



ED FAGAN INC.

efi Alloy 79

Description: A soft magnetic alloy consisting of 80% Nickel, 5% Molybdenum, and balance Iron used where extremely high initial & maximum permeability and minimum hysteresis is needed.

Applications: Electro-magnetic shielding, specialty transformer laminations, toroidal tape wound cores, high quality motor laminations, stepping motors.

AKA: Carpenter HyMu 80¹, Hipernom¹, Magnifer 7904², Moly-Permalloy, Permalloy 80

efi Alloy 50

Description: A soft magnetic alloy, consisting of 49% Nickel, balance Iron used where high initial permeability, maximum permeability, and low core loss is needed.

Applications: Transformer cores, highly efficient motors, shielding, and specialized electronic devices, such as LF power transducers, chokes, relay parts, solenoids & oscillators.

AKA: Carpenter High Permeability 49¹, Magnifer 50², Alloy 4750

Hiperco Hiperco 50 and Hiperco 50A²

Description: An alloy of 49% Cobalt, and 2% Vanadium, balance Iron, Hiperco 50 and Hiperco 50A have the highest magnetic saturation of all soft-magnetic alloys and excels in applications where this attribute is needed. Hiperco 50 maintains its strength after heat treating making it your best choice for applications that experience high forces (e.g. rotating parts).

Applications: Special Motors for the Aerospace Industry (e.g. applications where high magnetic saturation and high strength is required with as little weight as possible); Electromagnets for medical applications (e.g. to focus beams for radiation therapy in medical radiology applications); Electrical Generators; Specialty Transformers (e.g. electrical circuits and magnetic circuits where frequencies must be varied); Pole Pieces for Electromagnets; Magnetic Bearings (e.g. applications where rotating parts are levitated); High Magnetic Flux Devices and Instruments.

Vim Var Core Iron

Description: Carpenter VIM VAR Core Iron is a low carbon magnetic iron produced using vacuum induction melting plus vacuum arc re-melting practices. Other elements commonly found in low carbon irons are held as low as possible to ensure good DC magnetic properties. This double melting technique controls the distribution of nonmetallic inclusions to a minimum length and frequency so that thin wall sections will not contain leaks due to internal discontinuities.

Soft Magnetic Alloys

EAST: 769 Susquehanna Avenue, Franklin Lakes, NJ 07417 • phone 201.891.4003

WEST: 10537 Humbolt Street, Los Alamitos, CA 90720 • phone 562.431.2568

Nationwide Toll Free: 800.348.6268 • www.edfagan.com

Applications: Carpenter VIM VAR Core Iron is often used in the manufacture of soft magnetic components where vacuum integrity is needed such as in power tubes and microwave devices. In addition, relays, solenoids, and magnetic pole pieces for scientific instruments may be made utilizing the qualities of VIM VAR Core Iron.

AKA: Carpenter Consumet Core Iron¹

Radiometal 4550

Description: Radiometal 4550 is a Soft Magnetic Alloy consisting of 45% Nickel, balance Iron alloy, and has excellent permeability with high saturation flux density.

Applications: Sensitive relays that need to respond to very weak currents. Radiometal 4550 is also widely used in transformers, chokes and special motors where the properties of silicon-iron do not provide the required magnetic performance.

Footnotes

1. Trademark Carpenter Technology Corp., Reading PA
2. Trademark VDM Metals GmbH, Germany



1/2017



EFI also has a large inventory of Special Purpose Materials, Metals and Alloys for Refractory, Controlled Expansion and other Applications.

For customers outside of North America, contact
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TYPICAL DC MAGNETIC PROPERTIES*

	EFI Alloy 79	EFI Alloy 50	Hiperco 50	Hiperco 50A	Vim Var Core Iron	Radiometal 4550
Saturation Induction - Gauss	8,700	14,500	24,000	24,000	21,500	16,000
Minimum Mu Max Permeability	230,000	100,000	12,000	15,000	10,000	40,000
Coercive Force - Oersteds	0.015	0.06	0.9	0.4	1.0	0.1
Coercive Force - A/m	1.19	4.77	72	32	79.58	8

TYPICAL AC MAGNETIC PROPERTIES*

	EFI Alloy 79	EFI Alloy 50	Hiperco 50	Hiperco 50A	Vim Var Core Iron
Core Loss W/lb @400Hz & 20k G	N/A	N/A	34	30	N/A
B-40 Permeability @60 Hz	45,000	6,500	N/A	N/A	N/A

*All magnetic testing was performed in accordance with applicable ASTM specification. Please refer to appropriate specification for details. Procedures are product specific. N/A = not a typical application value.

THE MATERIALS YOU NEED, WHEN YOU NEED THEM

Soft Magnetic Alloys

www.edfagan.com

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Physical Properties	UNIT	EFI Alloy 79	EFI Alloy 50	Hiperco 50	Hiperco 50A	Vim Var Core Iron	Radiometal 4550
Density	lb/cu in	0.316	0.295	0.293	0.293	0.284	0.30
Specific Gravity		8.74	8.18	8.12	8.12	7.86	8.25
Curie Temp	°F	860	840	1720	1720	1400	840
	°C	460	450	938	938	760	450
Melting Point	°F	2650	2600	2600	2600	2790	2600
	°C	1454	1427	1427	1427	1532	1427
Electrical Resistivity	micro-ohm-cm	59	49	41	41	13	45
	ohm-cir mil/ft	349	290	240	240	78	270
Thermal Conductivity	W/cm °C	0.35	0.13	0.29	0.29	0.73	0.13
	BTU-in/sq. ft-hr-°F	240	90	200	200	508	89
Specific Heat	Cal/g-°C	0.11	0.12	0.10	0.10	0.11	0.11
	BTU/lbm-°F	0.11	0.12	0.10	0.10	0.11	0.11
Thermal Expansion	ppm/°F (75°F to 825°F)	7.5	5.0	5.6	5.6	8.2	7.6
	ppm/°C (25°C to 450°C)	13.6	9.0	10.2	10.2	14.7	13.7
Mechanical Properties							
Tensile Strength	ksi	98	75	118	104	50	68
	MPa	676	518	814	717	345	470
Yield Strength	ksi	38	23	63	53	27	23
	MPa	262	159	435	365	190	159
Elongation	% in 2 in.	40	40	9	7	45	40
Typical Hardness	Rockwell	HRB 85	HRB 80	HRC 20	HRC 20	HRB 60	HRB 80
Modulus of Elasticity	Mpsi	31.4	24	30	30	30	24
	kMPa	217	166	207	207	207	166
Chemistry							
maximum % unless noted	Iron	Bal	Bal	Bal	Bal	99.8	Bal
	Nominal Nickel	80	49	0.25	0.25	0.08	45
	Nominal Cobalt	0.50	0.50	49	49	-	0.50
	Molybdenum	5.0 nom.	0.30	-	-	-	0.30
	Carbon	0.05	0.05	0.025	0.025	0.02	0.05
	Manganese	0.80	0.80	0.15	0.15	0.12	0.80
	Silicon	0.50	0.50	0.15	0.15	0.12	0.50
	Vanadium	-	-	1.9 nom.	1.9 nom.	0.05	-
	Phosphorus	0.02	0.03	0.015	0.015	0.01	0.03
	Sulfur	0.01	0.01	0.010	0.010	0.01	0.01
	Chromium	0.30	0.30	0.15	0.15	-	0.30
	Niobium	-	-	0.05 nom.	-	-	-
Specifications							
	ASTM	A753 Type 4	A753 Type 2	A801 Alloy 1	A801 Alloy 1	A801 Alloy 1 Class 1	A753 Type 1
	MIL	N-14411C	N-14411C	-	-	-	-
		Comp 1	Comp 3				

FORMS AVAILABLE

	EFI Alloy 79 Annealed	EFI Alloy 50 Annealed	Vim Var Core Iron Annealed	Hiperco 50 Unannealed	Hyperco 50A Unannealed	High Perm 49FM Rotor Gr	HyMu 80 Unannealed	High Perm 49	Radiometal 4550
Rod	0.500" - 1.50"	0.0937" - 4.0"	0.500" - 6.0"	-	0.500" - 3.0"	-	-	-	0.625" - 1.57"
Sheet	0.010" - 0.062"	-	-	-	-	-	-	-	-
Plate				0.500" - 5.0"					
Strip/Coil	0.004" - 0.025"	Call for Sizes	-	0.004" - 0.020"	-	-	0.006" - 0.014"	0.007" - 0.014"	0.015"
Square Bar	1.812"	1.030" - 2.030"	-	-	-	1.781" - 2.030"	-	-	-

If you do not see the size or form you require listed above please call us. New stock sizes and forms are added often.