VACOPERM 100 D

solid material

COMPOSITION (in wt%)

77 Ni – 4.5 Cu – 4 Mo – bal. Fe
IEC 60404-8-6 E11
DIN 17405 (1979) RNi2 / RNi5

PRODUCT DESCRIPTION

VACOPERM® 100 D is an 80 % NiFe with very high maximum magnetic permeability and low coercivity, used for many different kinds of application ranging from magnetic lenses to current and positioning sensors.
The alloys VACOPERM 100 D and MUMETALL® are closely related, however, due to its modified composition the initial permeability of VACOPERM 100 D is slightly higher after the recommended standard heat treatments for solid material. This comes in hand with a slightly lower saturation induction of the alloy.

MAIN PROPERTIES

- Initial permeability $\mu_{0.1\ A/m} = 70{,}000$
- Saturation polarization $J_S = 0.74$ T
- Maximum permeability $\mu_{max} = 350{,}000$

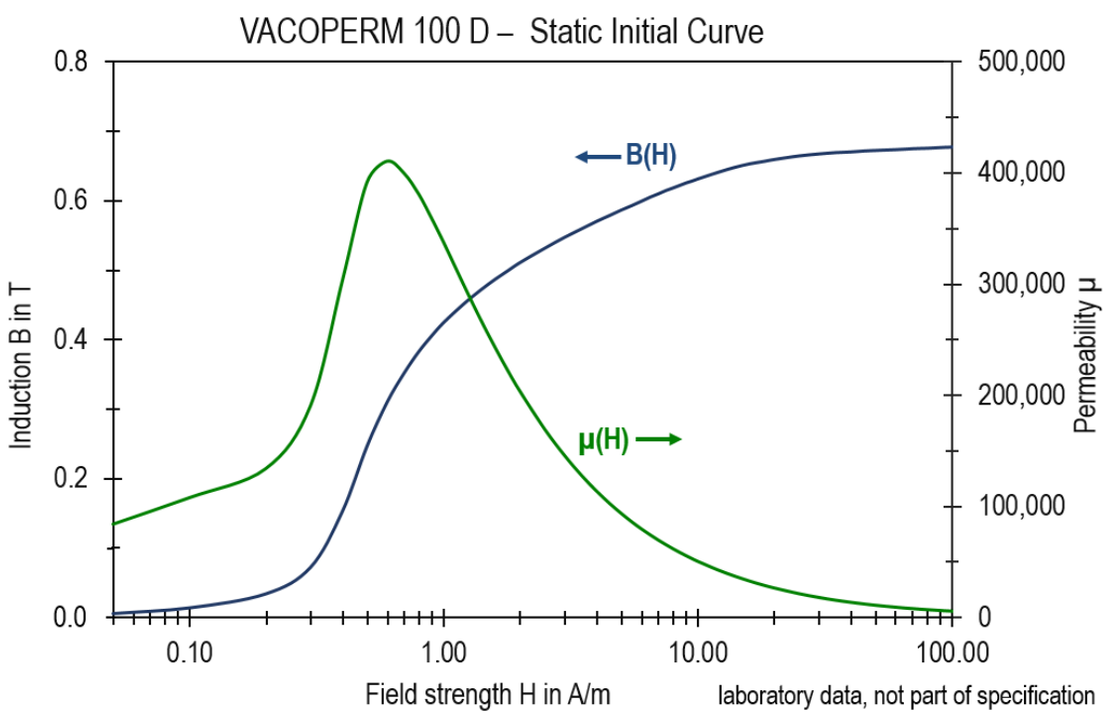
TYPICAL APPLICATIONS

High sensitivity current sensors, magnetic lenses/charged particle guiding, magnetic shielding

FORMS OF SUPPLY

- Solid rods, diameters 12.5 – 182 mm
- Wire material, diameters ≤ 13.5 mm

Other diameters, square profile material and tolerances upon request. For strip material, see brochure VACOPERM 100 strip material.



SOLID MATERIAL – TYPICAL VALUES

PHYSICAL PROPERTIES	Unit	
Mass density ρ	g/cm³	8.7
Thermal conductivity (25 °C) λ	W/(m·K)	18 – 20
Thermal expansion coefficient (20 – 100 °C) α	10^{-6}/K	13.5
Electrical resistivity ρ_e	µΩm	0.6

STATIC MAGNETIC PROPERTIES		
Coercivity H_C	A/m	0.6
Saturation polarization J_S	T	0.74
Saturation magnetization B_S at H = 40 kA/m	T	0.79
Maximum permeability μ_{max}		350,000
Initial permeability $\mu_{0.1\ A/m}$		70,000
Magnetostriction constant λ_S	ppm	~ 1
Curie temperature T_C	°C	360

MECHANICAL PROPERTIES (after recommended heat treatment)		
Young's modulus E	GPa	190
Yield strength $R_{p0.2}$	MPa	150
Hardness	HV	105

MECHANICAL PROPERTIES (hot rolled)		
Yield strength $R_{p0.2}$	MPa	300
Tensile strength R_m	MPa	650
Elongation A	%	> 30
Hardness	HV	160

RECOMMENDED PARAMETERS FOR HEAT TREATMENT		
Atmosphere		hydrogen
Temperature	°C	1,150
Annealing time	h	5
Cooling rate	K/h	50 – 300

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