

**This page is mainly introduced the 316 chemical information, mechanical properties, physical properties, mechanical properties, heat treatment, and Micro structure, etc. It also contains the use of 316, such as it is commonly used in bars, sheet, plates, steel coils, steel pipes, forged and other materials application.**

## Data Table for Grades Stainless Steels 316

| 316 Standard Number: |                          |  |
|----------------------|--------------------------|--|
| ITEM                 | Standard Number          | Descriptions   |
| 1                    | SAE AMS-QQ-S-763B (1998) | Steel, Corrosion Resistant, Bars, Wire, Shapes, and Forgings   |
| 2                    | SAE AMS-S-7720A (1997)   | Steel, Corrosion-Resistant (18-8) Bars, Wire and Forging Stock (Aircraft Quality)  |
| 3                    | A 182/A 182M (2012)      | Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service  |
| 4                    | A 213/A 213M (2011)      | Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat-Exchanger Tubes                                   |
| 5                    | A 240/A 240M (2012)      | Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications       |
| 6                    | A 249/A 249M (2010)      | Welded Austenitic Steel Boiler, Superheater, Heat-Exchanger, and Condenser Tubes   |
| 7                    | A 269 (2010)             | Seamless and Welded Austenitic Stainless Steel Tubing for General Service  |
| 8                    | A 270 (2010)             | Seamless and Welded Austenitic Stainless Steel Sanitary Tubing   |
| 9                    | A 276 (2010)             | Stainless Steel Bars and Shapes  |
| 10                   | A 312/A 312M (2012)      | Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes   |
| 11                   | A 313/A 313M (2010)      | Stainless Steel Spring Wire  |
| 12                   | A 314 (2008)             | Stainless Steel Billets and Bars for Forging   |
| 13                   | A 358/A 358M (2008)      | Electric-Fusion-Welded Austenitic Chromium-Nickel Stainless Steel Pipe for High-Temperature Service and General Applications |
| 14                   | A 368 (2009)             | Stainless Steel Wire Strand  |
| 15                   | A 376/A 376M (2012)      | Seamless Austenitic Steel Pipe for High-Temperature Central-Station Service  |
| 16                   | A 403/A 403M (2012)      | Wrought Austenitic Stainless Steel Piping Fittings   |
| 17                   | A 409/A 409M (2009)      | Welded Large Diameter Austenitic Steel Pipe for Corrosive or High-Temperature Service  |
| 18                   | A 473 (2009)             | Stainless Steel Forgings   |
| 19                   | A 478 (2008)             | Chromium-Nickel Stainless Steel Weaving and Knitting Wire  |
| 20                   | A 479/A 479M (2011)      | Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels  |
| 21                   | A 492 (2009)             | Stainless Steel Rope Wire  |
| 22                   | A 493 (2009)             | Stainless Steel Wire and Wire Rods for Cold Heading and Cold Forging   |
| 23                   | A 511/A 511M (2012)      | Seamless Stainless Steel Mechanical Tubing   |
| 24                   | A 580/A 580M (2012)      | Stainless Steel Wire   |
| 25                   | A 632 (2009)             | Seamless and Welded Austenitic Stainless Steel Tubing (Small-Diameter) for General Service                                   |

|    |                     |  |
|----|---------------------|--|
| 26 | A 666 (2010)        | Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar                           |
| 27 | A 688/A 688M        | Welded Austenitic Stainless Steel Feedwater Heater Tubes   |
| 28 | A 793 (2009)        | Rolled Floor Plate, Stainless Steel  |
| 29 | A 813/A 813M (2009) | Single- or Double-Welded Austenitic Stainless Steel Pipe   |
| 30 | A 814/A 814M (2008) | Cold-Worked Welded Austenitic Stainless Steel Pipe   |
| 31 | A 826/A 826M        | Seamless Austenitic and Martensitic Stainless Steel Duct Tubes for Liquid Metal-Cooled Reactor Core Components |
| 32 | A 943/A 943M (2009) | Spray-Formed Seamless Austenitic Stainless Steel Pipes   |
| 33 | A 959 (2011)        | Standard Guide for Specifying Harmonized Standard Grade Compositions for Wrought Stainless Steels              |
| 34 | A 965/A 965M (2012) | Steel Forgings, Austenitic, for Pressure and High Temperature Parts  |
| 35 | A 988/A 988M (2011) | Hot Isostatically-Pressed Stainless Steel Flanges, Fittings, Valves, and Parts for High Temperature Service    |
| 36 | SAE J 405 (1998)    | Chemical Compositions of SAE Wrought Stainless Steels  |
| 37 | SAE J 467 (1968)    | Special Purpose Alloys ("Superalloys")   |

### 316 Chemical composition(mass fraction)(wt.%)

| Chemical | Min.(%) | Max.(%) |
|----------|---------|---------|
| C        |         | 0.08    |
| Si       |         | 1.00    |
| Mn       |         | 2.00    |
| P        |         | 0.045   |
| S        |         | 0.03    |
| Cr       | 16.0    | 18.0    |
| Ni       | 10.0    | 14.0    |
| Mo       | 2.00    | 3.00    |

### 316 Physical Properties

|                  |         |                          |
|------------------|---------|--------------------------|
| Tensile strength | 115-234 | $\sigma_b$ /MPa          |
| Yield Strength   | 23      | $\sigma_{0.2} \geq$ /MPa |
| Elongation       | 65      | $\delta_5 \geq$ (%)      |
| $\psi$           | -       | $\psi \geq$ (%)          |
| Akv              | -       | Akv $\geq$ /J            |
| HBS              | 123-321 | -                        |
| HRC              | 30      | -                        |

### 316 Mechanical Properties

|                  |         |                          |
|------------------|---------|--------------------------|
| Tensile strength | 231-231 | $\sigma_b$ /MPa          |
| Yield Strength   | 154     | $\sigma_{0.2} \geq$ /MPa |
| Elongation       | 56      | $\delta_5 \geq$ (%)      |
| $\psi$           | -       | $\psi \geq$ (%)          |
| Akv              | -       | Akv $\geq$ /J            |
| HBS              | 235-268 | -                        |
| HRC              | 30      | -                        |

### 316 Heat Treatment Regime

| Annealing | Quenching | Tempering | Normalizing | Q & T |
|-----------|-----------|-----------|-------------|-------|
| √         | √         | √         | √           | √     |

### 316 Range of products

| Product type    | Products                                 | Dimension                  | Processes                                   | Deliver Status  |
|-----------------|--|----------------------------|---|---|
| Plates / Sheets | Plates / Sheets                          | 0.08-200mm(T)*W*L          | Forging, hot rolling and cold rolling       | Annealed, Solution and Aging, Q+T, ACID-WASHED, Shot Blasting |
| Steel Bar       | Round Bar, Flat Bar, Square Bar          | Φ8-1200mm*L                | Forging, hot rolling and cold rolling, Cast | Black, Rough Turning, Shot Blasting,                          |
| Coil / Strip    | Steel Coil /Steel Strip                  | 0.03-16.0x1200mm           | Cold-Rolled & Hot-Rolled                    | Annealed, Solution and Aging, Q+T, ACID-WASHED, Shot Blasting |
| Pipes / Tubes   | Seamless Pipes/Tubes, Welded Pipes/Tubes | OD:6-219mm x WT:0.5-20.0mm | Hot extrusion, Cold Drawn, Welded           | Annealed, Solution and Aging, Q+T, ACID-WASHED                |

## We can produce Stainless Steels the specifications follows:

Note:

- (1) listed in the table apex diameter (d), to steel thickness (a) multiples said.
- (2) in the ASTM A6 standard specified scope can meet any additional conditions.
- (3) from the standard for 50 mm (2 in).

Mechanical properties

Mechanische Eigenschaften

Caracteristiques mecaniques

ReH Minimum yield strength / Mindestwert der oberen Streckgrenze / Limite d'elasticite minimale

Rm Tensile strength / Zugfestigkeit / Resistance a la traction

A Minimum elongation / Mindestwert der Bruchdehnung / Allongement minimal

J Notch impact test / Kerbschlagbiegeversuch / Essai de flexion par choc

Round bar:

Diameter : 1mm-2000mm

Square bar:

Size: 50mm \* 50mm-600mm \*600mm

Plate steel/flat bar:

Size: Thickness: 0.1mm-800mm Width: 10mm to 1500mm

Tube/pipe:

Size: OD: 6-219mm WT: 1-35 mm.

Cold-rolled sheet: Thickness: 2-5mm Width:1000mm Length: 2000mm

Hot-rolled sheet: Thickness:6-80mm Width: 210-610mm

Length: We can supply any length based on the customer's requirement.

Forging/hot rolling/ extrusion of steel.

Forging: Shafts with flanks/pipes/tubes/slugs/donuts/cubes/other shapes

Finished goods condition: hot forging/hot rolling + annealing/normalizing + tempering/quenching + tempering/any conditions based on the customer's requirement

Surface conditions: scaled (hot working finish)/ground/rough machining/fine machining/based on the customer's requirement

Furnaces for metallurgical processing: electrode arc + LF/VD/VOD/ESR/Vacuum consumable electrode.

Ultrasonic inspection: 100% ultrasonic inspection for any imperfections or based on the customer's requirement.

UTS according to SEP 1921 C/c,D/d,E/e;A388 or GB/T 6402

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