

26

Fe

55.845

Iron

28

Ni

58.6934

Nickel

EFINEA Alloy 50

Soft Magnetic Alloys



EFINEA

Capabilities Beyond Infinity

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DESCRIPTION

A soft magnetic nickel-iron alloy consisting of approximately 47-49% Nickel and the balance Iron. This alloy is applicable when extremely high permeability at low magnetizing forces are needed as it increases the efficiency and performance of magnetic devices. EFINEA Alloy 50 exhibits the highest saturation induction within the nickel-iron alloys. Trademark names for this alloy can be referenced by Magnifer[®] 50, Carpenter High Permeability[®] 49, Alloy 4750.

APPLICATIONS

Laminated cores for instrument transformers; Magnetic shields; Sensitive relay components; Solenoid components; LF power transducers; Chokes; Oscillators.

TYPICAL PHYSICAL PROPERTIES

Density	lb/cu in	0.295
Specific Gravity		8.18
Curie Temp	F	860-930
	C	460-499
Melting Range	F	2600
	C	1427
Electrical Resistivity 70° F (20°C)	ohm-cir mil/ft	290
	Microhm-cm	48
Thermal Conductivity	BTU-in/sq.ft-hr- F	90.2
	W/m ·K	13
Mean Specific Heat	BTU/lb/ F	0.12
	J/kg ·K	502.41
Thermal Expansion	ppm/ F (75 F to 842 F)	5.0
	ppm/ C (25 C to 450 C)	9.0

Source: ASTM A753 | Carpenter Electrification High Permeability 49 Data Sheet v. 5/20

FORMS | SIZES AVAILABLE

Round Bar Rod (stress relief, anneal)	0.250" - 2.000"
Square Bar	1.003" - 2.030"
*Square Bar Free Machining	1.781" - 2.440"
**Strip/Coil	0.007" - 0.014"

* High Perm 49, **High Perm 49 Rotor Grade

Listed above are our standard stock items. Our inventory fluctuates based on market demands. If you do not see the size or form you require, please call us.

TYPICAL MECHANICAL PROPERTIES

Tensile Strength	ksi	75
	MPa	518
Yield Strength	ksi	23
	MPa	159
Elongation	% in 2"	40
Typical Hardness Ann.	Rockwell HRB	80
Modulus of Elasticity	ksi	24
	MPa	166

Source: ASTM A753 | Carpenter Electrification High Permeability 49 Data Sheet v. 5/20

TYPICAL DC MAGNETIC PROPERTIES

PROPERTIES	BAR	STRIP (0.014 IN)
Initial Permeability B_{100}	6,500	12,000
Maximum Permeability	75,000	150,000
Coercive Force (Hc) ¹ /Oersted	0.04/0.07	0.05/0.06
Saturation Inductance (G) ²	15,000	15,000

¹ From 10,000 gauss

² From H-100 oersteds

Source: Carpenter Electrification High Permeability 49 Data Sheet v. 5/20

TYPICAL AC MAGNETIC PROPERTIES

Minimum 60 Hz AC Permeability B40	8,000
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Rotor Grade 0.014 IN Thickness

All magnetic testing was performed in accordance with applicable ASTM specification. Please refer to appropriate specification for details. Procedures are product specific. Source: Carpenter Electrification High Permeability 49 Data Sheet v. 5/20

CHEMISTRY %

Nickel 47-49, Manganese 0.8 Max., Carbon 0.05 Max., Cobalt 0.5 Max., Silicon 0.5 Max., Iron Bal.

Source: ASTM A753

SPECIFICATIONS

AMS 7718 (Round Bar | Rod) • ASTM A753 Type 2 MIL N-14411C Comp 3 • UNS K94840

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