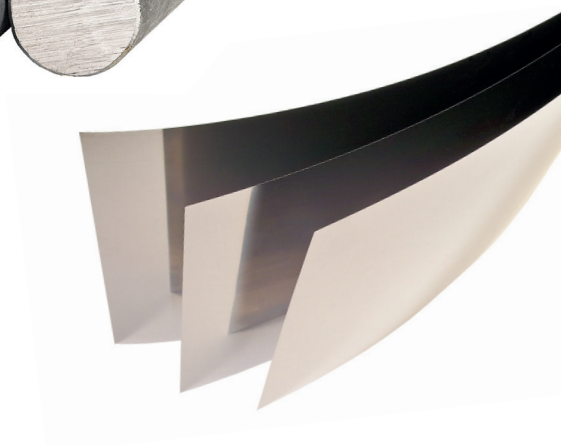


VACOFLUX 17

COMPOSITION (in wt%)
17 Co – bal. Fe – 2 Cr + Mo

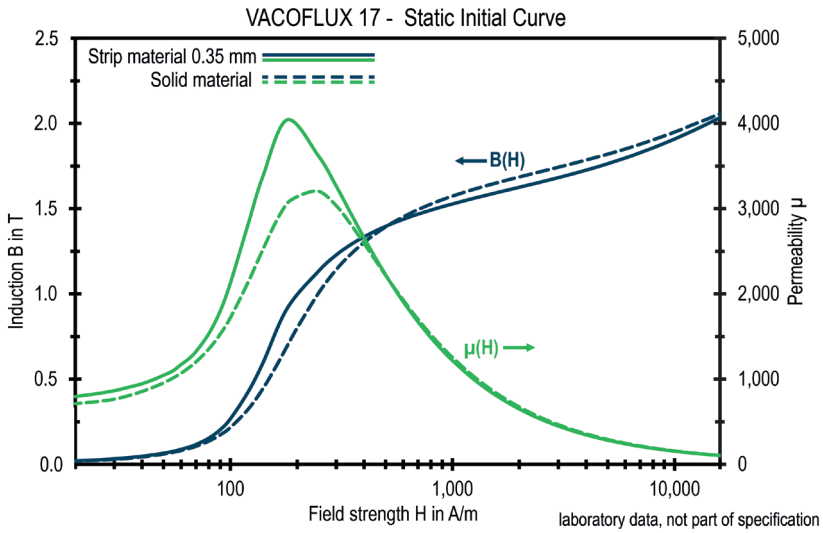
PRODUCT DESCRIPTION
High performance magnetic actuators need high force and short switching times. The magnetic force increases proportional to the square of the flux density B in the air gap of a solenoid valve. A good compromise between cost and magnetic performance for automotive applications is found in CoFe alloys with a cobalt content of around 17 wt% such as VACOFLUX® 17.

MAIN PROPERTIES
- Saturation polarization of J_S = 2.22 T
- Electrical resistivity of ρ_e = 0.41 µΩm
- Cost-efficient CoFe alloy with low cobalt content of 17 wt%

TYPICAL APPLICATIONS
Components and actuators for the automotive industry operating at high pressures, e.g. diesel injection
Rotors and stators of electrical motors and generators

FORMS OF SUPPLY
- Strip material, thickness 0.05 – 1 mm, width 120 – 260 mm
- Stamped parts, laminations, and laminated assemblies
- Solid rods, diameters 12.5 – 182 mm
- Wire material, diameters ≤ 13.5 mm

Other dimensions, square profile material, and tolerances upon request



STRIP MATERIAL 0.35 mm and SOLID MATERIAL - TYPICAL VALUES

PHYSICAL PROPERTIES	Unit		
Mass density ρ	g/cm^3	7.94	
Thermal conductivity (25 °C) λ	W/(m·K)	34	
Thermal expansion coefficient (20 – 100 °C) α	10^{-6}/K	10.7	
Electrical resistivity ρ_e	µΩm	0.41	
STATIC MAGNETIC PROPERTIES		**strip material**	**solid material**
Coercivity H_C	A/m	100	140
Saturation polarization J_S	T	2.22	2.22
Saturation magnetization B_S at H = 40 kA/m	T	2.27	2.27
Maximum permeability μ_{max}		3,500	3,200
Magnetostriction constant λ_S	ppm	+25	+25
Curie temperature T_C	°C	920	920
SPECIFIC IRON LOSSES OF STRIP MATERIAL AFTER FINAL HEAT TREATMENT			
ρ_e 1.5 T 50 Hz	W/kg	3.8	-
ρ_e 1.5 T 400 Hz	W/kg	54	-
ρ_e 1.5 T 1,000 Hz	W/kg	233	-
ρ_e 2.0 T 50 Hz	W/kg	7.0	-
ρ_e 2.0 T 400 Hz	W/kg	88	-
ρ_e 2.0 T 1,000 Hz	W/kg	400	-
MECHANICAL PROPERTIES (final annealed)			
Young's modulus E	GPa	200	200
Yield strength $R_{p\,0.2}$	MPa	250	250
Tensile strength R_m	MPa	450	450
Elongation A	%	32	32
Hardness	HV	140	140
MECHANICAL PROPERTIES (cold rolled strip / hot rolled solid material)			
Yield strength $R_{p\,0.2}$	MPa	1,000	300
Tensile strength R_m	MPa	1,050	500
Elongation A	%	1	32
Hardness	HV	310	170
RECOMMENDED PARAMETERS FOR THE FINAL HEAT TREATMENT			
Atmosphere		hydrogen	hydrogen
Temperature	°C	850	850
Annealing time	h	10	10
Cooling rate	K/h	100 – 200	100 – 200

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