

# 304 Stainless Steel Tubing, Standards, Properties, Uses & Buying Guide

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## 304 Stainless Steel Tubing: Standards, Properties, Uses & Buying Guide



*304 stainless steel tubing is the most widely used austenitic stainless tube for general corrosion resistance, good formability, and reliable weldability. In global trade you'll also see it as:*

- **AISI 304 / UNS S30400**
- **EN 1.4301 / X5CrNi18-10**

*It's often called "18/8" because its nominal chemistry is around 18% chromium and 8% nickel, which helps form a stable, corrosion-resistant passive film and an austenitic structure with excellent forming behavior.*

### 304 Tubing vs 304 Pipe

- Tubing is commonly ordered by OD × wall thickness (or sometimes ID × wall), with tighter dimensional focus for heat exchangers, instrumentation, sanitary lines, and mechanical/structural tube.
- Pipe is usually ordered by NPS (Nominal Pipe Size) + Schedule, and follows pipe standards (often different from tubing standards).

### Common Standards for 304 Stainless Steel Tubing

- ASTM standards (most common in international projects)
- EN standard (common in EU / pressure piping projects)

### Typical Applications of 304 Stainless Tubing

- food processing and beverage equipment
- kitchen equipment, sinks, troughs
- architectural trim, railings, decorative tube
- heat exchangers and general industrial tubing

## 304 Stainless Steel Tubing (AISI 304 / EN 1.4301): Complete Guide

**304 stainless steel tubing** is the most widely used austenitic stainless tube for general corrosion resistance, good formability, and reliable weldability. In global trade you'll also see it as:

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## 1) 304 Tubing vs 304 Pipe (Why the Standard Matters)

In practice:

- **Tubing** is commonly ordered by **OD × wall thickness** (or sometimes ID × wall), with tighter dimensional focus for heat exchangers, instrumentation, sanitary lines, and mechanical/structural tube.
- **Pipe** is usually ordered by **NPS (Nominal Pipe Size) + Schedule**, and follows pipe standards (often different from tubing standards).

For buyers, the fastest way to avoid mix-ups is to specify the **correct ASTM/EN standard** for the end use (general service vs boiler/heat exchanger vs sanitary vs ornamental/structural).

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## 2) Common Standards for 304 Stainless Steel Tubing

Here are the standards most frequently used when someone requests “304 stainless steel tubing”:

### ASTM standards (most common in international projects)

#### **ASTM A269 – General Service Tubing (Seamless or Welded)**

Used for general corrosion-resisting service and low/high temperature service. Typical supplied sizes are **≥ 1/4 in ID** and **≥ 0.020 in wall**, and the standard includes a clear ordering checklist (grade, OD & wall, length, optional tests, test reports).

#### **ASTM A213 – Boiler / Superheater / Heat Exchanger Tubes (Seamless)**

For high-temperature/pressure service (heat exchangers, boilers). Covers grades including **TP304**, and lists typical ranges such as **1/8 in ID to 5 in OD** with **0.015–0.500 in wall** (unless otherwise ordered).

#### **ASTM A270 – Sanitary Tubing (Seamless, Welded, or Heavily Cold-Worked)**

Designed for dairy/food service with special surface finish requirements; covers sizes up to **12 in OD** and allows specific finishes such as mechanical polishes (No. 80/120/180/240), electropolish, and maximum roughness requirements when ordered.

#### **ASTM A554 – Welded Mechanical Tubing (Ornamental / Structural / Exhaust)**

For applications where appearance or mechanical performance is needed; covers welded tubing up to **16 in OD** and **≥ 0.020 in wall**.

### EN standard (common in EU / pressure piping projects)

#### **BS EN 10217-7 – Welded Stainless Tubes for Pressure Purposes**

A recognized pressure-tube route in Europe; the standard has been updated over time (2005 → 2014 → 2021).

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### 3) Typical Chemical Composition (304)

Across widely used references for 304 / 1.4301, typical composition targets are roughly:

- **Cr ~ 17.5–19.5%**
- **Ni ~ 8.0–10.5%**
- **C ≤ ~0.07% (304)**
- With controlled Mn/Si/P/S limits depending on the governing spec

Note: exact composition limits and product analysis tolerances depend on the **product standard** (tubing vs plate vs pipe) and the edition specified.

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### 4) Mechanical & Physical Properties

For annealed 304, common minimum/typical reference values include:

- **Tensile strength:** ~515 MPa minimum (typical reference values)
- **0.2% proof / yield:** ~205 MPa minimum (typical reference values)
- **Elongation:** ~40% minimum (typical reference values)

Important buying note: some datasheets clearly state that properties shown for flat rolled products (like ASTM A240) are **similar but not necessarily identical** to those required for other product forms such as pipe/tube—so always rely on the **tube standard + MTR** for acceptance.

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### 5) Corrosion Resistance: Where 304 Works (and Where It Doesn't)

304 has excellent corrosion resistance in many environments, but buyers should watch for **chlorides**:

- **Pitting/crevice corrosion** can occur in chloride-containing environments, and **stress corrosion cracking** risk increases at elevated temperatures (e.g., above ~60°C).
- For mild chloride exposure, [worldstainless notes 1.4301](#) (304) can suit mild environments (example guidance mentions **< 200 ppm chloride** for certain mild conditions), while 1.4401 (316) is preferred where chloride is present in the atmosphere.

**Practical selection rule**

- Indoor / mild outdoor / non-salt environments → **304 tubing** is usually cost-effective.
  - Marine air, coastal exposure, chlorinated water, brines, aggressive cleaners → consider **316/316L** (or duplex, depending on severity).
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## 6) Temperature Performance (304 vs 304L vs 304H)

- 304 has **good oxidation resistance** and is commonly used up to around **870°C** in many oxidation-focused applications (application dependent).
- **304L** (low carbon) is often selected when you want improved resistance to sensitization in welding and heavy gauge fabrication.
- **304H** (higher carbon) is used where higher elevated-temperature strength is desired (pressure-containing/high-temperature service), but temperature range and corrosion considerations must be evaluated.

**Dual certification warning:** It's common for stock to be "dual certified" 304/304L, but some references caution this may be unacceptable for certain **high-temperature** applications.

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## 7) Seamless vs Welded 304 Tubing

### Seamless 304 tubing

Best when you need:

- high pressure capability in many designs
- demanding heat exchanger/boiler service (often specified by standard, e.g., A213 is seamless)

### Welded 304 tubing

Best when you need:

- cost efficiency in larger diameters
  - sanitary/mechanical tube with controlled weld quality and specified finishes (e.g., A270, A554)
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## 8) Surface Finishes (Especially Important for Sanitary Tubing)

If you're buying **food/dairy/pharma** tubing, finish is often as important as chemistry:

- ASTM A270 allows specifying finishes such as **mill finish**, **mechanically polished** finishes (No. 80/120/180/240), **electropolished**, and also allows ordering by **maximum roughness average** requirements

**Tip:** Always state whether you need **ID polish**, **OD polish**, or both, and whether the finish must be **measured and reported**.

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## 9) Typical Applications of 304 Stainless Tubing

Common “real world” uses include:

- food processing and beverage equipment
  - kitchen equipment, sinks, troughs
  - architectural trim, railings, decorative tube
  - heat exchangers and general industrial tubing
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## 10) Ordering Checklist

To quote and supply correctly, include:

1. **Standard** (A269 / A213 / A270 / A554 / EN 10217-7)
  2. **Grade** (304 / 304L / 304H) + permitted “dual cert” yes/no
  3. **Manufacturing route:** Seamless or Welded (and if sanitary: heavily cold-worked welded?)
  4. **Size:** OD × wall (and tolerance requirement)
  5. **Length:** random / fixed / cut-to-length
  6. **Heat treatment condition** (annealed / solution treated per standard)
  7. **Test requirements:** hydrostatic or NDT electric test, flattening/flaring, etc. (as applicable)
  8. **Surface finish** (mill/pickled/BA/polished; for A270 specify Ra/finish type)
  9. **Documentation:** MTR + any third-party inspection needs
  10. **Packing:** end caps, protective wrap, export seaworthy packaging
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## FAQ: 304 Stainless Steel Tubing

**Is 304 stainless tubing magnetic?**

304 is generally considered **non-magnetic** in typical austenitic condition (though magnetism can vary with processing).

## Can 304 be hardened by heat treatment?

304 **cannot be hardened by heat treatment**; it's typically solution treated/annealed and rapidly cooled to restore corrosion resistance and ductility.

## Which is better for welding: 304 or 304L?

304L is commonly chosen for **heavy gauge welding** to reduce sensitization risk; 304 has excellent weldability too, and filler selection (e.g., 308/308L family) is common depending on procedure.

## When should I choose 316 instead of 304?

When chlorides/salt exposure matters (coastal atmosphere, brines, chlorinated systems), 316 is typically preferred for better chloride resistance.

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## Buy 304 Stainless Steel Tubing

For projects sourcing 304 stainless tubing internationally, the biggest success factor is aligning **standard + finish + test documentation** with your end use. If you share your target application (sanitary line, heat exchanger, structural/ornamental tube, instrumentation), **GengFei Steel** can help match the right standard (A269/A213/A270/A554/EN routes), manufacturing method, and documentation package.

If you want, tell me your **application + OD/wall + standard**, and I'll draft a **ready-to-send RFQ template** and a "what to check on the MTR" checklist specific to that tubing standard.