

# 1.4005 IA, AISI 416 mod., X12CrS13, Ferritic Stainless Steel, Data Sheet

# ZAPP

Zapp is certified to ISO 9001 | IATF 16949



## Typical Fields of Application 1.4005 IA

The alloy Zapp® 1.4005 IA offers excellent magnetic properties. It is therefore primarily used for solenoid valves in pneumatic, hydraulic and HVAC applications as well as for high performance valves in injection technology.

Zapp® 1.4005 IA can be cold formed within certain limits.

[Information about further automotive applications at Zapp.](#)

## Corrosion Resistance

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

## Machinability

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

## Weldability

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

[Information about further stainless steel alloys at Zapp.](#)

## Surface Finish

Crack test according to. DIN EN ISO 683-7,  
Surface quality class 1-4

## Typical Chemical Analysis\*

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

\* weight percentage/approximate value

\*\* deviation from the DIN EN

## Mechanical Properties

Tensile strength R <sub>m</sub>	370 – 570 MPa
Yield strength R <sub>e</sub>	≥ 220 MPa
Elongation A <sub>5</sub>	≥ 25 %

## Physical Properties

Density ρ	7.7 kg/dm <sup>3</sup>
Modulus of elasticity E at 20 °C	215 GPa
Thermal conductivity λ at 20 °C	24.9 W/(m*K)
Specific el. resistance ρ at 20 °C	≥ 0.63 μΩm
Specific heat c at 20 °C	460 J/(kg*K)

## Magnetic Properties of Round Bars

Coercivity H <sub>c</sub>	≤ 200 A/m
Max. permeability μ <sub>max</sub>	≥ 1,700
Saturation polarization J <sub>s</sub>	≥ 1.70 T
Remanence B <sub>r</sub>	0.5 – 1.3 T

## Delivery Forms

Bars	annealed, ground
------	------------------

[Further information: Please see our linecard.](#)

For improved properties in selective cases, we recommend the following Zapp® grades:

#### Corrosion Resistance

Zapp® 1.4105 IL  
Zapp® 1.4016 IM  
Zapp® 1.4113 IM / IL  
Zapp® 1.4523 IM  
Zapp® 9.9013 IL

#### Cold Heading

Zapp® 1.4003 IA  
Zapp® 1.4016 IM

#### Machinability

Zapp® 1.4105 IL  
Zapp® 9.9013 IL

#### Magnetic Properties

Zapp® 9.9013 IL  
Zapp® 1.0715 QA

#### Weldability

Zapp® 1.4003 IA  
Zapp® 1.4511 IA  
Zapp® 1.4523 IM

### Overview Magnetic Properties



#### Zapp Precision Metals GmbH

PRECISION WIRE  
Letmather Straße 69  
58239 Schwerte  
[precisionwire@zapp.com](mailto:precisionwire@zapp.com)  
[www.zapp.com](http://www.zapp.com)

Further information regarding our products and locations are available in our image brochure and under [www.zapp.com](http://www.zapp.com)

The illustrations, drawings, dimensional and weight data and other information included in this data sheet are intended only for the purposes of describing our products and represent non-binding average values. They do not constitute quality data, nor can they be used as the basis for any guarantee of quality or durability. The applications presented serve only as illustrations and can be construed neither as quality data nor as a guarantee in relation to the suitability of the material. This cannot substitute for comprehensive consultation on the selection of our products and on their use in a specific application. The data sheet is not subject to change control.

Last revision: July 2025