

# MUMETALL

## strip material

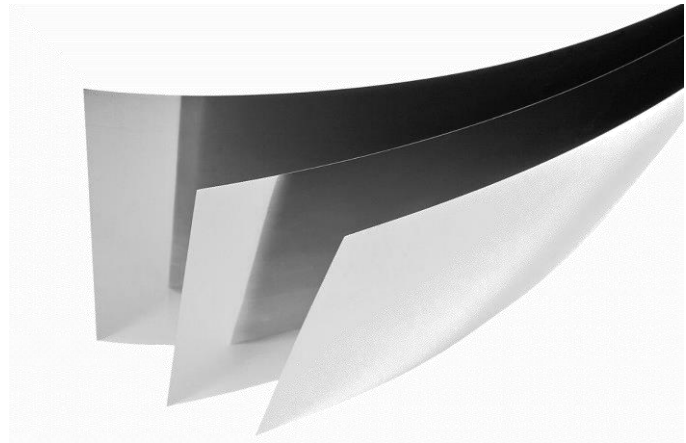
### COMPOSITION (in wt%)

77 Ni – 4.5 Cu – 3.3 Mo – bal. Fe  
IEC 60404-8-6 E11  
DIN 17405 (1979) RNi2 / RNi5

### PRODUCT DESCRIPTION

As one of the most prominent 80 % NiFe alloys, MUMETALL® stands for an exceptionally high maximum magnetic permeability paired with a very low coercivity, making it the standard material for many different kinds of application.

Through an optional tempering after heat treatment it is possible to adjust the material to a state with extraordinary high initial permeabilities.



### TYPICAL APPLICATIONS

Magnetic shielding, high sensitivity current sensors, relay parts for residual current devices, transformer cores.

### MAIN PROPERTIES

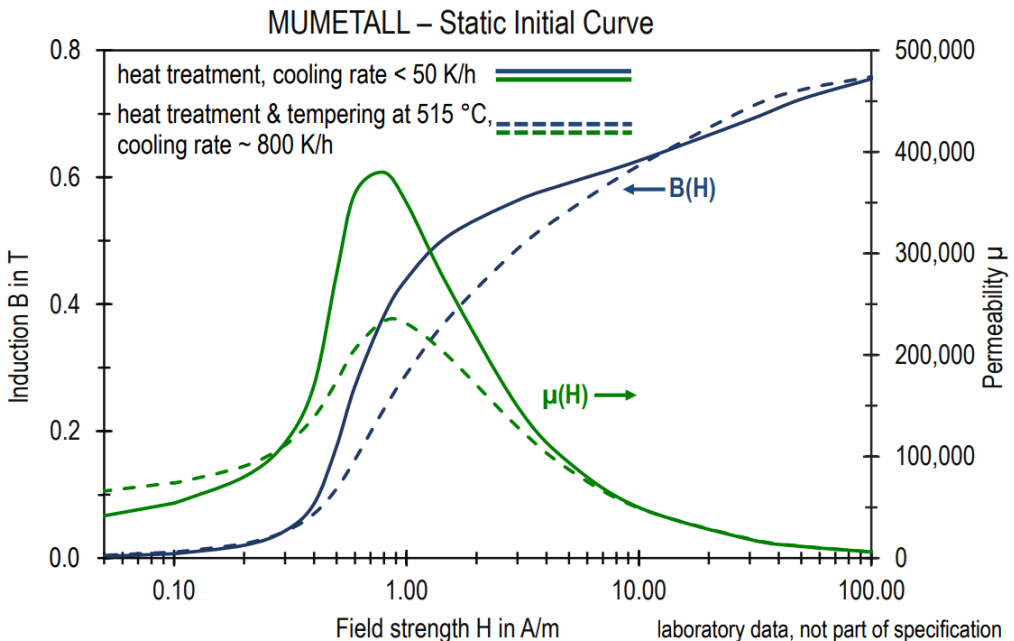
- Maximum permeability  $\mu_{max} = 500,000$
- Low Coercivity  $H_C = 0.6 \text{ A/m}$
- High initial permeability after tempering  $\mu_{0.1 \text{ A/m}} = 90,000$

### FORMS OF SUPPLY

- Strip material, thickness 0.025 – 2 mm, width  $\leq 305 \text{ mm}$
- Stamped parts, laminations, and laminated assemblies

Other dimensions and tolerances upon request.

For solid material and wire, see brochure MUMETALL solid material.



## STRIP MATERIAL 0.35 mm – TYPICAL VALUES

PHYSICAL PROPERTIES	Unit	
Mass density $\rho$	g/cm <sup>3</sup>	8.7
Thermal conductivity (25 °C) $\lambda$	W/(m·K)	18 – 20
Thermal expansion coefficient (20 – 100 °C) $\alpha$	10 <sup>-6</sup> /K	13.5
Electrical resistivity $\rho_e$	$\mu\Omega\text{m}$	0.6

STATIC MAGNETIC PROPERTIES		After heat treatment with cooling rate 50 K/h	After heat treatment & tempering with recommended conditions
Coercivity $H_C$	A/m		0.6
Saturation polarization $J_S$	T		0.78
Saturation magnetization $B_S$ at H = 40 kA/m	T		0.83
Maximum Permeability $\mu_{\text{max}}$		500,000	240,000
Initial Permeability $\mu_{0.1 \text{ A/m}}$		45,000	90,000
Magnetostriction constant $\lambda_S$	ppm		~ 1
Curie temperature $T_C$	°C		400

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

MECHANICAL PROPERTIES (delivery state)		cold rolled	soft annealed
Yield strength $R_{p0.2}$	MPa	1,250	290
Tensile strength $R_m$	MPa	1,290	660
Elongation A	%	1	30
Hardness	HV	350	150

RECOMMENDED PARAMETERS FOR HEAT TREATMENT		
Atmosphere		hydrogen
Temperature	°C	1,050 – 1,150
Annealing time	h	5
Cooling rate	K/h	50 – 300

RECOMMENDED PARAMETERS FOR OPTIONAL TEMPERING AFTER HEAT TREATMENT		
Atmosphere		hydrogen
Tempering temperature	°C	515
Tempering cooling rate	K/h	≥ 800