



AISI 416

Quick Facts

AISI 416 (German material number 1.4005) is basically a AISI 410 (German material number 1.4006) to which Sulphur has been added in controlled amounts to improve machinability and allow this steel grade readily used for automated machining purposes. However, the corrosion resistance and surface finish is inferior than the AISI 410 due to the addition in Sulphur.

Typical Applications

- Automotive Industry
- Petrochemical Industry
- Electronic Equipment
- Mechanical engineering gen. applications

Stock Range

We stock a comprehensive range of round bars, sizes between 20mm and 250mm in diameter
Flat Bars with a thickness between 15mm – 100mm and a width between 20mm – 250mm.

We are offering as well:

General forgings

Rings

Blocks

Primarily manufactured in: Europe, US

Primarily manufactured in: Europe, US



Industry Specifications

- X12CrS13, 1.4005, EN 10088-3
- DIN 17440
- AISI 416,
- BS 146S21
- AFNOR Z11CF13

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

Chemical Analysis

Chemical Composition, %

	C	Cr	S	Mo	-	-	-	-	-	-	-	-	-	-	Fe
Min	0.08	12.00	0.15	-	-	-	-	-	-	-	-	-	-	-	Bal.
Max	0.15	14.00	0.35	0.60	-	-	-	-	-	-	-	-	-	-	Bal.



Mechanical Properties

AISI 416 is usually supplied in annealed condition! This condition is obtained by heating in the temperature range 745 deg C. to 825 deg. C., followed by slow cooling in a furnace. In this condition the following mechanical properties can be expected:

	Tensile Strength (MPA)	Yield Strength (0.2% offset), (MPA) min.	Elongation %	Reduction of Area	Hardness , (HB)	Charpy Impacts at - 60°C (J)
Min.	-	-	-	-	-	-
Max.	< 730	Not spec.	Not spec.	Not spec.	< 220	-

PLEASE NOTE: with cold working processes below OD 35mm, you can expect HB app. 60 units higher
 And Tensile at about 150 units higher.

This Alloy may be heat treated by hardening in air or oil after holding at the temperature between 950 deg.C. and 1000 deg. C. However, normally Q&T 650 condition are specified, temperature range 680 deg.C. and 780 deg.C. with this condition the following properties can be expected:

OD above 160mm specification has to be agreed between customer and supplier!

	Tensile Strength (MPA)	Yield Strength (0.2% offset), (MPA) min.	Elongation %	Reduction of Area	Hardness (HB)	Charpy Impacts at - 60°C (J)
Min.	650	≥ 450	-	-	-	-
Max.	850	-	≥ 12	Not spec.	< 220	-
Typical	710	480	14	-	-	-



Machinability

AISI 416 shows improved machinability in comparison to AISI 410 as a result of the sulphur addition.

Machining parameters depending on heat treated condition of this particular Stainless Steel.

Material Conditions

AISI 416 will be supplied in annealed condition as well as in quenched and tempered condition! This must be specified with enquiry stage!



Corrosion Resistance

Although AISI 416 contains 13% nominal content chromium, its corrosion resistance is compromised by the additional addition of sulphur. Care should be taken, when specifying this grade for use in corrosive environments which might promote crevice and/or pitting corrosion.