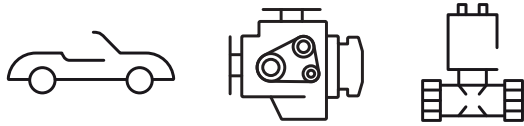


9.9013 IL, Solenoid Valves

Automotive & Automation, Data Sheet

ZAPP

Zapp is Certified to ISO 9001 | IATF 16949



Classification of 9.9013 IL from Zapp

- Ferritic, corrosion resistant steel
- Material No: 9.9013

Typical Field of Application

Ergste® 9.9013 IL has excellent magnetic properties and is therefore primarily used for solenoid valves in pneumatic, hydraulic and HVAC applications. Ergste® 9.9013 IL combines the excellent magnetic properties of a 12% Cr steel (Ergste® 1.4005 IA) with the good corrosion resistance of an 18% Cr steel (Ergste® 1.4105 IL) with good machinability at the same time

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

Corrosion Resistance

Ergste® 9.9013 IL has a very good corrosion resistance.

Machinability

Due to the sulfur content, Ergste® 9.9013 IL is very suitable for machining.

Weldability

Ergste® 9.9013 IL is in certain limits weldable. Welding is impaired by the presence of manganese sulfide inclusions.

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

Corrosion Resistance

Ergste® 1.4523 IM

Ergste® 1.4113 IM

Cold Heading

Ergste® 1.4016 IM

Ergste® 1.4523 IM

Machinability

Ergste® 1.4105 IL

For further materials see:

<https://www.zapp.com/en-uk/materials/stainless-steel>

Typical Chemical Analysis [Mass-%]

C	Si	Mn	P	S	Cr	Mo	Others
≤ 0.02	1.2-2.0	≤ 1.0	≤ 0.04	0.15-0.35	12.00-14.00	~ 0.4	0.5

Mechanical Properties

Tensile strength R_m	350 - 550 MPa
Yield strength R_e	≥ 320 MPa
Elongation A_5	≥ 35 %

Physical Properties

Density ρ	7.6 kg/dm ³
Modulus of elasticity E at 20 °C	210 GPa
Thermal conductivity λ at 20 °C	17.15 W/(m*K)
Coefficient of thermal expansion α	(10 ⁻⁶ K ⁻¹)
20 - 100 °C	12.7
20 - 200 °C	13.1
20 - 300 °C	13.5
20 - 400 °C	13.9
Specific heat c at 20 °C	450 J/(kg*K)

Magnetic Properties of Round Bars

Coercivity H_c	< 150 A/m
Max. permeability μ_{max}	> 3,000
Saturation polarization J_s	> 1.60 T
Remanence B_r	≤ 0.7 - 1.4 T
Specific electrical resistance ρ	> 0.60 $\mu\Omega m$
Electric conductivity at 20 °C	> 0.55 1/($\mu\Omega * m$)

Delivery Forms

Bar	annealed, ground
Profile	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:

Magnetic Properties

Ergste® 1.4005 IA

Ergste® 1.0715

Weldability

Ergste® 1.4511 IA

[Further information: Please see our linecard for solenoid valves products.](#)

PRECISION WIRE

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Further information regarding our products and locations are available in our image brochure and under 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.

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