L cannot be hardened by heat treatment — only by cold working (strain hardening)
- Lower yield strength than SUS316L at room temperature due to ultra-low carbon content
- Higher work hardening rate than SUS316L — requires more power for forming operations
- Excellent ductility and toughness maintained from cryogenic to high temperatures
- No ductile-brittle transition temperature — remains tough down to cryogenic range
- The only heat treatment is solution annealing (typically 1090–1170°C followed by rapid cooling)
- Solution annealing dissolves any precipitated phases, restores ductility, and maximizes corrosion resistance
- Higher alloy content increases sensitivity to sigma phase precipitation during slow cooling — quench rapidly after annealing

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Physical Properties

The physical properties of SUS904L reflect its high alloy content. The density is slightly higher than standard austenitic grades due to the large amounts of heavy elements (molybdenum and copper). The thermal conductivity is lower than carbon steel but comparable to other austenitic stainless steels. The coefficient of thermal expansion is similar to SUS316L. These properties are important for design calculations, thermal analysis, and compatibility with other materials.

Property	Value	Unit	Condition / Note
Density	8.00	g/cm³	At 20°C (room temperature)
Density	0.289	lb/in³	At 20°C (room temperature)
Melting Point Range	1380–1430	°C	Approximate solidus-liquidus
Melting Point Range	2516–2606	°F	Approximate solidus-liquidus
Specific Heat Capacity	450	J/kg·K	At 0–100°C
Thermal Conductivity	13.0	W/m·K	At 100°C
Thermal Conductivity	16.8	W/m·K	At 500°C
Coefficient of Thermal Expansion (CTE)	15.0 × 10 ^{−6}	/°C	At 0–100°C
Coefficient of Thermal Expansion (CTE)	17.5 × 10 ^{−6}	/°C	At 0–500°C
Electrical Resistivity	95 × 10 ^{−8}	Ω·m	At 20°C
Magnetic Permeability	< 1.01	—	In annealed condition (non-magnetic)
Modulus of Elasticity (E)	190	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	15.0	32 – 212	8.3
0 – 200	16.0	32 – 392	8.9
0 – 300	16.6	32 – 572	9.2

Temperature Range (°C)	Mean CTE ($\times 10^{-6} / ^\circ\text{C}$)	Temperature Range (°F)	Mean CTE ($\times 10^{-6} / ^\circ\text{F}$)
0 – 400	17.0	32 – 752	9.4
0 – 500	17.5	32 – 932	9.7
0 – 600	17.9	32 – 1112	9.9
0 – 700	18.2	32 – 1292	10.1
0 – 800	18.5	32 – 1472	10.3

Note: SUS904L has a slightly higher density than SUS316L (7.98) due to the higher molybdenum and copper content. The higher electrical resistivity reflects the higher alloy content. Thermal properties are important for heat exchanger design and high-temperature service calculations.

Magnetic Properties

SUS904L is essentially non-magnetic in the fully annealed condition, with magnetic permeability typically less than 1.01. The high nickel content (23–28%) ensures a very stable austenitic structure that is more resistant to martensite transformation during cold working than SUS304 or even SUS316L. For applications requiring strictly non-magnetic material, specify fully annealed condition. Annealing restores the non-magnetic state after any cold working has induced slight magnetism.

05

Corrosion Resistance

The corrosion resistance of SUS904L is its defining characteristic and the primary reason for its specification. As a super-austenitic grade with PREN ~35–40, SUS904L provides corrosion resistance that far exceeds SUS316L and approaches that of nickel-based alloys. The combination of high chromium, high molybdenum, and copper creates a multi-layered defense against uniform, localized, and acid corrosion. SUS904L excels particularly in sulfuric acid service and chloride-containing environments where standard austenitic grades would fail rapidly.

Corrosion Resistance Rating by Environment

Environment	Resistance	Notes & Limitations
Atmospheric / Rural	Excellent	Superior performance; decades of service life expected
Atmospheric / Marine (coastal)	Excellent	Excellent resistance to salt spray and coastal environments
Fresh Water (potable)	Excellent	Suitable for drinking water applications
Chlorinated Water (≤500 ppm Cl ⁻)	Excellent	Far superior to SUS316L; handles high chloride levels
Salt Water / Seawater (ambient)	Good – Excellent	Suitable for continuous immersion at ambient temperatures
Seawater (warm, >40°C)	Good	Better than SUS316L but may still pit at elevated temps — consider 254 SMO or 6% Mo grades
Sulfuric Acid (dilute, 0–50%)	Excellent	Outstanding — copper addition provides unique protection at all concentrations
Sulfuric Acid (conc., 50–95%)	Very Good – Excellent	Excellent up to ~60°C; concentration-dependent above 90%
Hydrochloric Acid (dilute)	Good	Resistant at low concentrations and ambient temperatures
Nitric Acid	Good	Resistant but SUS304 is more cost-effective for this acid
Phosphoric Acid	Excellent	Widely used in phosphoric acid processing — resistant at high temps
Acetic Acid	Excellent	Resistant at all concentrations and temperatures up to boiling
Caustic Solutions (NaOH)	Good	Resistant up to ~30% concentration at moderate temperatures
Organic Solvents	Excellent	Resistant to most alcohols, esters, ketones, hydrocarbons
Oxidizing Agents	Excellent	Excellent resistance due to high chromium content
Reducing Agents	Very Good	Good resistance enhanced by copper addition

Environment	Resistance	Notes & Limitations
Chloride SCC	Excellent	Highly resistant to chloride-induced stress corrosion cracking
Intergranular (welded)	Excellent	Ultra-low carbon ($\leq 0.02\%$) prevents sensitization

Common Corrosion Types & SUS904L Performance

Uniform Corrosion

SUS904L exhibits exceptionally low uniform corrosion rates in most environments. Its corrosion rate in sulfuric acid at moderate concentrations and temperatures is typically less than 0.1 mm/year — far below SUS316L. The copper addition enhances the stability of the passive film in reducing environments, providing protection that standard austenitic grades cannot achieve.

Pitting and Crevice Corrosion

SUS904L has outstanding resistance to pitting and crevice corrosion due to its 4–5% molybdenum content. The Pitting Resistance Equivalent Number (PREN) is approximately 35–40, calculated as $PREN = \%Cr + 3.3 \times \%Mo + 16 \times \%N \approx 20.5 + 3.3 \times 4.5 + 0.3 \approx 35.6$. This is significantly higher than SUS316L (PREN ~24–27) and is the reason SUS904L can be used in chloride environments where SUS316L would fail. The Critical Pitting Temperature (CPT) in 3.5% NaCl is approximately 70–80°C, compared to 40–60°C for SUS316L and 20–30°C for SUS304.

Sulfuric Acid Resistance — THE DEFINING FEATURE

SUS904L is the premier stainless steel for sulfuric acid service. The 1–2% copper addition is uniquely effective in providing resistance to sulfuric acid at all concentrations. SUS904L can handle dilute sulfuric acid (0–50%) at temperatures up to 80°C and concentrated sulfuric acid (50–90%) at moderate temperatures. This makes it the standard material for sulfuric acid production plants, acid coolers, piping, and storage systems. No other standard stainless steel grade offers comparable sulfuric acid resistance without the addition of copper.

Stress Corrosion Cracking (SCC)

SUS904L has excellent resistance to chloride-induced stress corrosion cracking (SCC) due to its high nickel content (23–28%). The threshold temperature for chloride SCC in SUS904L is significantly higher than SUS316L — approximately 150–200°C versus 60°C for SUS316L. This makes SUS904L suitable for hot chloride applications where SUS316L would be susceptible to SCC. However, in extreme conditions (very high chlorides + high temperatures + high stress), even SUS904L may be susceptible, and higher nickel alloys (e.g., Alloy 625, Alloy C-276) may be required.

Intergranular Corrosion (Sensitization)

Thanks to its ultra-low carbon content (max 0.02%), SUS904L is highly resistant to sensitization during welding or high-temperature exposure. This is even lower than SUS316L (max 0.03%), virtually eliminating chromium carbide precipitation at grain boundaries. Post-weld solution annealing is generally not required for intergranular corrosion resistance in most applications. However, the high alloy content of SUS904L can make it susceptible to sigma phase and other intermetallic precipitates if cooled too slowly through the 700–1000°C range, so rapid quenching after solution annealing is recommended.

Galvanic Corrosion

Due to its high alloy content, SUS904L is positioned higher on the galvanic series than standard stainless steels. When coupled with less noble metals (carbon steel, aluminum), the less noble metal will corrode preferentially. Conversely, coupling with nickel alloys or titanium generally does not cause problems. Proper insulation at dissimilar metal joints is always recommended.

06

Temperature Performance

SUS904L performs well across a wide temperature range, from cryogenic to moderate high-temperature service. While it is not specifically designed for extreme high-temperature oxidation resistance (like SUS310S), its high alloy content provides good strength and corrosion resistance at moderate elevated temperatures. Its ultra-low carbon content preserves corrosion resistance after thermal exposure. The main temperature-related consideration for SUS904L is its susceptibility to sigma phase precipitation if held too long in the 700–1000°C range.

High-Temperature Mechanical Properties

Temperature (°C)	Tensile Strength (MPa)	Yield Strength 0.2% (MPa)	Elongation (%)
20 (Room Temp)	520–680	220–280	35–45
100	490–640	200–260	33–43
200	460–600	180–230	32–42
300	440–570	160–210	30–40
400	410–540	140–190	28–38
500	380–500	130–170	27–37
600	340–440	120–160	26–36
700	270–350	100–130	25–35
800	180–230	80–100	25–35
900	100–130	50–65	25–35

Temperature Comparison: SUS904L vs SUS316L vs SUS304

The following comparison highlights the key temperature and corrosion performance differences between SUS904L and standard austenitic grades:

Property	SUS904L	SUS316L	SUS304
Maximum Continuous Service Temp	~400°C (750°F)	870°C (1600°F)	870°C (1600°F)
Oxidation Resistance (up to)	~400°C	925°C	900°C
Critical Pitting Temp (CPT)	~70–80°C	~40–60°C	~20–30°C
Pitting Resistance (PREN)	~35–40	~24–27	~18–20

Property	SUS904L	SUS316L	SUS304
Sulfuric Acid Resistance	Excellent (Cu addition)	Poor – Fair	Poor
Chloride SCC Resistance	Excellent (high Ni)	Good	Fair
Creep Strength (at 600°C, 10 ⁴ h)	~30 MPa	~70 MPa	~50 MPa
Cryogenic Toughness	Excellent	Excellent	Excellent
Weld Decay Resistance	Excellent (≤0.02% C)	Excellent (≤0.03% C)	Fair
Key High-Temp Limitation	Sigma phase risk >700°C; not for oxidation service	Limited by oxidation above 870°C	Limited by oxidation above 870°C
Typical Applications	Acid service, seawater, FGD	Chemical, marine, pharma	General purpose

Sigma Phase Considerations

SUS904L, due to its high alloy content (particularly the high molybdenum), is susceptible to sigma phase precipitation when held in the 700–1000°C range for extended periods. Sigma phase is a hard, brittle intermetallic compound that forms at grain boundaries and can significantly reduce toughness and corrosion resistance. To prevent sigma formation:

- Rapid quenching after solution annealing — do not slow-cool through 700–1000°C
- Avoid prolonged service in the 700–1000°C range
- Solution annealing temperature: 1090–1170°C (1994–2138°F) followed by rapid water quench
- Sigma phase is reversible — re-annealing dissolves sigma and restores properties
- Weld heat input should be controlled to minimize time in the sigma range
- Tack welds should be minimized as they create localized sigma-precipitated zones

Low-Temperature Performance

SUS904L maintains excellent toughness and ductility at cryogenic temperatures due to its fully austenitic structure and high nickel content. Like all austenitic stainless steels, it does not exhibit a ductile-brittle transition and remains tough down to -196°C (-321°F) and below. The high nickel content (23–28%) makes it even more resistant to low-temperature embrittlement than SUS316L.

Temperature (°C)	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Charpy V-Notch (J)
20	520–680	220–280	35–45	>250
0	580–740	260–320	33–43	>220
-50	680–840	300–370	30–40	>180

Temperature (°C)	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Charpy V-Notch (J)
-100	780–940	360–430	28–38	>140
-196 (LN ₂)	950–1150	450–550	25–35	>100

Note: Values are typical for annealed material. Actual values may vary depending on product form, heat treatment, and testing direction. The limited high-temperature service of SUS904L (~400°C max) is due to sigma phase risk, not oxidation — it is a corrosion-resistant alloy, not a heat-resistant alloy.

07

Product Forms & Standards

GNEE Steel supplies SUS904L 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 general applications. SUS904L plate and sheet are available in various thicknesses, widths, and surface finishes for applications ranging from acid storage tank construction to chemical process vessel fabrication.

Pipe — ASTM A312

ASTM A312 covers seamless, straight-seam welded, and heavily cold-worked welded austenitic stainless steel pipe for high-temperature and general corrosive service. Both seamless and welded SUS904L pipes are available in a wide range of sizes and schedules, commonly used in acid processing lines and seawater cooling systems.

Tube — ASTM A213 / A269

ASTM A213: Seamless austenitic alloy-steel boiler, superheater, and heat-exchanger tubes. SUS904L tubes are widely used in shell-and-tube heat exchangers handling aggressive media.

ASTM A269: Seamless and welded austenitic stainless steel tubing for general service, with emphasis on smooth interior surfaces for fluid transport in corrosive environments.

Bar — ASTM A276

ASTM A276 covers hot-finished or cold-finished bars including rounds, squares, and hexagons. SUS904L bars are available in various finishes and sizes for machining fasteners, shafts, and structural components in corrosive environments.

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 manufactured from SUS904L for corrosive piping systems.

Full Product Range Summary

Product Form	Key Standards	Available Types	Typical Applications
Plate / Sheet	ASTM A240, EN 10088-2, SEW 400	Hot rolled, cold rolled, coil, strip	Acid tanks, vessel linings, chemical equipment

Product Form	Key Standards	Available Types	Typical Applications
Pipe	ASTM A312, EN 10216-5	Seamless, welded (ERW/LSAW)	Acid piping, seawater cooling, process lines
Tube	ASTM A213, A269, EN 10216-5	Seamless, welded, precision, U-bend	Heat exchangers, condensers, instrumentation
Bar / Rod	ASTM A276, EN 10088-3	Round, square, hexagonal, flat, wire	Fasteners, pump shafts, valve stems
Coil / Strip	ASTM A240, EN 10088-2	Hot rolled coil, cold rolled coil, slit strip	Stamping, forming, cladding
Fittings	ASTM A403, MSS SP-43	Elbows, tees, reducers, caps, flanges	Corrosive piping systems, process connections
Wire	ASTM A580, EN 10263-5	Spring wire, welding wire, weaving wire	Springs, welding consumables, mesh

08

Size Range & Specifications

GNEE Steel offers SUS904L products in an extensive range of sizes. Below are our standard size ranges for each product form. Custom sizes are available upon request.

Plate & Sheet Size Range

Parameter	Hot Rolled Plate	Cold Rolled Sheet	Coil / Strip
Thickness	3.0 – 80 mm	0.5 – 3.0 mm	0.3 – 6.0 mm
Thickness (inch)	0.118 – 3.15"	0.020 – 0.118"	0.012 – 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 15 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 – 406 mm	12.7 – 1524 mm	1.6 – 114.3 mm
OD (inch)	1/4 – 16"	1/2 – 60"	1/16 – 4.5"
Wall Thickness	1.2 – 40 mm	1.6 – 30 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 – 350 mm (0.12 – 14")	3000 – 6000 mm (10 – 20 ft)	Hot rolled, cold drawn, polished
Square Bar	5 × 5 – 150 × 150 mm	3000 – 6000 mm	Hot rolled, cold drawn
Hexagonal Bar	6 – 80 mm A/F	3000 – 6000 mm	Cold drawn, hot rolled
Flat Bar	Thickness: 3 – 80 mm Width: 10 – 400 mm	3000 – 6000 mm	Hot rolled, cold drawn
Angle Bar	25×25×3 – 150×150×15 mm	3000 – 6000 mm	Hot rolled, pickled
Wire Rod / Wire	Ø 0.5 – 12 mm	Coils / Cut to length	Annealed, cold drawn

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.

- 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

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Surface Finish Options

SUS904L is available in a variety of surface finishes. The surface finish can affect corrosion performance, cleanability, and aesthetics. For aggressive corrosive environments, a smooth surface finish is generally recommended as rough surfaces can trap corrosive media and promote localized attack.

Finish	Description	Ra (µm)	Appearance	Typical Applications
No.1	Hot rolled, annealed & pickled.	~3.2 – 6.3	Dull, matte silver-gray	Industrial tanks, thick plate, structural
2B	Cold rolled, annealed & pickled, skin-passed.	~0.2 – 0.8	Smooth, moderately reflective	General purpose, vessels, process equipment
BA	Bright Annealed in controlled atmosphere.	~0.05 – 0.2	Bright, highly reflective	Specialty components, decorative trim
No.4	Brushed / satin with 120-180 grit.	~0.2 – 0.8	Uniform brushed, satin sheen	Equipment panels, architectural
HL	Hairline with finer 180-240 grit.	~0.1 – 0.4	Finer continuous lines, elegant	Decorative panels, specialty
Mirror 8K	Mirror-polished to high reflectivity.	~0.02 – 0.08	Near-perfect mirror reflection	Reflectors, decorative, specialty

Detailed Finish Specifications

No. 1 Finish (Hot Rolled Annealed & Pickled)

Produced by hot rolling, annealing, and pickling. Dull, non-reflective surface. Standard finish for hot-rolled plate used in tank construction and structural applications. Note: for severely corrosive service, a smoother finish (2B or polished) is preferred as the rougher No.1 surface can trap corrosive media and initiate pitting.

2B Finish (Cold Rolled — Annealed & Pickled)

The most widely used surface finish. Produced by cold rolling, annealing, pickling, and a final skin pass. Smooth, moderately reflective surface. Standard for sheet and coil used in vessel fabrication, heat exchanger plates, and general chemical equipment.

BA Finish (Bright Annealed)

Cold rolled and bright annealed in a controlled atmosphere. Bright, reflective surface with no additional polishing needed. Used for specialty components and applications requiring a clean, smooth surface for optimal corrosion resistance.

No. 4 / HL / Mirror 8K

Mechanical polish finishes for aesthetic or functional purposes. No. 4 provides a uniform brushed appearance. HL offers finer hairline lines. Mirror 8K provides near-perfect reflectivity. These finishes can improve surface smoothness (lower Ra), which is beneficial for corrosion resistance in crevice-prone areas.

Note: For severely corrosive environments, especially those involving chlorides or hot acids, a smooth surface finish ($Ra \leq 0.8 \mu m$) is recommended to minimize the risk of crevice corrosion initiation. Polished surfaces also clean more easily, reducing the risk of under-deposit corrosion.

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Quality Control & Testing

At GNEE Steel, quality assurance is integrated into every stage of production. Our quality management system ensures that every SUS904L product meets or exceeds international standards. Due to the high cost and critical service of SUS904L, particular attention is paid to chemical composition verification (especially Mo and Cu), sigma phase inspection, and corrosion testing.

Inspection & Testing Capabilities

Test Method	Description	Standard	Purpose
PMI Test (Positive Material Identification)	XRF analysis to verify Cr, Ni, Mo, Cu content of finished products.	ASTM E1019	Material grade verification, Mo & Cu confirmation
Spectrochemical Analysis	Laboratory OES analysis for precise composition including Mo, Cu, and C.	ASTM E1019	Full composition verification, C ≤ 0.02%
Tensile Test	Mechanical testing for tensile strength, yield strength, elongation.	ASTM E8 / E8M JIS Z2241	Mechanical property compliance
Hardness Test	Rockwell, Brinell, Vickers hardness testing.	ASTM E10, E18, E92	Hardness verification
Ultrasonic Testing (UT)	NDT using sound waves to detect internal defects.	ASTM A388 / A577 EN 10160	Internal soundness verification
Eddy Current Test	Electromagnetic NDT for surface defects in tubes/bars.	ASTM E309 / E426 EN 10246	Surface defect detection
Dimensional Inspection	Precision measurement of all dimensions and tolerances.	ASTM / JIS / EN	Dimensional compliance
Surface Inspection	Visual and optical inspection for surface defects.	Standard specs	Surface quality verification
Hydrostatic Test	Pressure testing of pipes and tubes.	ASTM A312 / A213	Pressure integrity verification
Intergranular Corrosion Test	ASTM A262 testing for sensitization resistance.	ASTM A262	Weld decay resistance verification
Pitting Corrosion Test	ASTM G48 critical pitting temperature test.	ASTM G48	Pitting resistance verification (CPT)
Metallographic Exam	Microstructural examination for sigma phase and precipitates.	ASTM E407	Sigma phase & microstructure verification

Certifications & Documents

Certificate / Document	Description	Applicable Standard
EN 10204 3.1 MTC	Material Test Certificate with full chemical composition (incl. Mo, Cu, C) and mechanical properties.	EN 10204 Type 3.1
EN 10204 3.2 MTC	Material Test Certificate with third-party verification.	EN 10204 Type 3.2
SGS Inspection	Third-party inspection by SGS.	SGS Testing Services
BV Inspection	Third-party inspection by Bureau Veritas.	Bureau Veritas Standards
TUV Inspection	Third-party inspection by TUV.	TUV Rheinland / TUV SUD
Mill Test Report (MTR)	Full report: heat number, composition (with Mo, Cu), mechanical tests.	ASTM / EN standards
VdTÜV Data Sheet	German Technical Code certification for pressure service.	VdTÜV 421
ISO 9001:2015	Quality Management System certification.	ISO 9001:2015

Note: Due to the high cost and critical service of SUS904L, third-party inspections (SGS, BV, TUV) and corrosion testing (ASTM A262, G48) are strongly recommended for all orders. Please specify inspection requirements at the time of order placement.

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Applications & Industries

SUS904L is specified for the most demanding corrosive environments where standard austenitic stainless steels (SUS304, SUS316L) would fail. Its combination of high chromium, high molybdenum, high nickel, and copper makes it indispensable in sulfuric acid processing, seawater systems, flue gas desulfurization, chemical processing, and offshore industries. While more expensive than standard grades, SUS904L is far more cost-effective than nickel alloys for equivalent service.

Industry	Key Applications	Why SUS904L?
Sulfuric Acid Processing	Acid coolers, heat exchangers, piping, storage tanks, reactors, pumps, valves	Cu addition provides unique sulfuric acid resistance at all concentrations
Flue Gas Desulfurization (FGD)	Absorber vessels, ductwork, mist eliminators, spray nozzles, piping	Resistant to SO ₂ /SO ₃ + chloride environments at moderate temperatures
Seawater Cooling	Heat exchanger tubes, tube sheets, water boxes, intake screens, piping	High PREN (~35–40) resists pitting in chlorinated seawater at ambient temps
Chemical Processing	Reactors, columns, heat exchangers, piping, storage vessels, agitators	Multi-acid resistance (sulfuric, phosphoric, acetic); excellent SCC resistance
Pharmaceutical & Fine Chemicals	Reactors, crystallizers, piping systems, storage tanks, cleanroom equipment	Resistant to aggressive process chemicals; hygienic; low contamination risk
Pulp & Paper	Bleaching equipment, digester components, white/black liquor systems, washers	Resistant to chloride and sulfur compounds in bleach plant environments
Oil & Gas / Offshore	Downhole tubulars, wellhead components, seawater systems, process piping	Superior chloride and sour gas resistance; suitable for offshore platforms
Phosphoric Acid Production	Evaporators, heat exchangers, reaction vessels, piping systems	Excellent phosphoric acid resistance at high temperatures and concentrations
Environmental & Water Treatment	Wastewater treatment, acid neutralization, scrubber systems	Resistant to mixed acid/chloride environments in waste processing

Additional Application Areas

- Acetic Acid Production: Reactors, columns, heat exchangers — excellent resistance to acetic acid at all concentrations up to boiling
- Fertilizer Industry: Phosphoric acid handling equipment, sulfuric acid piping in DAP/MAP plants
- Mining & Metallurgy: Acid leaching equipment, SX-EW tank construction, acid piping for copper/nickel extraction
- Steel Pickling: Pickling tank construction, fume exhaust ducts, acid recovery equipment
- Marine Engineering: Seawater intake systems, ballast water treatment, offshore platform piping
- Desalination: Brine handling equipment, reject brine piping, heat exchanger tubes in MSF/MED plants

- Food & Beverage: Hot acid processing, brine systems, pickle liquor handling equipment
- Nuclear Industry: Spent fuel storage pool liners, radioactive waste handling — high corrosion + low contamination

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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 SUS904L compares to other common grades and when to specify it.

SUS904L vs SUS316L

SUS904L dramatically outperforms SUS316L in virtually all corrosive environments. With nearly double the nickel (23–28% vs 10–14%), much higher molybdenum (4–5% vs 2–3%), and the unique copper addition (1–2%), SUS904L provides corrosion resistance approaching nickel alloys. The PREN of SUS904L (~35–40) is far higher than SUS316L (~24–27). However, SUS904L is significantly more expensive and has lower high-temperature oxidation resistance due to sigma phase risk. SUS316L remains the cost-effective choice for moderate corrosive service; SUS904L is for the most demanding environments.

Property	SUS904L	SUS316L
Chromium (Cr)	19.0 – 23.0%	16.0 – 18.5%
Nickel (Ni)	23.0 – 28.0%	10.0 – 14.0%
Molybdenum (Mo)	4.0 – 5.0%	2.0 – 3.0%
Copper (Cu)	1.0 – 2.0%	—
Carbon (max)	0.02%	0.03%
Tensile Strength (min)	490 MPa	485 MPa
Yield Strength (min)	216 MPa	170 MPa
Elongation (min)	35%	40%
Density	8.00 g/cm³	7.98 g/cm³
Pitting Resistance (PREN)	~35–40	~24–27
Critical Pitting Temp (CPT)	~70–80°C	~40–60°C
Sulfuric Acid Resistance	Excellent (Cu addition)	Poor – Fair
Seawater Resistance	Good – Excellent	Fair – Good
Chloride SCC Resistance	Excellent (high Ni)	Good
Max Service Temp	~400°C (sigma risk)	870°C
Cost	High (~2–3× of 316L)	Moderate (baseline)

Property	SUS904L	SUS316L
Key Advantage	Superior corrosion in aggressive acids/chlorides	Cost-effective, versatile, widely available

SUS904L vs SUS2205 (Duplex)

SUS2205 is a duplex stainless steel with PREN ~34–38, comparable to SUS904L. Duplex grades offer higher strength and lower cost but have lower ductility and are more difficult to weld. SUS904L has better sulfuric acid resistance (due to copper), better formability (fully austenitic), and is easier to weld. SUS2205 is stronger and cheaper but more limited in complex fabrication. For sulfuric acid service or complex welded fabrications, SUS904L is preferred; for simple structures in chloride environments, SUS2205 may be more economical.

Property	SUS904L (1.4539)	SUS2205 (1.4462)
Chromium (Cr)	19.0 – 23.0%	22.0 – 23.0%
Nickel (Ni)	23.0 – 28.0%	4.5 – 6.5%
Molybdenum (Mo)	4.0 – 5.0%	3.0 – 3.5%
Copper (Cu)	1.0 – 2.0%	—
Carbon (max)	0.02%	0.03%
Structure	Fully austenitic	Duplex (austenite + ferrite)
Tensile Strength (min)	490 MPa	655 MPa
Yield Strength (min)	216 MPa	450 MPa
Elongation (min)	35%	25%
Pitting Resistance (PREN)	~35–40	~34–38
Sulfuric Acid Resistance	Excellent (Cu)	Good
Weldability	Excellent	Good (requires controlled heat input)
Formability	Excellent (austenitic)	Good (less than austenitic)
Cost	Higher	Lower (~50–60% of 904L)
Best For	Sulfuric acid, complex fabrications, severe corrosion	High-strength chloride service, cost-sensitive

SUS904L vs 254 SMO (Super-Austenitic 6% Mo)

254 SMO (UNS S31254) is an even higher-grade super-austenitic with 6% molybdenum (vs 4–5% in 904L) and higher chromium (20%), giving it a PREN of ~42–46 — higher than SUS904L (~35–40). 254 SMO has superior chloride pitting resistance and is preferred for the most severe chloride/brine environments. However, SUS904L retains a unique advantage in sulfuric acid service due to its copper addition, which 254 SMO does not contain. For sulfuric acid applications, SUS904L is the better choice; for pure chloride pitting, 254 SMO is superior.

Property	SUS904L (1.4539)	254 SMO (1.4547)
Chromium (Cr)	19.0 – 23.0%	19.5 – 20.5%
Nickel (Ni)	23.0 – 28.0%	17.5 – 18.5%
Molybdenum (Mo)	4.0 – 5.0%	6.0 – 7.0%
Copper (Cu)	1.0 – 2.0%	0.50 – 1.00%
Nitrogen (N)	—	0.18 – 0.22%
Carbon (max)	0.02%	0.02%
Pitting Resistance (PREN)	~35–40	~42–46
Sulfuric Acid Resistance	Excellent (high Cu)	Good (lower Cu)
Chloride Pitting Resistance	Very Good	Excellent (higher Mo + N)
Cost	High	Very High (~1.3–1.5× of 904L)
Key Application	Sulfuric acid service, FGD, multi-acid	Severe chloride/brine, seawater, bleach

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Purchasing Guide

This purchasing guide helps you make informed decisions when sourcing SUS904L stainless steel products. Due to its high cost and critical service, proper specification, verification, and documentation are essential.

How to Choose the Right SUS904L Specification

Factor	What to Consider	Guidance
Product Form	Plate, sheet, pipe, tube, bar, fitting?	Choose based on application: plates for vessels, tubes for heat exchangers
Thickness / Size	What dimensions are required?	Check standard sizes; custom sizes available but may have higher MOQ
Surface Finish	Is corrosion performance critical?	For aggressive service, specify smooth finish (2B or polished, Ra ≤ 0.8 μm)
Corrosion Environment	What acids, chlorides, temperatures are present?	Verify SUS904L is suitable — check corrosion tables; consider 254 SMO for extreme chlorides
Service Temperature	What is the maximum operating temperature?	SUS904L: max ~400°C due to sigma phase risk; NOT a heat-resistant grade
Welding Requirement	Will the component be welded?	SUS904L welds well; control heat input to minimize sigma; no PWHT needed for IGC
Sulfuric Acid Service	Concentration and temperature of H ₂ SO ₄ ?	SUS904L is premier grade for sulfuric acid — verify concentration/temp range
Standard / Specification	Which standard must it comply with?	Specify ASTM A240 N08904, EN 1.4539, or VdTÜV 421
Certification Needs	What documentation is required?	MTC 3.1 minimum; 3.2 for critical service; ASTM A262 and G48 corrosion tests recommended
Sigma Phase Check	For thick sections and castings	Request metallographic examination for sigma phase, especially for thick plate
Quantity & Lead Time	How much and how soon?	904L is a specialty grade — longer lead times than standard grades; plan ahead

How to Verify Material Authenticity

Ensuring you receive genuine SUS904L material is critical — the high cost of 904L makes it a target for mislabeling. The key verification is the high Mo (4–5%), Cu (1–2%), and Ni (23–28%) content — these distinguish 904L from SUS316L.

Verification Method	Description	Reliability
Mill Test Certificate (MTC)	Official mill document with full composition including Mo, Cu, Ni, C and mechanical test results.	□□□□□
Spectrochemical Analysis	Laboratory OES analysis providing precise Mo (4–5%), Cu (1–2%), and Ni (23–28%) content — the defining 904L elements.	□□□□□
PMI Testing (XRF)	Portable XRF can verify Cr, Ni, Mo, Cu but CANNOT detect carbon. Useful for field verification of Mo and Cu.	□□□□□
Copper Spot Test	Chemical test detecting copper presence — quick field test to distinguish 904L (has Cu) from 316L (no Cu).	□□□□□
Intergranular Corrosion Test	ASTM A262 test verifying sensitization resistance — functional test for welded service.	□□□□□
Pitting Corrosion Test	ASTM G48 critical pitting temperature test — SUS904L should show CPT > 70°C in 6% FeCl ₃ .	□□□□□
Heat / Lot Number Traceability	Unique heat number traceable to mill MTC with full Mo, Cu, Ni data.	□□□□□
Magnet Test	Non-magnetic like all austenitic grades — cannot distinguish 904L from 316L or 304.	□□□□□

Required Certificates & Documentation

- Mill Test Certificate (MTC) EN 10204 3.1: Standard — full composition with Mo (4–5%), Cu (1–2%), Ni (23–28%), C (≤0.02%) and mechanical tests
- EN 10204 3.2 Certificate: For critical/safety applications — third-party witnessed testing and verification
- ASTM A262 Intergranular Test: Verification of resistance to intergranular corrosion — critical for welded service
- ASTM G48 Pitting Test: Critical pitting temperature verification — CPT should exceed 70°C for genuine 904L
- Metallographic Examination: Verification of microstructure — sigma phase and intermetallic precipitate check
- Third-Party Inspection Report: SGS, BV, or TUV inspection — strongly recommended for 904L due to high cost
- Heat Treatment Report: Solution annealing details (1090–1170°C, rapid quench) — verify proper processing
- VdTÜV Certificate: German Technical Code for pressure service applications
- Packing List & Commercial Invoice: Standard shipping and customs documentation
- Certificate of Origin: For customs clearance and trade compliance

14 Frequently Asked Questions

Answers to common questions about SUS904L stainless steel. If you have additional questions, please contact our technical sales team for expert advice.

Q1. What is SUS904L stainless steel equivalent to?

SUS904L has several international equivalents: UNS N08904 (American), AISI 904L (American Iron and Steel Institute), EN 1.4539 / X1NiCrMoCu25-20-5 (European), and NAS 185 (Nippon Steel designation). All these grades have essentially the same chemical composition — 19–23% chromium, 23–28% nickel, 4–5% molybdenum, 1–2% copper, with carbon limited to 0.02% maximum. The copper addition is the unique distinguishing feature of 904L.

Q2. What is the PREN value of SUS904L?

The Pitting Resistance Equivalent Number (PREN) of SUS904L is approximately 35–40. $PREN = \%Cr + 3.3 \times \%Mo + 16 \times \%N \approx 20.5 + 3.3 \times 4.5 + 0.3 \approx 35.6$. This is significantly higher than SUS316L (PREN ~24–27) and SUS304 (PREN ~18–20). The higher PREN is primarily driven by the 4–5% molybdenum content. For comparison, super-austenitic 254 SMO with 6% Mo has a PREN of ~42–46.

Q3. Why does SUS904L contain copper?

Copper (1–2%) is the unique defining element of SUS904L. Copper dramatically improves resistance to reducing acids, particularly sulfuric acid, by enhancing the stability of the passive film in reducing environments. No other standard austenitic stainless steel grade contains copper as an intentional alloying element at this level. This makes SUS904L the premier grade for sulfuric acid service — it can handle dilute H_2SO_4 at temperatures up to 80°C and concentrated H_2SO_4 at moderate temperatures where SUS316L would rapidly corrode.

Q4. What is the difference between SUS904L and SUS316L?

SUS904L dramatically outperforms SUS316L in corrosion resistance: it has much higher chromium (19–23% vs 16–18.5%), nickel (23–28% vs 10–14%), molybdenum (4–5% vs 2–3%), and the unique copper addition (1–2%). The PREN of 904L (~35–40) is far higher than 316L (~24–27). SUS904L excels in sulfuric acid, chloride pitting, and stress corrosion cracking resistance. However, 904L is about 2–3× more expensive than 316L and has lower maximum service temperature (~400°C vs 870°C) due to sigma phase risk. Use 904L when 316L is insufficient; use 316L when 904L is overkill.

Q5. Can SUS904L be used in seawater?

Yes, SUS904L has good to excellent resistance to seawater, particularly at ambient temperatures. With a PREN of ~35–40 and critical pitting temperature of 70–80°C in 3.5% NaCl, SUS904L significantly outperforms SUS316L in seawater. It is suitable for continuous immersion in ambient-temperature seawater, seawater cooling systems, and offshore platform components. However, for warm seawater (>40°C) or very severe chloride service, consider 6% Mo super-austenitic grades (254 SMO, AL-6XN) or nickel alloys (Alloy 625, Alloy C-276).

Q6. What is the maximum temperature for SUS904L?

SUS904L has a maximum recommended continuous service temperature of approximately 400°C (750°F). This limitation is NOT due to oxidation (it has good oxidation resistance) but due to the risk of sigma phase precipitation in the 700–1000°C range. The high molybdenum content makes SUS904L susceptible to sigma formation, which embrittles the material and reduces corrosion resistance. SUS904L is a corrosion-resistant alloy, not a heat-resistant alloy. For high-temperature service, use SUS310S (up to 1150°C).

Q7. Is SUS904L weldable?

Yes, SUS904L has excellent weldability using TIG (GTAW), MIG (GMAW), and stick (SMAW) welding. Matching filler metals such as ER385 (matching composition) or ER NiCrMo-3 (Alloy 625 filler) should be used. The ultra-low carbon content ($\leq 0.02\%$) eliminates the need for post-weld annealing for intergranular corrosion.

resistance. Key precautions: control heat input to minimize time in the sigma range, minimize tack welds, and use low heat input procedures. No preheating is required.

Q8. Can SUS904L be hardened by heat treatment?

No, SUS904L (like all austenitic stainless steels) cannot be hardened by heat treatment. It can only be hardened by cold working. The only heat treatment is solution annealing (1090–1170°C / 1994–2138°F followed by rapid water quench), which dissolves precipitates (including any sigma phase), restores ductility, and maximizes corrosion resistance. Rapid quenching through the 700–1000°C range is critical to prevent sigma phase re-formation.

Q9. What is the density of SUS904L?

The density of SUS904L is approximately 8.00 g/cm³ (0.289 lb/in³ or 8000 kg/m³) at room temperature. This is slightly higher than SUS316L (7.98) and SUS304 (7.93) due to the higher molybdenum and copper content (both heavier elements). The higher density affects weight calculations for material ordering.

Q10. Is SUS904L magnetic?

SUS904L is essentially non-magnetic in the fully annealed condition, with magnetic permeability typically less than 1.01. The high nickel content (23–28%) makes it more stable against cold-work-induced magnetism than SUS304 or even SUS316L. Cold working may cause very slight magnetism, which is fully reversed by annealing.

Q11. What standards apply to SUS904L pipe?

SUS904L pipe is covered by: ASTM A312 (seamless and welded pipe for general corrosive service), ASTM A213 (seamless boiler, superheater, and heat-exchanger tubes), ASTM A269 (seamless and welded tube for general service), EN 10216-5 (seamless steel tubes for pressure purposes — stainless steel), and VdTÜV 421 (German Technical Code for pressure service).

Q12. What filler metal should be used for welding SUS904L?

The recommended filler metals for welding SUS904L are: ER385 (matching composition, for TIG/MIG) and E385-15 or E385-16 (for stick welding). These matching fillers maintain the same high-alloy composition in the weld deposit. Alternatively, over-alloyed nickel fillers such as ER NiCrMo-3 (Alloy 625) can be used for dissimilar welds or when maximum corrosion resistance in the weld zone is required. No preheat is required. Control heat input to minimize sigma phase formation.

Q13. When should I choose SUS904L over SUS316L?

Choose SUS904L over SUS316L when: (1) the environment contains sulfuric acid at any concentration where SUS316L would fail, (2) chloride levels exceed SUS316L's pitting resistance (PREN < 24–27 is insufficient), (3) the service temperature in chlorides exceeds 60°C (SCC threshold for 316L), (4) the application involves FGD, seawater cooling, or aggressive chemical processing. For moderate corrosive environments, SUS316L remains the cost-effective choice — SUS904L's superior performance comes at 2–3× the cost.

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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, including super-austenitic and specialty grades for the most demanding corrosive environments.

Available Products

- Stainless Steel Plate & Sheet: Hot rolled plate, cold rolled sheet, coil, strip — various finishes
- 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
- Available Grades: SUS304, 304L, 316, 316L, 321, 310S, 904L, 2205, 2507, 254 SMO, 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	300 kg	1 – 2 sheets	Specialty grade — smaller lots possible for stock sizes
Pipe / Tube	300 kg	10 – 50 meters	904L pipe has higher per-unit cost; lower MOQ negotiable
Bar / Rod	300 kg	10 – 50 kg	Cut-to-length samples available
Coil / Strip	500 kg	50 – 200 kg	Slit strip: depends on width and gauge
Fittings / Flanges	10 pieces	1 – 5 pieces	Specialty grade — limited stock sizes
Custom Fabrication	Project-based	—	Discuss with sales for custom requirements

Note: SUS904L is a high-cost specialty grade. GNEE Steel offers flexible MOQ policies to support customer projects. Contact our sales team to discuss your specific needs.

Lead Time

Order Type	Standard Lead Time	Expedited Service	Note
Stock Items (ex-warehouse)	5 – 10 days	3 – 5 days	Limited stock of common sizes
Standard Production	15 – 25 days	10 – 15 days	For common sizes and specifications

Order Type	Standard Lead Time	Expedited Service	Note
Custom Size / Finish	20 – 35 days	—	Custom cutting, slitting, or special surface
Custom Fabrication	25 – 50 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
Express Courier (DHL/FedEx)	3 – 7 days	1 – 3 days	For samples and small packages

Contact GNEE Steel

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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.