

General Information

301 stainless steel is an austenitic chromium-nickel stainless steel. It is well - known for its good formability and high strength, which makes it a popular choice for applications demanding high yield strength and elasticity.

Chemical Composition

The high content of chromium and nickel in 301 stainless steel endows it with good corrosion resistance and mechanical properties.

Element	Content Range
Carbon (C)	≤0.15
Silicon (Si)	≤1.0
Manganese (Mn)	≤2.0
Phosphorus (P)	≤0.045
Sulfur (S)	≤0.030
Chromium (Cr)	16.0 - 18.0
Nickel (Ni)	6.0 - 8.0
Nitrogen (N)	≤0.10
Iron (Fe)	Balance

Mechanical Properties**Annealed Condition**

Property	Value
Tensile Strength Min.	≥515 Mpa
Yield Strength Min.	≥205 Mpa
Elongation at Break	≥40
Hardness, Brinell (HBW)	≤217
Hardness, Rockwell B (HRB)	≤90
Hardness, Vickers (HV)	≤200
Modulus of Elasticity (E)	193 - 212 Gpa

Cold - Worked Conditions

Cold working can significantly increase the strength of 301 stainless steel. For example:

Condition	Tensile Strength	Yield Strength	Elongation	Hardness HV
1/4 Hard	≥780	≥470	≥25	250-310
1/2 Hard	≥930	≥510	≥10	310-370
3/4 Hard	≥1130	≥745	≥5	370-430
Full Hard	≥1320	≥1030	-	430-490
Extra Hard	≥1570	≥1275	-	490-550
Super Hard	≥1740	≥1450	-	550-620

Products Specifications:

Parameter	Value
Thickness	0.03-1.50 mm
Width	2.0-300 mm
Tolerance	T: +/- 0.005 mm, W: +/- 0.10 mm
Forms	Coiled or cut-to-length
Surface Finish	2H -work hardened and temper rolled for higher tensile strength
Coil Inner Diameter	300 mm, 400 mm, 500 mm
Lead Time	10-15 working days
MOQ	100 kg

Processing States and Application Scenarios Corresponding to Different Hardness Ranges

1. Hardness Grade Classification

Hardness Grade	Vickers Hardness (HV)	Corresponding Processing State
1/4H	250 - 310	Mild cold rolling process
1/2H	310 - 370	Moderate cold rolling process
3/4H	370 - 430	Medium-high strength cold rolling process
H	430 - 490	High strength cold rolling process
EH	490 - 550	Extra-high strength cold rolling process
SH	550-620	Ultra-high strength cold rolling process

2 Typical Application Scenarios for Each Hardness Grade

2.1 1/4H (250 - 310HV)

- **Processing State:** Rolled with approximately 20 - 30% cold deformation, retaining good ductility
- **Characteristics:** Elongation $\geq 25\%$, excellent bending performance, capable of withstanding complex forming
- **Typical Applications:**
 - Shells of precision electronic components (e.g., mobile phone middle frames)
 - Automotive interior decorative strips
 - Manufacturing of various metal hoses
 - Stretched forming components (e.g., thermos cup shells)
- **Processing Recommendations:** Suitable for severe deformation processes such as deep drawing and spinning

2.2 1/2H (310 - 370HV)

- **Processing State:** Approximately 35 - 45% cold deformation, balanced strength and toughness
- **Characteristics:** Yield strength ≥ 510 MPa, elongation $\geq 10\%$
- **Typical Applications:**
 - Spring plates for electronic devices
 - Automotive seat adjustment springs
 - Structural components for medical devices
 - Stationery hardware accessories
- **Processing Recommendations:** Medium-difficulty bending and stamping are feasible

2.3 3/4H (370 - 430HV)

- **Processing State:** Approximately 50 - 60% cold deformation, high strength with certain toughness
- **Characteristics:** Tensile strength ≥ 1130 MPa, stable elastic modulus
- **Typical Applications:**
 - Mobile phone button shrapnel
 - Laptop hinges
 - Precision springs
 - Eyeglass frames
- **Processing Recommendations:** Suitable for simple forming, bending radius should be controlled $\geq 1.5t$

2.4 H (430 - 490HV)

- **Processing State:** Approximately 60 - 70% cold deformation, high strength with low toughness
- **Characteristics:** High elastic limit, long fatigue life
- **Typical Applications:**
 - Watch buckle
 - Electronic connector shrapnel
 - Automotive engine gaskets
 - High-strength fasteners
- **Processing Recommendations:** Only suitable for slight forming, laser cutting is recommended

2.5 EH (490 - 550HV)

- **Processing State:** Approximately 70 - 80% cold deformation, ultra-high strength
- **Characteristics:** Elastic modulus close to 200 GPa, excellent fatigue resistance
- **Typical Applications:**
 - Shielding covers for high-end electronic devices
 - Fasteners for aerospace
 - Springs for precision instruments
 - Razor blades
- **Processing Recommendations:** Difficult to form, electrical discharge machining is recommended

2.6 SH (550HV - 620HV)

- **Processing State:** $\geq 80\%$ cold deformation, ultimate strength
- **Characteristics:** Hardness close to quenched steel, extremely high elastic limit
- **Typical Applications:**
 - High-end watch straps
 - Springs for precision balances
 - Seals for special environments
 - Medical instrument blades
- **Processing Recommendations:** Only suitable for cutting and grinding

Hardness Selection Guide

Processing Technology	Applicable Hardness Range	Notes
Bending processing	$\leq 3/4H$	Bending radius \geq material thickness
Stamping processing	$\leq H$	Carbide molds are required
Laser cutting	Full hardness range	Cutting speed needs to be reduced for high hardness
Welding processing	$\leq 1/2H$	Hardness may decrease after welding
Cold heading processing	$\leq 1/4H$	Multiple annealing treatments are required