

SS 301, WNR 1.4310, UNS S30100, AISI 301, Type 301, DIN 1.4310, AFNOR Z 12 CN 17-07, Grade 301

Introduction :

Grade 301 stainless steel is normally supplied in the form of wires and strips, with up to 1800 Mpa tensile strength, to process tempers ranging from 1/16 Hard to Full Hard. Grade 301 wires and strips can be utilized in rail car components, architectural structures and aircraft. The corrosion resistance provided by stainless steel grade 301. The resistance to corrosion provided by stainless steel grade 301 is similar to that provided by 304. In mildly corrosive environments at ambient temperatures this grade exhibits good resistance to corrosion. It exhibits good oxidation resistance for intermittent services up to 840°C and for continuous service up to 900°C. In temperatures ranging from 1010°C to 1120°C followed by rapid cooling grade 301 is subjected to solution treatment annealing. Stainless steel 301 material and low carbon form of this grade are mainly used as high strength stainless steel. The work hardening rates of grades 301 are terribly high it is within the range of a 14MPa increase per 1% reduction in area of cold work. Due to this characteristic high strength can be achieved from roll forming operations and cold rolling. 301 Grade is suitable for all forms of standard welding methods. In order to attain maximum corrosion resistance grade 301 welded parts must be subjected to annealing.

| | SS 301 | WNR 1.4310 | UNS S30100 | AISI 301 | Type 301 | DIN 1.4310 | AFNOR Z 12 CN 17- | Grade 301 |
|-----------------------------|-----------|------------|------------|-----------|-----------|------------|-------------------|-----------|
| Carbon | 0.15 max | 0.15 max | 0.15 max | 0.15 max | 0.15 max | 0.15 max | 0.15 max | 0.15 max |
| Chemical Composition | 2.00 max | 2.00 max | 2.00 max | 2.00 max | 2.00 max | 2.00 max | 2.00 max | 2.00 max |
| Manganese | 0.045 max | 0.045 max | 0.045 max | 0.045 max | 0.045 max | 0.045 max | 0.045 max | 0.045 max |
| Phosphorus | 0.030 max | 0.030 max | 0.030 max | 0.030 max | 0.030 max | 0.030 max | 0.030 max | 0.030 max |
| Sulfur | 0.75 max | 0.75 max | 0.75 max | 0.75 max | 0.75 max | 0.75 max | 0.75 max | 0.75 max |
| Silicon | 16.0-18.0 | 16.0-18.0 | 16.0-18.0 | 16.0-18.0 | 16.0-18.0 | 16.0-18.0 | 16.0-18.0 | 16.0-18.0 |
| Chromium | 6.0-8.0 | 6.0-8.0 | 6.0-8.0 | 6.0-8.0 | 6.0-8.0 | 6.0-8.0 | 6.0-8.0 | 6.0-8.0 |
| Nickel | 0.10 max | 0.10 max | 0.10 max | 0.10 max | 0.10 max | 0.10 max | 0.10 max | 0.10 max |
| Nitrogen* | Bal | Bal | Bal | Bal | Bal | Bal | Bal | Bal |
| Iron | | | | | | | | |

Mechanical Properties

| | SS 301 | WNR 1.4310 | UNS S30100 | AISI 301 | Type 301 | DIN 1.4310 | AFNOR Z 12 CN 17- | Grade 301 |
|--------------------------------------|----------|------------|------------|----------|----------|------------|-------------------|-----------|
| Ultimate Tensile Strength, ksi (Mpa) | 120(827) | 120(827) | 120(827) | 120(827) | 120(827) | 120(827) | 120(827) | 120(827) |
| 0.2% Yield Strength, ksi(Mpa) | 45(310) | 45(310) | 45(310) | 45(310) | 45(310) | 45(310) | 45(310) | 45(310) |
| Elongation in 2 inches, % | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| Reduction in Area, % | - | - | - | - | - | - | - | - |
| Hardness, Rockwell | B86 | B86 | B86 | B86 | B86 | B86 | B86 | B86 |

Standard Available in forms :

ASTM A182/ ASME SA182 Stainless Steel Pipe Fittings
 ASTM A213 / ASME SA213 Seamless Stainless Steel Pipes
 ASTM A240/ ASME SA240 Stainless Steels Sheets / Plates
 ASTM A249/ ASME SA249 Stainless Steel Welded Tubes
 ASTM A269/ ASME SA269 Stainless Steel Tubes

Products Available in forms :

- SS 301, WNR 1.4310, UNS S30100, AISI 301 Plates
- SS 301, WNR 1.4310, UNS S30100, AISI 301 Pipes
- SS 301, WNR 1.4310, UNS S30100, AISI 301 Round Bar
- SS 301, WNR 1.4310, UNS S30100, AISI 301 Tube
- SS 301, WNR 1.4310, UNS S30100, AISI 301 Flanges

ASTM A270/ ASME SA270 Stainless Steel Sanitary Tubes
ASTM A312/ ASME SA312 Stainless Steel Pipes
ASTM A403/ ASME SA403 Stainless Steel Pipe Fittings
ASTM A554/ ASME SA554 Stainless Steel Welded Tubes
ASTM A731/ ASME SA731 Stainless Steel Pipes
ASTM A789/ ASME SA789 Stainless Steel Tubes
ASTM A790/ ASME SA790 Stainless Steel Pipes
ASTM A791/ ASME SA791 Stainless Steel Tubes

- SS 301, WNR 1.4310, UNS S30100, AISI 301 Wire
- SS 301, WNR 1.4310, UNS S30100, AISI 301 Fittings

Corrosion Resistance

- The resistance to corrosion offered by stainless steel grade 301 is similar to that offered by 304.
- This grade exhibits good resistance to corrosion in mildly corrosive environments at ambient temperatures.

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Heat Resistance

- Grade 301 exhibits good oxidation resistance for intermittent services up to 840°C and for continuous service up to 900°C.

Heat Treatment

- Stainless steel grade 301 is subjected to solution treatment annealing in temperatures ranging from 1010oC to 1120°C followed by rapid cooling.
- For intermediate annealing a low temperature range is chosen. Thermal hardening does not suit this grade of stainless steel.

Cold Working

- Stainless steel grade 301 and low carbon variants of this grade are predominantly used as high strength stainless steel.
- The work hardening rates of these grades are very high, in the range of a 14MPa increase per 1% reduction in area of cold work.
- As a result of this characteristic high strength can be achieved from cold rolling and roll forming operations.
- Through such forming methods strain hardened austenite may be partially transformed to martensite.
- In spite of achieving such high strengths, the residual ductility in the alloy is capable of causing severe cold deformation.
- The alloy is non-magnetic in the annealed condition, but shows strong magnetism when cold worked.

Welding

- Stainless steel grade 301 is suitable for all forms of standard welding methods.
- The use of grade 308L as filler metal is recommended.
- Welded parts in grade 301 must be subjected to annealing in order to attain maximum corrosion resistance.
- For grades 301L and 301LN annealing is not necessary after welding.
- The purpose of welding followed by annealing is to remove the high strength brought about by cold rolling.
- The process of spot welding is used to assemble the cold rolled 301 components; this rapid welding technique does not hamper the overall strength of the component.

Applications

Some of the typical applications of grade 301 stainless steels are listed below:

- Making rail car structural components
- Air frame sections
- Highway trailer components
- Automotive wheel covers
- Wiper blade clips and holders
- Stove element clips
- Screen frames
- Toaster springs
- Curtain walls



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