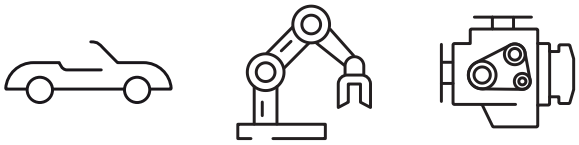
AISI 416, 1.4005, X12CrS13
Automotive & Automation, Data Sheet

Zapp is certified to ISO 9001 I IATF 16949



Classification - 416 Stainless Steel

- Ferritic, corrosion resistant chrome steel
- Material no. 1.4005
- Short name: X12CrS13
- Norm: DIN EN 10088-3
- AISI: 416

Typical Fields of Application from Zapp

The alloy Ergste® 1.4005 IA offers excellent magnetic properties and is therefore primarily used for solenoid valves in pneumatic, hydraulic and HVAC applications. Ergste® 1.4005 IA can be cold formed within certain limits.

Information about further automotive applications at Zapp.

Corrosion Resistance

Ergste® 1.4005 IA is resistant to water, steam, and other less aggressive media.

Machinability

Ergste® 1.4005 IA was developed for the series production of precision turned parts and is easy to machine due to the sulfur content.

Weldability

Ergste® 1.4005 IA is limited weldable. Welding is impaired by the presence of manganese sulfide inclusions.

Information about further stainless steel alloys at Zapp.

Typical Chemical Analysis [Mass-%]

C	Si	Mn	P	S	Cr	Mo
≤ 0.02	≤ 1.00	≤ 1.50	≤ 0.04	0.25-0.35	12.00-14.00	≤ 0.60

Mechanical Properties

Tensile strength R_m	350 – 550 MPa
Yield strength R_e	≥ 230 MPa
Elongation A5	≥ 30 %

Physical Properties

Density ρ	7.7 kg/dm³
Modulus of elasticity E at 20° C	215 GPa
Thermal conductivity λ at 20°C	24.9 W/(m*K)
Coefficient of thermal expansion α	(10^{-6} K^{-1})
20 – 100 °C	10.5
20 – 200 °C	11.0
20 – 300 °C	11.5
20 – 400 °C	12.0
Specific heat c at 20 °C	460 J/(kg*K)

Magnetic Properties of Round Bars

Coercivity H_c	≤ 200 A/m
Max. permeability μ_{max}	≥ 2,000
Saturation polarization J_s	≥ 1.70 T
Remanence B_r	06 – 1.3 T
Specific el. resistance ρ at 20 °C	≥ 0.63 µΩm
Electric conductivity σ at 20°C	≤ 1.81 1/(µΩ*m)

Delivery Forms

Bars	annealed, ground
Profiles	annealed, straightened

Surface Finish

Crack test according to. DIN EN 10277,
Surface quality class 1-4

For improved properties in different areas, we recommend the following Ergste® qualities

Corrosion Resistance
Ergste® 1.4105 IL
Ergste® 1.4016 IM
Ergste® 1.4113 IM / IL
Ergste® 1.4523 IM

Cold Heading
Ergste® 1.4003 IA
Ergste® 1.4016 IM

Machinability
Ergste® 1.4105 IL
Ergste® 9.9013 IL

Magnetic Properties
Ergste® 9.9013 IL
Ergste® 1.0715 QA

Weldability
Ergste® 1.4003 IA
Ergste® 1.4511 IA

Further information: Please see our linecard.

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