



Magnetic Alloys

Alloy 50, Alloy 75 & Alloy 79

These nickel-chromium-iron magnetic alloys offer high strength and good ductility. They have the ability for work hardening and strengthening. These alloys possess good resistance to extremely corrosive environments at elevated temperatures, and oxidation resistance sustained up to 1200°C.

Alloy 50 is a soft magnetic nickel-iron alloy with approximately 48% nickel and 52% iron. Given an appropriate thermal treatment, this material is capable of a high permeability. Typical applications include transformer laminations, magnetic shields and relay parts.

Alloy 75 is a soft magnetic alloy with approximately 75% nickel, 5% copper, 2% chromium and 15% iron. Given an appropriate thermal treatment, this material is capable of a high permeability. Typical applications include transformer laminations and magnetic shields.

Alloy 79 is a soft magnetic alloy with approximately 80% nickel, 5% molybdenum and 15% iron. Given an appropriate thermal treatment, this material is capable of a high permeability. Typical applications include transformer laminations and magnetic shields.

Nominal Chemical Composition								
	Ni	Mo	Mg	Si	C	Cr	Cu	Fe
Alloy 50	48%	-	0.5%	0.4%	0.2%	-	-	Balance
Alloy 75	75%	-	0.5%	0.2%	0.0%	2%	5%	Balance
Alloy 79	80%	5%	0.5%	0.2%	0.01%	-	0.02%	Balance

Mechanical Properties			
	Tensile Strength	% Elongation on 50.4mm	Hardness - Birnell
Alloy 50	590N/mm ²	25	121
Alloy 75	550N/mm ²	40	125
Alloy 79	520N/mm ²	40	100

Physical Properties					
	Density	Melting Point	Curie Temperature	Saturation Magnetosriction	Specific Heat
Alloy 50	8.3 gcm ⁻³	1427°C	471°C	+25 x 10 ⁻⁶	-
Alloy 75	8.6 gcm ⁻³	1454°C	438°C	1 x 10 ⁻⁶	502 J/Kkg
Alloy 79	8.8 gcm ⁻³	1454°C	443°C	1 x 10 ⁻⁶	494 J/Kkg

Thermal Properties				
Coefficient of Expansion				
	Temperature Range			x10K ⁻¹
Alloy 50	25°C	to	100°C	8.0
Alloy 75	25°C	to	100°C	12.5
Alloy 79	25°C	to	100°C	12.0

Thermal Conductivity	
Alloy 50	11 Wm ⁻¹ K ⁻¹
Alloy 75	23.5 Wm ⁻¹ K ⁻¹
Alloy 79	24 Wm ⁻¹ K ⁻¹

Electrical Properties	
Electrical Resistivity	
Alloy 50	47 uOhm Cm
Alloy 75	58 uOhm cm
Alloy 79	58 uOhm cm