



## 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
- 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

## Products Available in forms :

- SS 410, Type 410, WNR 1.4006, UNS S41000, AISI 304 Plates
- SS 410, Type 410, WNR 1.4006, UNS S41000, AISI 304 Pipes
- SS 410, Type 410, WNR 1.4006, UNS S41000, AISI 304 Round Bar
- SS 410, Type 410, WNR 1.4006, UNS S41000, AISI 304 Tube
- SS 410, Type 410, WNR 1.4006, UNS S41000, AISI 304 Flanges
- SS 410, Type 410, WNR 1.4006, UNS S41000, AISI 304 Wire
- SS 410, Type 410, WNR 1.4006, UNS S41000, AISI 304 Fittings

## Corrosion Resistance

- Grade 410 stainless steels are resistant to hot gases, steam, food, mild acids and alkalis, fresh water and dry air.
- These steels obtain maximum corrosion and heat resistance through hardening.
- However, grade 410 steels are less corrosion resistant than austenitic grades and grade 430 ferritic alloys containing 17% chromium.
- Smooth surface finish offers improved performance of steels.

## Heat Resistance

- Grade 410 steels have good scaling resistance at temperatures of up to 650°C.
- However, the mechanical properties of the material will tend to reduce at temperatures ranging from 400 to 580°C.

## Heat Treatment

### Annealing -

- Grade 410 steels can be fully annealed at temperatures from 815 to 900°C, followed by slow furnace cooling and air-cooling.
- Process annealing of grade 410 steels can be carried out at temperatures ranging from 650 to 760°C and air-cooled.

### Hardening -

- Hardening of grade 410 steels can be performed at 925 to 1010°C, followed by air and oil quenching.
- Heavy sections of grade 410 need to be oil quenched.
- Tempering, to enhance the mechanical properties and hardness of grade 410 steels, follows this process.
- It is not recommended to perform tempering at temperatures from 400 to 580°C.

## Welding

- Grade 410 steels can be welded using all conventional welding techniques, but the materials should pre-heated at 150 to 260°C followed by post-weld annealing treatment, to mitigate cracking.
- Grade 410 welding rods are recommended for tempering and post-hardening. In the "as welded" conditions, grade 309 filler rods can be used to achieve a ductile joint.
- According to AS 1554.6 standards, grade 309 electrodes or rods are preferred for welding 410 steels.

## Machining

- Grade 410 steels can be easily machined in highly tempered or annealed conditions.
- However, it is hard to machine grade 410 steels if they are hardened above 30HRC.
- Free machining grade 416 is the best alternative.

## Applications

- Bolts, screws, bushings and nuts
- Petroleum fractionating structures
- Shafts, pumps and valves
- Mine ladder rungs
- Gas turbines



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