PERMENORM 5000 H2 / V5

Strip material

COMPOSITION (in wt%)

47.5 Ni – bal. Fe
IEC 60404-8-6 E31
DIN 17405 (1979) RNi8 / RNi12
ASTM 753-21 Alloy 2

PRODUCT DESCRIPTION

The family of PERMENORM® 5000 includes the two complementary strip materials PERMENORM 5000 H2 and PERMENORM 5000 V5 providing high saturation magnetization and low magnetic coercivity. After final annealing PERMENORM 5000 H2 possesses a semi-isotropic coarse grain structure with high permeabilities which, among others, finds application in laminated transformer cores for thicknesses below 0.2 mm (transformer grade).

PERMENORM 5000 V5 is an alloy with a more closely controlled purity for improved magnetic properties. Through a tailored fabrication path it exhibits an isotropic fine grain structure after annealing with advantages for use in rotating laminations and other applications with dynamic magnetization changes (rotor grade).

MAIN PROPERTIES

- Saturation induction $J_S = 1.55$ T
- Coercivity $H_C = 3$ A/m*
- Max. permeability $\mu_{max} = 150{,}000 – 180{,}000$*

*typical for thickness 0.35 mm, data for other dimensions upon request

TYPICAL APPLICATIONS

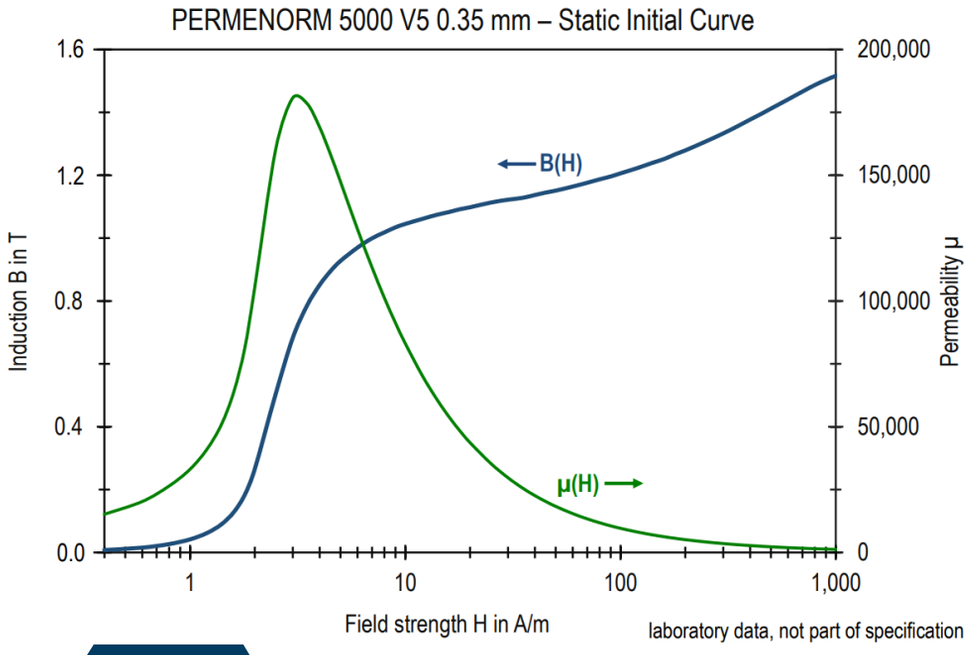
PERMENORM 5000 H2: Toroidal and laminated cores for e.g. current transformers and storage chokes; magnetic shielding

PERMENORM 5000 V5: RCCB-Relays, laminated stacks for high freq. motors, magnetic shielding, current and positioning sensors

FORMS OF SUPPLY

- Strip material, thickness 0.025 – 2 mm, width ≤ 305 mm
- Stamped parts, laminations, and laminated assemblies

Other dimensions and tolerances upon request.
For solid material and wires, see brochure PERMENORM 5000 H2 solid material.



STRIP MATERIAL 0.35 mm – TYPICAL VALUES

PHYSICAL PROPERTIES	Unit	
Mass density ρ	g/cm³	8.25
Thermal conductivity (25 °C) λ	W/(m·K)	18 – 21
Thermal expansion coefficient (20 – 100 °C) α	10^{-6}/K	10
Electrical resistivity ρ_e	µΩm	0.45

STATIC MAGNETIC PROPERTIES		5000 V5	5000 H2
Coercivity H_C	A/m	2.5	3
Saturation polarization J_S	T	1.55	1.55
Saturation magnetization B_S at H = 40 kA/m	T	1.60	1.60
Maximum permeability μ_{max}		180,000	150,000
Magnetostriction constant λ_S	ppm	+ 25	+ 25
Curie temperature T_C	°C	440	440

SPECIFIC IRON LOSSES OF STRIP MATERIAL AFTER FINAL HEAT TREATMENT		measured on stamped rings of PERMENORM 5000 V5 strip thickness		
		0.10 mm	0.20 mm	0.35 mm
p_{Fe} 1.0 T 50 Hz	W/kg	0.2	0.2	0.3
p_{Fe} 1.0 T 400 Hz	W/kg	2.6	4.7	11
p_{Fe} 1.0 T 1,000 Hz	W/kg	9.7	25	61
p_{Fe} 1.2 T 50 Hz	W/kg	0.3	0.3	0.4
p_{Fe} 1.2 T 400 Hz	W/kg	4.0	7.6	18
p_{Fe} 1.2 T 1,000 Hz	W/kg	15	40	103

MECHANICAL PROPERTIES (finally heat treated)		
Young's modulus E	GPa	140
Yield strength $R_{p0.2}$	MPa	140
Hardness	HV	105

MECHANICAL PROPERTIES (delivery state)		cold rolled	soft annealed
Yield strength $R_{p0.2}$	MPa	975	250
Tensile strength R_m	MPa	100	500
Elongation A	%	1	30
Hardness	HV	280	140

RECOMMENDED PARAMETERS FOR THE FINAL HEAT TREATMENT		
Atmosphere		hydrogen
Temperature	°C	1,150
Annealing time	h	5
Cooling rate	K/h	100 – 300

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