

VITROPERM® 800 / 500



NOMINAL ALLOY COMPOSITION

Alloy	Fe	Ni	Co	Cu	Nb	Si	B	
VP 800	Balance (82.8)	–	–	1.3	5.6	8.8	1.5	(wt-%)
	73.6	–	–	1.0	3.0	15.5	6.9	(at.-%)

MAGNETIC PROPERTIES¹

Property	Value	Unit
Saturation polarization (as cast / amorphous @ 20 °C)	1.21	T
Saturation polarization (nanocrystalline @ 20 °C)	1.24	T
Saturation magnetostriction (as cast / amorphous)	25	ppm
Saturation magnetostriction (nanocrystalline)	$ \lambda_s < 0.5$	ppm
Permeability (VP 800 F / transverse field annealing)	20,000 – 200,000	(μ_{max} @ 50 Hz)
Permeability (VP 800 R / annealing without magn. field)	$\leq 600,000$	(μ_{max} @ 50 Hz)
DC coercivity (VP 800 F / transverse field annealing)	0.5	A/m
DC coercivity (VP 800 R / annealing without magn. field)	1	A/m
Magnetic power loss (VP 800 F @ 100 kHz, 0,3 T)	≤ 80	W/kg
Magnetic power loss (VP 800 R @ 50 Hz, 1,0 T)	0.03	W/kg
Curie temperature	600	°C

PHYSICAL PROPERTIES¹

Property	Value	Unit
Mass density (as cast / amorphous)	7.17	g/cm ³
Mass density (nanocrystalline)	7.35	g/cm ³
Electrical resistivity (nanocrystalline)	1.15	$\mu\Omega\text{m}$
Coefficient of thermal expansion (20 - 100 °C, as cast)	8	10 ⁻⁶ /K
Crystallization temperature (as cast / amorphous)	510	°C

AVAILABLE DIMENSIONS²

Property	Value	Unit
Thickness (computed average thickness from weight)	14 ± 2 / 16 ± 2 / 18 ± 3	μm
Widths slit to width	2.0 ... 24.9 ± 0.1 / 25.0 ... 69.9 ± 0.15 / 70.0 ... 101.6 ± 0.25	mm
Widths width as cast	25.0 ... 54.5 ± 0.5 / 60.0 ... 78.0 ± 1.0 / 82.0 ... 108.0 ± 2.0	mm

¹ Typical values, not part of a specification

² Standard casting widths (mm): 25, 30, 36, 40, 46, 50, 54.5, 60, 66, 72, 78, 82, 90, 108; nominal thickness of 14 μm and 18 μm available up to 66 mm width only

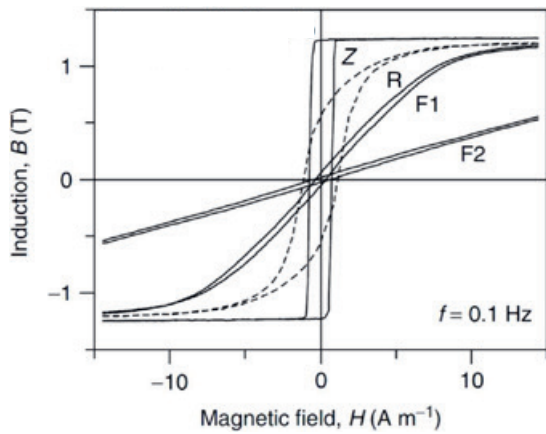


Figure 1: Typical quasistatic hysteresis loops (adjustable by annealing, e.g. 1 h @ 540 °C)³
 Z – with parallel magnetic field
 R – without magnetic field
 F1 – with transverse magnetic field ($K_u \approx 6 \text{ Jm}^{-3}$, $\mu \approx 100.000$)
 F2 – with transverse magnetic field ($K_u \approx 20 \text{ Jm}^{-3}$, $\mu \approx 30.000$)

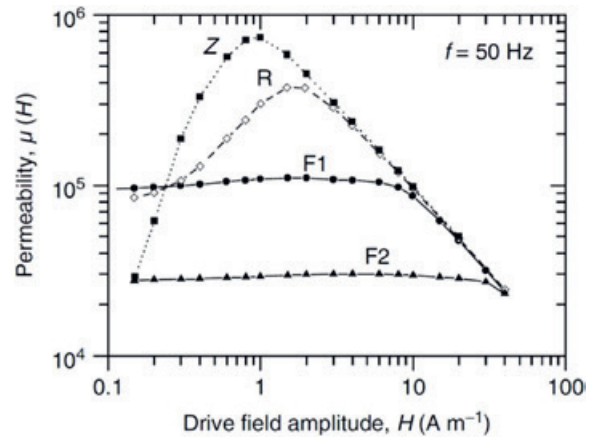


Figure 2: Permeability @ 50 Hz for materials shown in fig. 1.

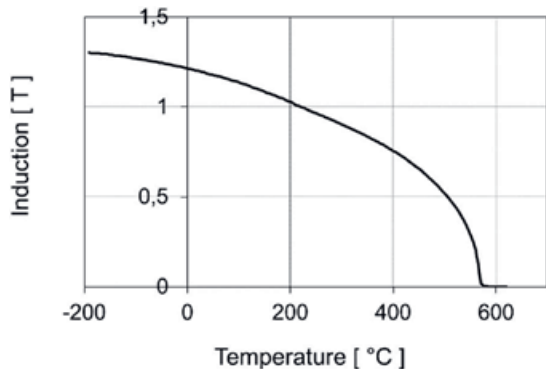


Figure 3: Temperature dependence of saturation induction. Service temperature should not exceed 120 °C - 180 °C. The precise upper limit for service temperature depends on time, magnetic quality, magnetization condition during operation, and the accepted changes. Please contact VAC for further information.

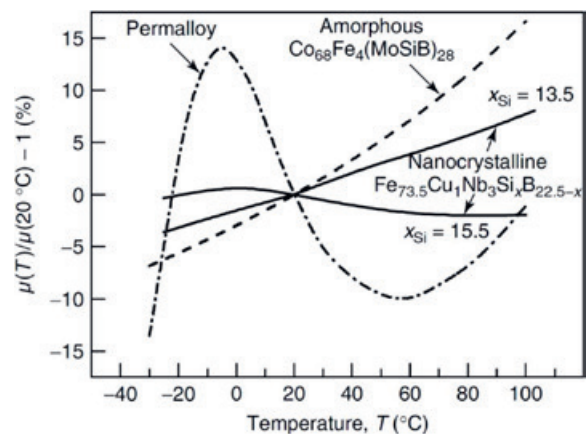


Figure 4: Temperature dependence of typical permeabilities. Relative change of the initial permeability normalized to its room-temperature value versus the typical range of application temperatures for highly permeable soft magnetic materials. All examples have been transverse field annealed and reveal an initial permeability in the range of 70,000 - 90,000.

³ G. Herzer, Nanocrystalline soft magnetic alloys. In: K.H.J. Buschow, editor. Handbook of magnetic materials, vol. 10, Elsevier Science B.V. (1997) p.415