



## Stainless Steel Grade 410

### Quick Facts

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Type 410 is a martensitic stainless Steel that provides good corrosion resistance plus high strength and hardness. It is magnetic in both the annealed and hardened conditions. A wide range of properties can be developed with different heat treatments.

### Typical Applications

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- Springs,
- knives, bolts, screws, nuts and bushings
- tools,
- Gas turbines,
- Shafts, pumps and valves,

Applications require moderate corrosion resistance and high mechanical properties are ideal for this Alloy.

### Stock Range

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We stock a comprehensive range of round bars, sizes between 20mm and 160mm in diameter  
Flat Bars with a thickness between 15mm – 60mm and a width up to 160mm.

We are offering as well:

General forgings

Rings

Blocks

Primarily manufactured in: Europe, US

Primarily manufactured in: Europe, US



## Industry Specifications

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- AMS 5504
- ASTM A 240
- DIN EN 1.4006
- ASTM A 370-14
- UNS S41000

Material may also be supplied against Customer specifications, subject to enquiry.

## Melting Practices

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- EAF
- VOD

## Chemical Analysis

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### Chemical Composition, %

	C	Mn	P	S	Si	Cr	Ni	Mo	-	-	-	-	-	-	Fe
Min	-	-	-	-	-	11.50	-	-	-	-	-	-	-	-	Bal.
Max	0.15	1.00	0.04	0.03	1.00	13.50	-	-	-	-	-	-	-	-	Bal.



## Mechanical Properties *(typical annealed properties)*

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	<i>Tensile Strength (MPa)</i>	<i>Yield Strength (0.2% offset), (MPa) min.</i>	<i>Elongation %</i>	<i>Reduction of Area</i>	<i>Hardness (Rockwell)</i>	<i>Charpy Impacts</i>
Min.	517	310	25	-	B80	-
Max.	-	-	-	-	-	-

## Machinability

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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.

## Material Conditions

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This Alloy can be supplied in annealed and quenched and tempered condition.

## Corrosion Resistance

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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 Treatment

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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.