Catalog MCC-100S

NICKEL-IRON and SUPERMENDUR

CUT CORES

MAGNETICS®

A Division of Spang and Company

Introduction

Nickel-Iron Cut Cores are the latest addition to Magnetics' sophisticated product lines. Magnetics has pioneered their development and application, and offers the cores in a choice of C and E shapes, in several materials.

The Magnetics' Nickel-Iron Cut Core is ideal for applications in which low core loss is desired and core saturation is undesirable. The small gap introduced in cutting results in a core that will not saturate due to a slight unbalance on the primary and secondary windings.

Magnetics is one of the world's leading specialists in the research, design and manufacture of high permeability magnetic materials and components. The company's pioneering efforts have led to the development of many components accepted as standard in the industry. Other products manufactured by the Components Division of Magnetics include tape wound, bobbin, molypermalloy powder, and ferrite cores . . . laminations . . . photo-etched parts . . . and custom components.

MATERIALS and APPLICATIONS

Magnetics offers cut cores in a choice of soft magnetic materials. C Cores are made from Supermendur, or from the nickel-iron alloys of Orthonol or Permalloy 80. Three phase E Cores are manufactured from Supermendur.

SUPERMENDUR (Material Code Letter S)

Supermendur is a highly refined iron-vanadium-cobalt alloy available in .002" and .004" thicknesses. This material is specially processed and annealed in a magnetic field to develop a very high saturation flux density (approximately 20,000 gauss).

Supermendur C and E Cores are used in power transformers at frequencies up to 1500 Hz where minimum weight and size are required. They will give up to a 30% weight reduction over conventional 3% silicon-iron core designs. Supermendur C and E Cores can be used in power and pulse transformers, chokes, magnetic amplifiers, and other devices requiring highest possible saturation flux densities. The bonding material used restricts the use of Supermendur C and E Cores to temperatures below 150^{o} C.

PERMALLOY 80 (Material Code Letter D)

Permalloy 80 is a non-oriented, 80% nickel-iron alloy available in thicknesses of .001", .002" and .004". It is processed to have a high initial permeability and low core loss. C Cores made from this material have a saturation flux density of 7500 gauss, and core loss approximately 1/10 that of a silicon-iron C Core of the same material thickness.

C Cores from Permalloy 80 are ideal for the output transformer of high frequency, high power inverters. When used with minimum gap, the small gap will keep the transformer from saturating when the inverter is turned on, or when an unbalanced AC is present on the transformer. The low core loss of Permalloy 80 C Cores makes them suitable for operation at up to 5000 gauss, at frequencies up to 25 KHz. Permalloy 80 C Cores are also used for high power pulse transformers, high frequency inductors, and low loss current transformers.

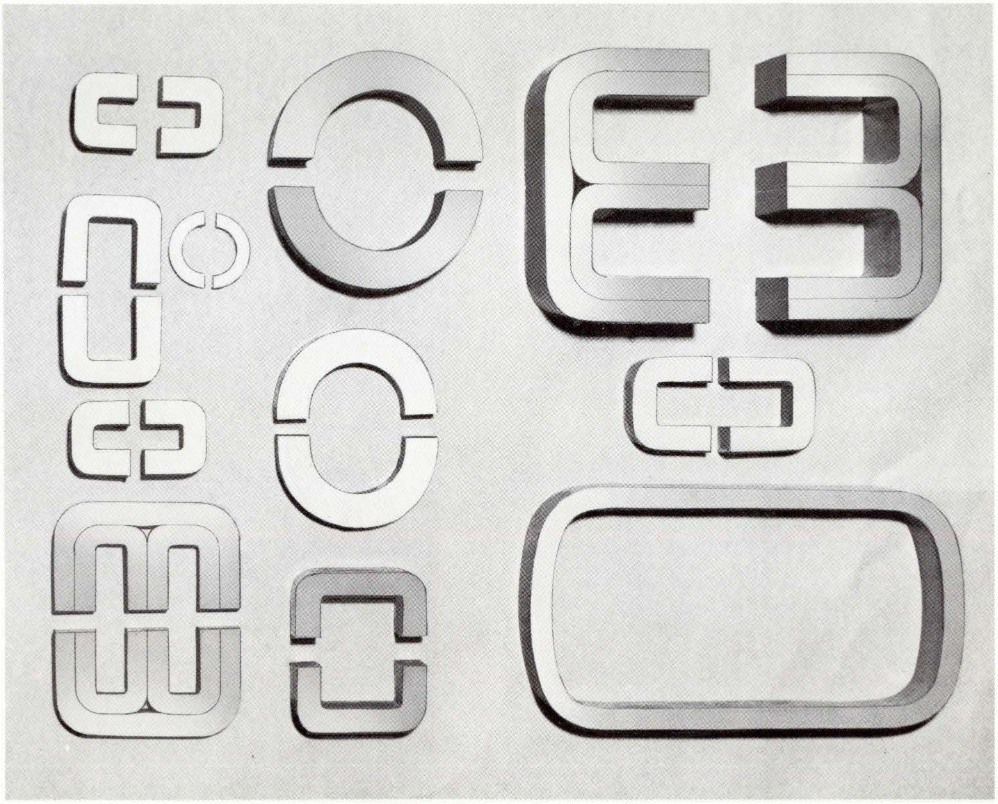
ORTHONOL® (Material Code Letter A)

Orthonol is a grain-oriented, 50% nickel-iron alloy available in thicknesses of .001", .002", and .004". C Cores made from this material have a saturation flux density of 15,000 gauss, and a core loss approximately one-half that of a silicon-iron C Core of the same material thickness. Core loss curves for typical Orthonol C Cores are given on page 10. This material is especially suitable for power transformers operating at flux densities up to 10,000 gauss, and frequencies up to 8 KHz.

Table 1: CUT CORE MATERIAL CHARACTERISTICS

MAGNETICS MATERIAL LETTER CODE	COMMON TRADE NAMES	COMPOSITION IN % (Balance Iron)	FLUX DENSITY (Kilogauss)	DC COERCIVE FORCE (Oersteds)	RESISTIVITY (Microhm-cm)	CURIE Temp. °C	UPPER RECOMMENDED FREQUENCY
S	**SUPERMENDUR**	49% Co 2% Va	22	.25	25	940	**at 20 Kilogauss** .004" 750 Hz .002" 1500 Hz
D	**PERMALLOY 80** 4-79 PERMALLOY HY MU 80 HIPERNOM	80% Ni 4% Mo	7.5	.02	57	460	**at 5 Kilogauss** .004" 5000 Hz .002" 15,000 Hz .001" 25,000 Hz
A	**ORTHONOL** DELTAMAX ORTHONIK HYPERNIK–V 49 SQ. MU	50% Ni (Grain Oriented)	15	.1	45	500	**at 10 Kilogauss** .004" 2000 Hz .002" 4000 Hz .001" 8000 Hz

Typical Cut Core Sizes and Shapes



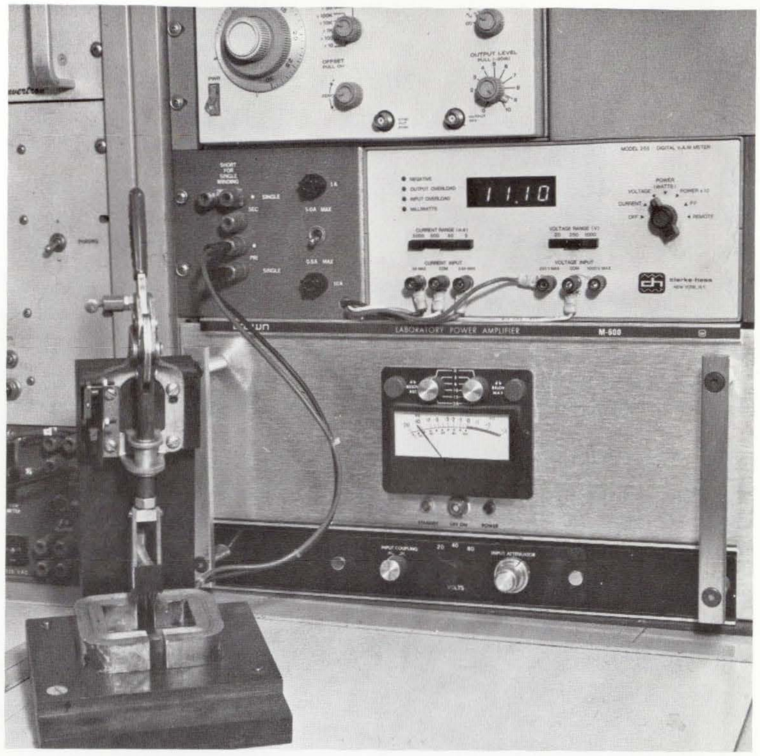
MANUFACTURING

The material used for Magnetics cut cores is slit to the required width and is then coated with a high temperature insulation. This insulation gives maximum interlaminar resistance in order to minimize eddy current losses at high frequencies. The strip is wound to the desired dimensions on a rectangular mandrel, on a precision-controlled tension winding machine. The wound cores are then blocked to maintain tight dimensional control, and are annealed in a hydrogen atmosphere to develop the ultimate in magnetic properties. The annealed cores are impregnated in a vacuum and pressure system, using an epoxy bonding material, and are then cured to obtain thermoset characteristics.

The bonded cores are cut in half using precision cutting wheels. They are then flat-lapped, and etched in a mild acid solution. The finished cores will have typically less than a .001" effective gap.

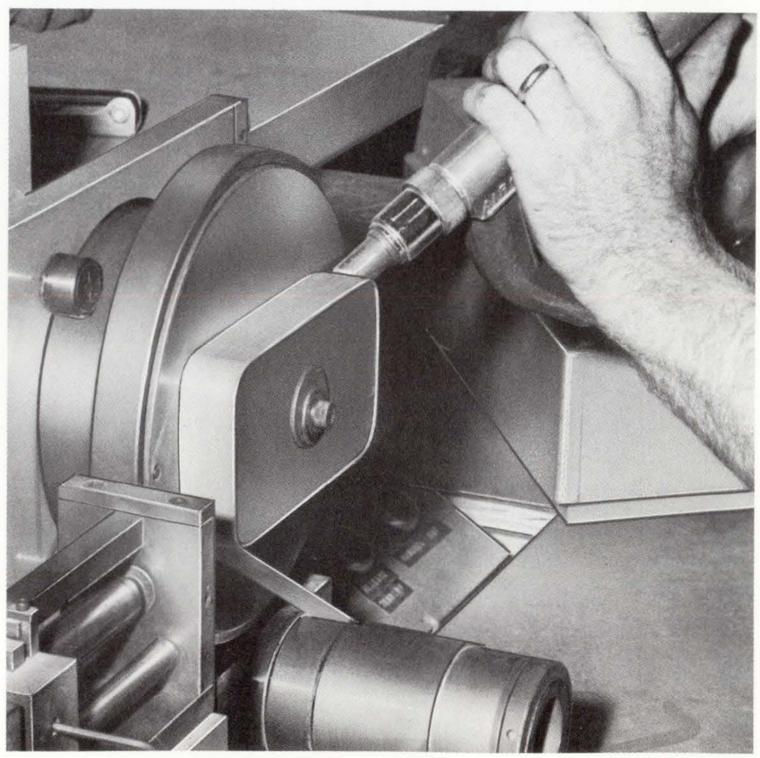
The stacking factors for C and E Cores for various material thicknesses are:

Material Thickness	Stacking Factor
.004"	.9 minimum
.002"	.85 minimum
.001"	.8 minimum



CORE LOSS TESTING

WINDING CUT CORES



CORE SIZE SELECTION GUIDE

Once the transformer core material and material thickness are established, the following curves are a useful guide in determining the proper core size for a required operating frequency and output power.

The curves plotted are based on a 750 cir. mils/ampere current density in the windings, expressed as follows:

$$\text{Power Handling (in.}^4) = \frac{13 \times W}{B_m \times f}$$

where:

Power handling (in.^{4}) = D x E x F x G for a cut core, and is listed on pgs. 6 & 7 for each core size.

W = Transformer output power in Watts

B_m = Operating flux density in Kilogauss

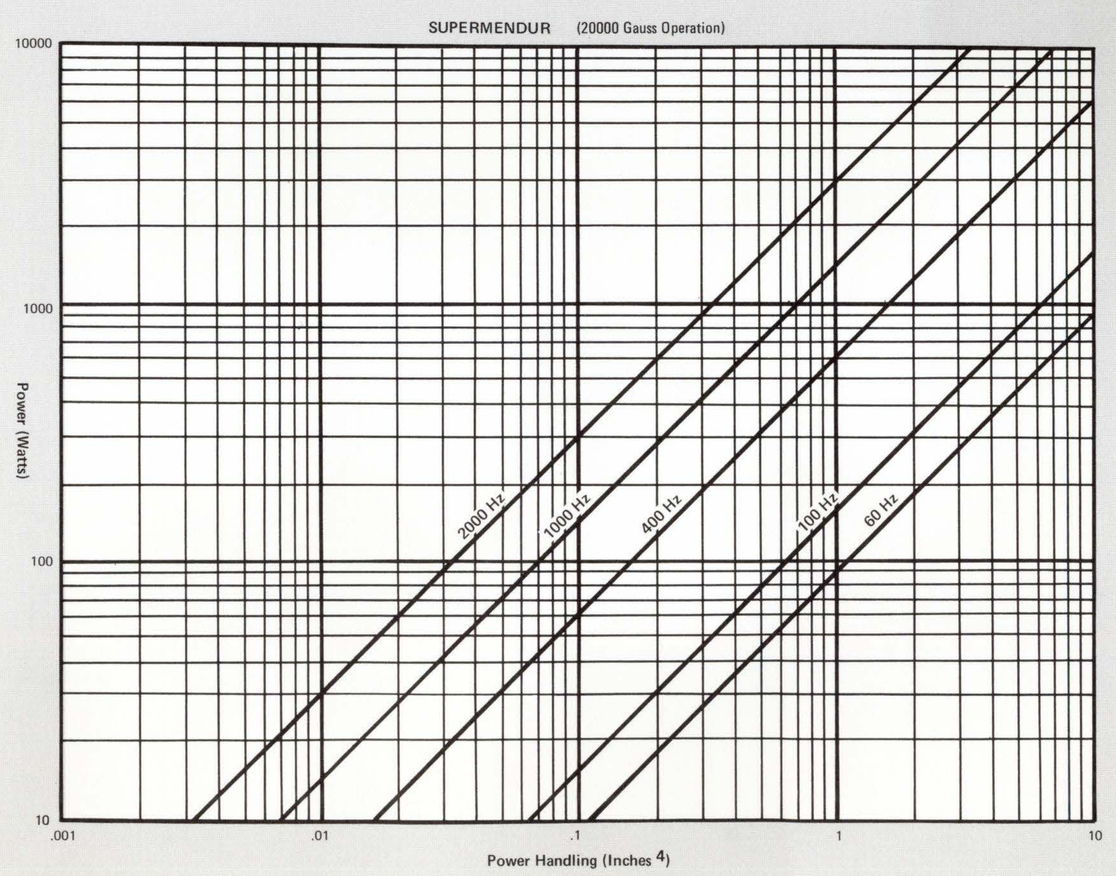
f = Operating frequency in Hertz

The curves are for single phase cut cores and give the approximate size core required to handle a given power at a given frequency. The plotted curves are for the following operating flux densities:

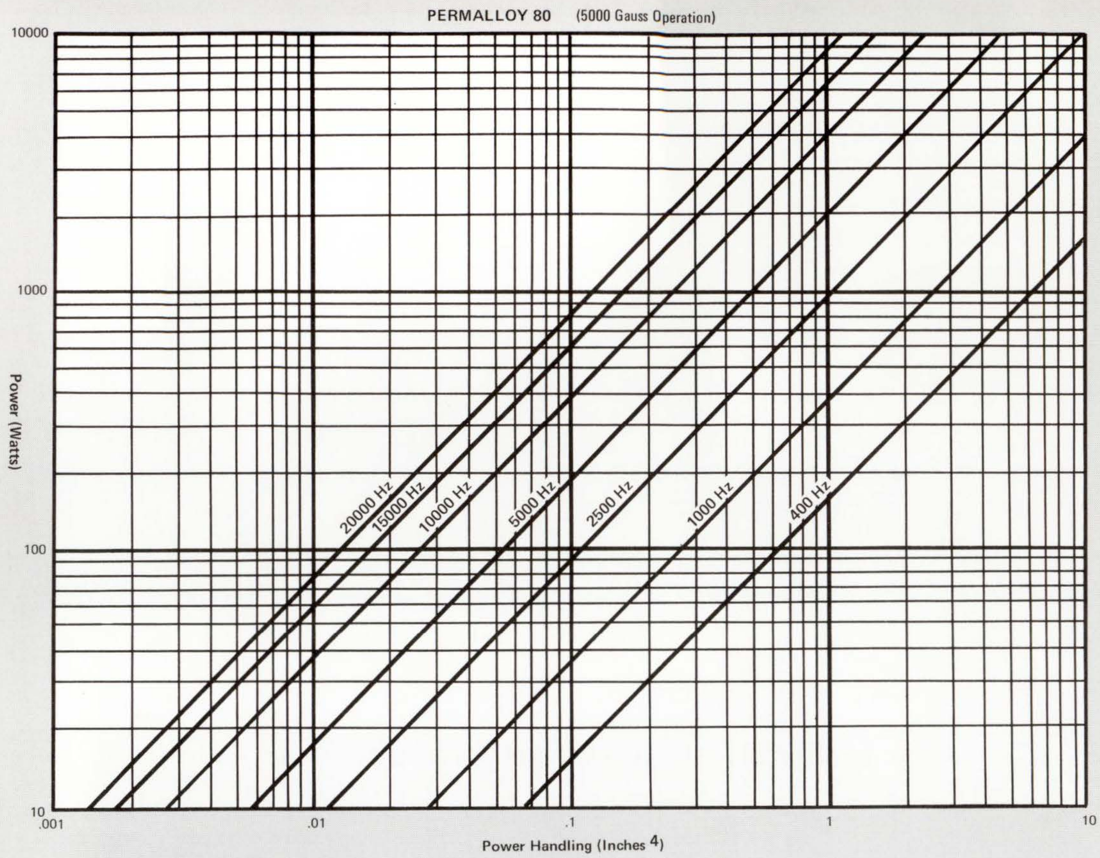
Supermendur	20 kilogauss
Permalloy 80	5 kilogauss
Orthonol	10 kilogauss

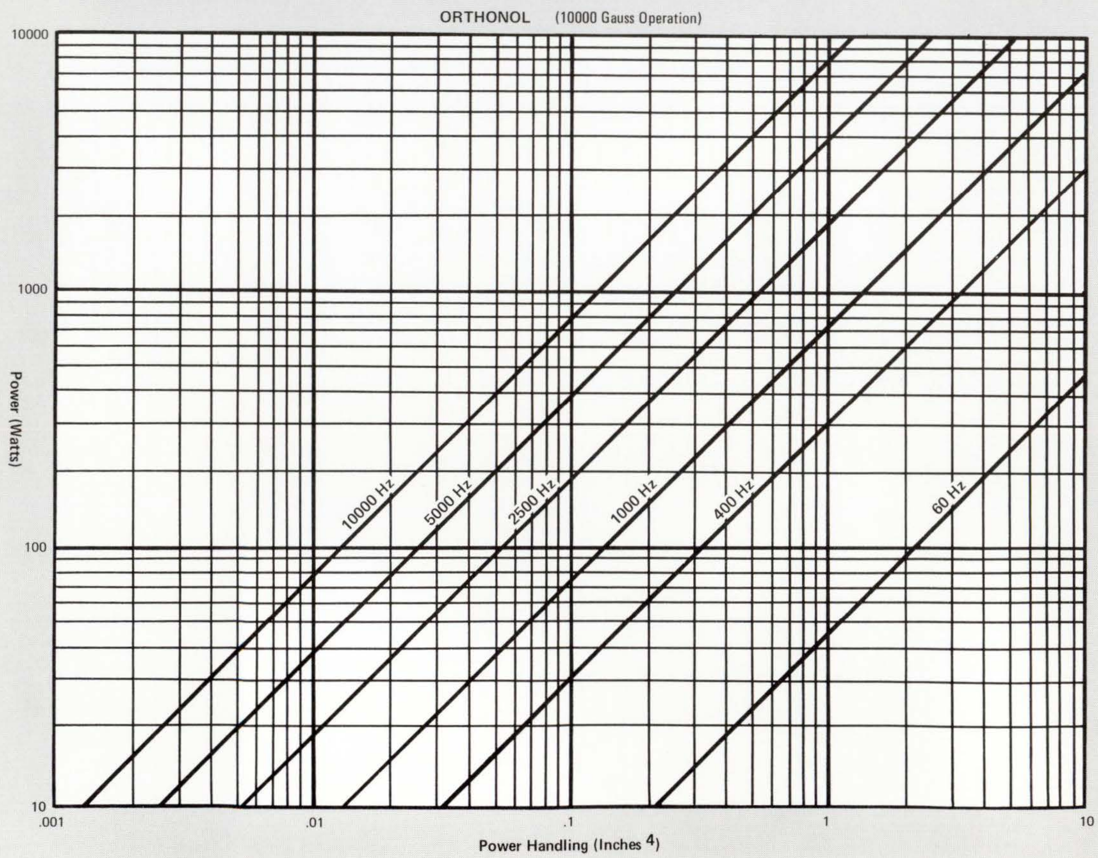
For other operating flux densities, or frequencies not plotted on the curves, use the Power Handling formula above.

Power Handling Curves



Power Handling Curves



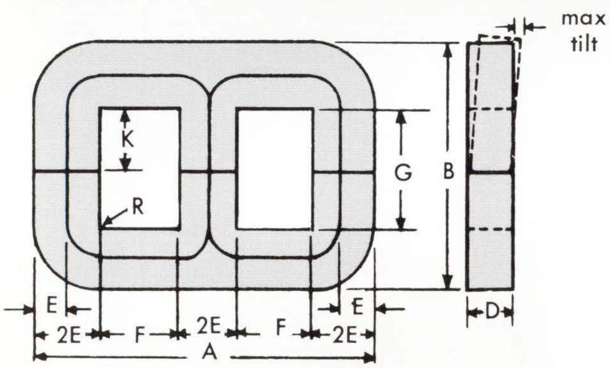


STANDARD E CORES

Part No.	(DIMENSIONS ARE IN INCHES) D	2E	F	G	Weight (lbs.)	Power Handling (in.^{4})	Area* (in^2)	(cm^2)
ME1573	.375	.188	.625	1.625	.128	.072	.071	.455
ME2160	.375	.250	.438	1.000	.156	.041	.094	.605
ME0043	.375	.375	.500	1.125	.286	.079	.141	.907
ME1237	.500	.250	.250	.750	.159	.023	.125	.806
ME0025	.500	.375	.625	1.625	.480	.190	.188	1.21
ME1555	.500	.375	.500	1.250	.410	.117	.188	1.21
ME2540	.625	.375	.500	1.188	.490	.139	.234	1.51
ME0067	.625	.500	.750	2.000	1.000	.468	.313	2.02
ME0053	.750	.250	.438	1.000	.310	.082	.188	1.21
ME2180	.750	.250	.500	1.563	.420	.146	.188	1.21
ME3800	.750	.375	.750	2.000	.860	.421	.281	1.81
ME1559	.750	.375	.500	1.563	.670	.219	.281	1.81
ME1151	.750	.375	.500	1.125	.570	.158	.281	1.81
ME6200	.750	.500	.625	1.375	.960	.322	.375	2.42
ME3001	.750	.625	1.000	2.000	1.72	.937	.469	3.03
ME1558	.813	.625	.875	1.813	1.72	.806	.508	3.28
ME1551	1.000	.250	.938	2.000	.900	.469	.250	1.61
ME1810	1.000	.375	.750	2.000	1.12	.563	.375	2.42
ME0078	1.000	.500	.500	1.563	1.29	.391	.500	3.23
ME0090	1.000	.500	.750	2.000	1.59	.750	.500	3.23
ME1440	1.000	.500	1.000	3.000	2.14	1.500	.500	3.23
ME1560	1.000	.625	1.359	2.700	2.88	2.293	.625	4.03
ME1570	1.000	.875	1.000	1.750	3.39	1.531	.875	5.65
ME1561	1.125	.500	.500	1.250	1.32	.350	.563	3.63
ME1562	1.250	.625	1.000	3.000	3.51	2.344	.781	5.04
ME1567	1.250	.375	1.625	4.500	3.26	3.428	.469	3.03
ME1570	1.000	.875	1.000	1.750	3.39	1.531	.875	5.65
ME1572	1.375	.250	.469	1.125	.620	.181	.343	2.21
ME1571	1.500	.250	.563	1.938	.979	.409	.375	2.42
ME1600	1.500	.250	.500	2.500	1.11	.469	.375	2.42
ME2250	1.500	.500	.750	2.000	2.41	1.125	.750	4.84
ME1566	1.500	.500	1.000	3.000	3.20	2.250	.750	4.84
ME3002	1.500	.500	.750	1.625	2.19	.914	.750	4.84
ME1565	1.500	.670	2.100	3.100	5.84	6.543	1.01	6.52
ME9200	1.500	.750	.750	2.250	4.29	1.898	1.13	7.29

*Area calculated as solid. For true area, multiply by these stacking factors:
.5 mil — .60 2 mils — .85
1 mil — .80 4-6 mils — .90

MECHANICAL TOLERANCES for E CORES



Refer to page 8 for explanation of tolerances and how to measure cores.

K = G/2 if G $\leq$ 5
  G/3 to nearest 1/16 if G > 5

R = 1/16 when F $\leq$ 2 and G $\leq$ 2
  1/8 when F or G > 2 and F and G $\leq$ 5
  5/32 when F or G > 5

DIMENSION	ALLOWABLE TOLERANCES FINISHED CORES
A	+ 3/32 max when A $\leq$ 5 + 3/16 max when A > 5 $\leq$ 10 + 5/16 max when A > 10
B	+ 3/32 max when B $\leq$ 5 + 5/32 max when B > 5 $\leq$ 10 + 1/4 max when B > 10
D	+ 1/32 – 0 when D < 1 + 3/64 – 0 when D $\geq$ 1 < 2 + 1/16 – 0 when D $\geq$ 2 + 5/32 – 0 when 2E > 2-1/2
2E	± 1/32 when 2E $\leq$ 1 + 1/16 – 1/32 when 2E > 1 $\leq$ 2 ± 1/16 when 2E > 2
F	– 1/64 minimum
G	– 1/64 minimum
TILT	1/32 max when B < 3-1/2 1/16 max when B $\geq$ 3-1/2

STANDARD C CORES

Part No.	(DIMENSIONS ARE IN INCHES) D	E	F	G	Weight (lbs.)	Power Handling (in.⁴)	Area* (in²)	Area* (cm²)	Mean Length (in)	Mean Length (cm)
MC1100	.125	.063	.125	.375	.0026	.00037	.0079	.0508	1.25	3.180
MC1505	.125	.063	.313	.438	.0037	.0011	.0079	.0508	1.75	4.455
MC1504	.125	.125	.315	.438	.0084	.0022	.0156	.1008	2.01	5.095
MC1576	.188	.313	.188	.938	.055	.010	.0588	.3795	3.51	8.900
MC1603	.188	.344	.300	1.125	.073	.022	.0647	.4171	4.22	10.73
MC2340	.250	.125	.188	.375	.014	.0022	.0313	.2016	1.62	4.130
MC1606	.250	.125	.188	.500	.016	.0029	.0313	.2016	1.88	4.765
MC0001	.250	.125	.250	.500	.017	.0039	.0313	.2016	2.00	5.080
MC0147	.250	.125	.315	1.000	.026	.0098	.0313	.2016	3.13	7.950
MC0002	.250	.188	.250	.625	.031	.0072	.0470	.3032	2.50	6.355
MC1589	.250	.188	.281	.500	.029	.0066	.0470	.3032	2.31	5.878
MC1685	.250	.188	.500	1.500	.060	.035	.0470	.3032	4.75	12.07
MC1684	.250	.188	.600	1.750	.068	.049	.0470	.3032	5.45	13.85
MC0143	.250	.250	.250	.500	.042	.0078	.0625	.4031	2.50	6.350
MC0004	.250	.250	.250	.875	.054	.014	.0625	.4031	3.25	8.255
MC8400	.250	.250	.250	1.375	.071	.021	.0625	.4031	4.25	10.80
MC1695	.250	.250	.250	1.750	.083	.027	.0625	.4031	5.00	12.70
MC1709	.250	.250	.375	.563	.048	.013	.0625	.4031	2.88	7.305
MC1705	.250	.250	.375	.875	.058	.021	.0625	.4031	3.50	8.890
MC1693	.250	.250	.375	1.000	.063	.023	.0625	.4031	3.75	9.525
MC1586	.250	.250	.375	1.188	.069	.028	.0625	.4031	4.13	10.48
MC1696	.250	.250	.500	.375	.046	.010	.0625	.4031	2.75	6.985
MC1679	.250	.250	.500	.625	.054	.020	.0625	.4031	3.25	8.255
MC1694	.250	.250	.500	1.125	.071	.035	.0625	.4031	4.25	10.80
MC1707	.250	.250	.500	1.250	.075	.040	.0625	.4031	4.50	11.43
MC8100	.250	.250	.500	1.313	.077	.041	.0625	.4031	4.63	11.75
MC1703	.250	.250	.500	1.500	.083	.047	.0625	.4031	5.00	12.70
MC1698	.250	.250	.600	1.750	.095	.070	.0625	.4031	5.70	14.48
MC1604	.250	.250	.625	1.750	.096	.068	.0625	.4031	5.75	14.61
MC1598	.250	.250	.625	2.500	.12	.098	.0625	.4031	7.25	18.42
MC1577	.250	.250	.875	1.750	.10	.096	.0625	.4031	6.25	15.88
MC1668	.250	.250	1.000	2.000	.12	.13	.0625	.4031	7.00	17.78
MC1560	.250	.250	3.500	6.000	.33	1.31	.0625	.4031	20.00	50.80
MC1691	.250	.265	.515	1.390	.086	.047	.0663	.4273	4.87	12.37
MC1666	.250	.375	.250	.781	.089	.018	.0938	.6047	3.56	9.047
MC1677	.250	.375	.350	.781	.094	.026	.0938	.6047	3.76	9.555
MC1591	.281	.250	.250	.563	.049	.0099	.0703	.4531	2.63	6.670
MC1582	.375	.125	.250	.500	.025	.0060	.0469	.3023	2.00	5.080
MC1574	.375	.160	.250	.500	.034	.0075	.0600	.3870	2.14	5.436
MC1647	.375	.178	.125	.150	.023	.0013	.0668	.4305	1.26	3.205
MC1645	.375	.188	.125	.625	.042	.0055	.0705	.4547	2.25	5.720
MC0003	.375	.188	.250	.625	.047	.011	.0705	.4547	2.50	6.350
MC0076	.375	.188	.375	1.000	.066	.026	.0705	.4547	3.50	8.895
MC1638	.375	.188	.438	.938	.068	.030	.0705	.4547	3.50	8.900
MC1521	.375	.203	.375	1.000	.072	.029	.0761	.4910	3.56	9.047
MC0007	.375	.219	.310	1.000	.077	.025	.0821	.5297	3.50	8.880
MC1169	.375	.250	.250	.750	.075	.018	.0938	.6047	3.00	7.620
MC0005	.375	.250	.250	.875	.081	.021	.0938	.6047	3.25	8.255
MC1200	.375	.250	.375	1.000	.094	.035	.0938	.6047	3.75	9.525
MC1571	.375	.250	.375	1.188	.10	.042	.0938	.6047	4.13	10.48
MC1573	.375	.250	.500	1.125	.11	.053	.0938	.6047	4.25	10.80
MC1656	.375	.250	.625	.625	.088	.037	.0938	.6047	3.50	8.890
MC1490	.375	.250	.625	1.250	.12	.073	.0938	.6047	4.75	12.07
MC1149	.375	.313	.500	2.000	.20	.12	.1174	.7571	6.25	15.88
MC1363	.375	.313	.625	1.313	.16	.096	.1174	.7571	5.13	13.03
MC1710	.375	.313	.625	1.320	.16	.097	.1174	.7571	5.14	13.06
MC1378	.375	.313	.625	1.563	.18	.11	.1174	.7571	5.63	14.30
MC0008	.375	.375	.375	1.188	.17	.063	.1406	.9070	4.63	11.75
MC1547	.375	.375	.438	1.438	.20	.089	.1406	.9070	5.25	13.34
MC1543	.375	.375	.500	1.500	.21	.11	.1406	.9070	5.50	13.97
MC1219	.375	.375	.750	1.313	.21	.14	.1406	.9070	5.63	14.29
MC1711	.375	.390	.750	1.940	.27	.21	.1463	.9433	6.94	17.63
MC1300	.375	.500	.500	1.563	.31	.15	.1875	1.209	6.13	15.56
MC1634	.375	.500	1.300	2.250	.46	.55	.1875	1.209	7.10	18.03
MC1635	.375	.500	1.500	2.750	.53	.77	.1875	1.209	10.50	26.67
MC1617	.375	.690	.810	1.500	.51	.31	.2588	1.669	7.38	18.75
MC1572	.438	.219	.375	1.188	.10	.043	.0959	.6187	4.00	10.17
MC1599	.438	.250	.188	.625	.077	.013	.1095	.7063	2.63	6.670
MC1605	.438	.250	.188	.781	.086	.016	.1095	.7063	2.94	7.463
MC1142	.500	.125	.438	1.125	.061	.031	.0625	.4031	3.63	9.210
MC1669	.500	.188	.350	.625	.068	.021	.0940	.6063	2.70	6.863
MC1594	.500	.200	.300	.625	.071	.019	.1000	.6450	2.65	6.731
MC1528	.500	.200	.325	.800	.081	.026	.1000	.6450	3.05	7.747
MC1613	.500	.219	.200	.750	.081	.016	.1095	.7063	2.78	7.051
MC1614	.500	.219	.275	.570	.075	.017	.1095	.7063	2.57	6.518

*Area calculated as solid. For true area, multiply by these stacking factors:
.5 mil — .60 2 mils — .85
1 mil — .80 4-6 mils — .90

STANDARD C CORES Continued

Part No.	(DIMENSIONS ARE IN INCHES)				Weight (lbs.)	Power Handling (in.^{4})	Area*		Mean Length	
	D	E	F	G			(in^2)	(cm^2)	(in)	(cm)
MC1581	.500	.250	.250	.531	.086	.017	.1250	.8063	2.56	6.507
MC1237	.500	.250	.250	.750	.10	.023	.1250	.8063	3.00	7.620
MC0006	.500	.250	.250	.875	.11	.027	.1250	.8063	3.25	8.255
MC0124	.500	.250	.310	1.000	.12	.039	.1250	.8063	3.64	9.246
MC1670	.500	.250	.375	.688	.10	.032	.1250	.8063	3.13	7.940
MC4400	.500	.250	.500	1.000	.13	.063	.1250	.8063	4.00	10.16
MC1347	.500	.250	.500	1.313	.15	.082	.1250	.8063	4.63	11.75
MC1583	.500	.250	.500	1.375	.16	.086	.1250	.8063	4.75	12.07
MC2300	.500	.250	.500	1.750	.18	.11	.1250	.8063	5.50	13.97
MC1692	.500	.250	.625	1.125	.15	.088	.1250	.8063	4.50	11.43
MC1380	.500	.250	.655	1.500	.18	.12	.1250	.8063	5.31	13.49
MC1714	.500	.250	.690	1.750	.20	.15	.1250	.8063	5.88	14.94
MC1713	.500	.250	1.000	1.690	.21	.21	.1250	.8063	6.38	16.21
MC1712	.500	.250	1.000	1.875	.23	.24	.1250	.8063	6.75	17.15
MC1559	.500	.250	1.500	1.313	.22	.25	.1250	.8063	6.63	16.83
MC1690	.500	.265	.515	1.390	.17	.095	.1325	.8546	4.87	12.37
MC1413	.500	.313	.500	1.500	.22	.12	.1565	1.009	5.25	13.34
MC1151	.500	.313	.500	1.563	.22	.12	.1565	1.009	5.38	13.66
MC1155	.500	.313	.625	1.563	.24	.15	.1565	1.009	5.63	14.30
MC0009	.500	.375	.375	1.188	.23	.083	.1875	1.209	4.63	11.75
MC1664	.500	.375	.500	1.625	.29	.15	.1875	1.209	5.75	14.61
MC1649	.500	.375	.625	1.625	.30	.19	.1875	1.209	6.00	15.24
MC1715	.500	.375	.625	1.060	.24	.12	.1875	1.209	4.87	12.37
MC1414	.500	.375	.625	2.000	.34	.23	.1875	1.209	6.75	17.15
MC0012	.500	.438	.500	1.125	.29	.12	.2190	1.413	5.00	12.71
MC0018	.500	.438	.625	1.563	.36	.21	.2190	1.413	6.13	15.57
MC1721	.500	.500	.285	.750	.27	.05	.2500	1.613	4.07	10.34
MC1264	.500	.500	.375	1.250	.35	.12	.2500	1.613	5.25	13.34
MC0014	.500	.500	.500	1.563	.41	.20	.2500	1.613	6.13	15.56
MC1249	.500	.500	.500	1.875	.45	.23	.2500	1.613	6.75	17.15
MC1716	.500	.500	.610	1.940	.47	.30	.2500	1.613	7.10	18.03
MC1154	.500	.500	.625	1.313	.39	.21	.2500	1.613	5.88	14.93
MC1359	.500	.500	.625	1.563	.43	.24	.2500	1.613	6.38	16.20
MC1718	.500	.500	.750	1.690	.46	.32	.2500	1.613	6.88	17.48
MC1717	.500	.500	.750	2.000	.50	.38	.2500	1.613	7.50	19.05
MC1720	.500	.500	1.060	1.440	.47	.38	.2500	1.613	7.00	17.78
MC1719	.500	.500	1.500	4.440	.93	1.67	.2500	1.613	13.88	35.26
MC1722	.500	.500	1.625	3.303	.79	1.34	.2500	1.613	11.85	30.11
MC1700	.563	.188	.188	.780	.076	.016	.1058	.6827	2.69	6.830
MC1699	.563	.203	.203	.740	.082	.017	.1143	.7372	2.70	6.850
MC1544	.563	.250	.500	1.000	.150	.070	.1408	.9078	4.00	10.16
MC1611	.563	.281	.313	.938	.150	.046	.1582	1.020	3.63	9.210
MC1608	.563	.500	.750	1.250	.45	.26	.2815	1.816	6.00	15.24
MC1609	.563	.563	.785	1.938	.65	.48	.3170	2.044	7.70	19.55
MC1569	.563	.563	1.060	2.313	.76	.78	.3170	2.044	8.99	22.85
MC1235	.563	.625	.625	1.375	.61	.30	.3519	2.270	6.50	16.51
MC1223	.625	.203	.375	1.000	.12	.048	.1269	.8183	3.56	9.047
MC1317	.625	.203	.375	1.563	.16	.074	.1269	.8183	4.69	11.91
MC1612	.625	.219	.300	.900	.12	.037	.1369	.8828	3.28	8.321
MC1632	.625	.234	.350	.900	.13	.046	.1463	.9433	3.44	8.727
MC1371	.625	.250	.310	.875	.14	.042	.1563	1.008	3.37	8.560
MC2350	.625	.250	.375	1.000	.16	.060	.1563	1.008	3.75	9.525
MC1723	.625	.250	.430	1.130	.17	.08	.1563	1.008	4.12	10.46
MC0013	.625	.250	.500	1.125	.18	.088	.1563	1.008	4.25	10.80
MC1178	.625	.250	.625	1.375	.21	.13	.1563	1.008	5.00	12.70
MC1362	.625	.250	.625	1.500	.22	.15	.1563	1.008	5.25	13.34
MC1346	.625	.250	.625	1.563	.22	.15	.1563	1.008	5.38	13.66
MC1379	.625	.281	.280	1.000	.17	.049	.1756	1.133	3.68	9.357
MC1675	.625	.281	.500	1.563	.25	.14	.1756	1.133	5.25	13.34
MC1683	.625	.297	.500	1.562	.26	.14	.1856	1.197	5.31	13.49
MC1184	.625	.313	.375	1.188	.23	.087	.1956	1.262	4.37	11.12
MC1279	.625	.313	.625	1.000	.23	.12	.1956	1.262	4.50	11.44
MC1724	.625	.313	1.250	1.575	.36	.39	.1956	1.262	6.90	17.53
MC1725	.625	.313	1.250	1.940	.40	.47	.1956	1.262	7.63	19.39
MC1164	.625	.375	.375	1.063	.27	.093	.2344	1.512	4.38	11.12
MC0010	.625	.375	.375	1.188	.29	.10	.2344	1.512	4.63	11.75
MC1349	.625	.375	.500	1.313	.32	.15	.2344	1.512	5.13	13.02
MC1508	.625	.375	.500	1.500	.34	.18	.2344	1.512	5.50	13.97
MC1221	.625	.375	.750	1.313	.35	.23	.2344	1.512	5.63	14.29
MC1510	.625	.375	.750	1.94	.43	.34	.2344	1.512	6.88	17.48
MC1726	.625	.375	.750	2.060	.45	.36	.2344	1.512	7.12	18.08
MC1727	.625	.375	.750	2.130	.45	.37	.2344	1.512	7.26	18.44
MC0015	.625	.500	.500	1.563	.51	.24	.3125	2.016	6.13	15.56
MC1367	.625	.500	.625	1.313	.49	.26	.3125	2.016	5.88	14.93
MC1728	.625	.625	.375	1.500	.65	.22	.3906	2.520	8.38	15.88
MC1530	.625	.625	.625	2.313	.87	.56	.3906	2.520	8.38	21.28
MC1515	.625	.625	.875	2.750	1.02	.94	.3906	2.520	9.75	24.77

*Area calculated as solid. For true area, multiply by these stacking factors:
.5 mil — .60 2 mils — .85
1 mil — .80 4-6 mils — .90

STANDARD C CORES Continued

Part No.	(DIMENSIONS ARE IN INCHES) D	E	F	G	Weight (lbs.)	Power Handling ($in.^4$)	Area* (in^2)	Area* (cm^2)	Mean Length (in)	Mean Length (cm)
MC1648	.625	.625	1.250	2.750	1.10	1.34	.3906	2.520	10.50	26.67
MC1248	.688	.375	.438	1.313	.34	.15	.2580	1.664	5.00	12.71
MC1729	.688	.375	.438	1.940	.43	.22	.2580	1.664	6.26	15.89
MC1385	.688	.375	.625	1.313	.37	.21	.2580	1.664	5.38	13.66
MC1284	.688	.375	.625	1.875	.45	.30	.2580	1.664	6.50	16.51
MC1263	.688	.375	.688	1.875	.46	.33	.2580	1.664	6.63	16.83
MC1654	.688	.688	.625	1.938	1.00	.57	.4733	3.053	7.88	20.01
MC1663	.750	.188	.313	.325	.076	.014	.1410	.9095	2.03	5.151
MC1618	.750	.188	.313	.675	.10	.030	.1410	.9095	2.73	6.929
MC1368	.750	.219	.313	1.000	.15	.051	.1643	1.059	3.50	8.895
MC1615	.750	.250	.150	.500	.12	.014	.1875	1.209	2.30	5.842
MC1374	.750	.250	.375	1.125	.20	.079	.1875	1.209	4.00	10.16
MC1360	.750	.250	.625	1.500	.26	.18	.1875	1.209	5.25	13.34
MC1730	.750	.250	.750	1.750	.30	.25	.1875	1.209	6.00	15.24
MC1511	.750	.265	.500	1.125	.23	.11	.1988	1.282	4.31	10.95
MC1518	.750	.265	1.000	1.125	.28	.22	.1988	1.282	5.31	13.49
MC1731	.750	.265	1.000	1.225	.29	.24	.1988	1.282	5.51	14.00
MC1540	.750	.266	.500	1.125	.23	.11	.1995	1.288	4.31	10.96
MC0078	.750	.313	.313	2.250	.40	.17	.2348	1.514	6.38	16.20
MC0011	.750	.375	.375	1.188	.35	.13	.2813	1.814	4.63	11.75
MC1733	.750	.375	.530	1.125	.36	.17	.2813	1.814	4.81	12.22
MC1145	.750	.375	.563	1.063	.36	.17	.2813	1.814	4.75	12.07
MC1660	.750	.375	.625	1.250	.39	.22	.2813	1.814	5.25	13.34
MC1641	.750	.375	.625	2.000	.51	.35	.2813	1.814	6.75	17.15
MC1215	.750	.375	.656	.750	.32	.14	.2813	1.814	4.31	10.95
MC1732	.750	.375	.750	2.000	.53	.42	.2813	1.814	7.00	17.78
MC1682	.750	.375	1.216	3.235	.78	1.11	.2813	1.814	10.40	26.42
MC1350	.750	.391	.625	1.250	.42	.23	.2933	1.891	5.31	13.50
MC1372	.750	.391	1.250	1.250	.51	.46	.2933	1.891	6.56	16.67
MC1568	.750	.438	1.000	2.375	.75	.78	.3285	2.119	8.50	21.60
MC1527	.750	.438	1.000	2.500	.77	.82	.3285	2.119	8.75	22.23
MC0016	.750	.500	.500	1.563	.61	.29	.3750	2.419	6.13	15.56
MC1688	.750	.500	.625	1.563	.64	.37	.3750	2.419	6.38	16.20
MC1512	.750	.500	.750	3.750	1.10	1.05	.3750	2.419	11.00	27.94
MC1391	.750	.500	1.000	1.500	.701	.56	.3750	2.419	7.00	17.78
MC1529	.750	.500	1.000	2.000	.80	.75	.3750	2.419	8.00	20.32
MC1217	.750	.500	1.000	2.563	.91	.96	.3750	2.419	9.16	23.18
MC1689	.750	.500	1.125	1.500	.73	.63	.3750	2.419	7.25	18.42
MC1650	.750	.500	1.500	1.000	.70	.56	.3750	2.419	7.00	17.78
MC1734	.750	.500	1.500	3.690	1.24	2.08	.3750	2.419	12.38	31.45
MC1636	.750	.531	.625	1.500	.68	.37	.3983	2.569	6.37	16.19
MC1537	.750	.625	.625	1.625	.88	.48	.4689	3.023	7.00	17.78
MC1602	.750	.625	.685	1.988	.98	.64	.4689	3.023	7.85	19.93
MC1686	.750	.672	.625	1.563	.95	.49	.5625	3.628	7.06	17.94
MC1735	.750	.750	.250	.690	.73	.10	.5625	3.628	4.88	12.40
MC1737	.750	.750	.750	1.190	1.03	.50	.5625	3.628	6.88	17.48
MC1736	.750	.750	.750	3.565	1.75	1.50	.5625	3.628	11.63	29.54
MC1687	.750	.750	1.125	1.750	1.31	1.11	.5625	3.628	8.75	22.23
MC1570	.750	.750	1.500	2.375	1.62	2.00	.5625	3.628	10.75	27.31
MC1525	.750	.750	1.500	5.000	2.40	4.22	.5625	3.628	16.00	40.64
MC1620	.750	.750	1.750	1.750	1.50	1.72	.5625	3.628	10.00	25.40
MC1316	.750	.750	3.500	8.500	4.06	16.73	.5625	3.628	27.00	68.58
MC1651	.750	.833	1.750	4.375	2.60	4.78	.6248	4.030	15.58	39.58
MC1377	.875	.313	.625	.563	.26	.096	.2739	1.766	3.63	9.215
MC1742	.875	.313	.625	1.575	.41	.27	.2739	1.766	5.65	14.36
MC1236	.875	.375	.375	1.000	.37	.12	.3281	2.116	4.25	10.80
MC1678	.875	.375	.450	1.750	.52	.26	.3281	2.116	5.90	14.99
MC1642	.875	.375	.690	1.000	.43	.23	.3281	2.116	4.88	12.40
MC1502	.875	.375	.905	1.781	.60	.53	.3281	2.116	6.87	17.45
MC1509	.875	.375	1.313	2.500	.80	1.08	.3281	2.116	9.13	23.18
MC1738	.875	.375	1.375	3.000	.90	1.35	.3281	2.116	10.25	26.04
MC1536	.875	.500	.950	1.984	.92	.82	.4375	2.822	7.87	19.98
MC1739	.875	.500	.990	1.985	.93	.86	.4375	2.822	7.95	20.19
MC1740	.875	.500	1.000	2.065	.95	.90	.4375	2.822	8.13	20.65
MC1744	.938	.328	.500	1.910	.50	.29	.3077	1.984	6.13	15.58
MC1743	.938	.938	1.625	3.938	3.49	5.61	.8798	5.675	14.88	37.79
MC1503	1.000	.313	.375	1.625	.44	.19	.3130	2.019	5.25	13.34
MC1401	1.000	.313	.500	2.250	.56	.35	.3130	2.019	6.75	17.15
MC1593	1.000	.375	.435	1.938	.63	.32	.3750	2.419	6.24	15.86
MC1355	1.000	.375	.469	1.750	.59	.31	.3750	2.419	5.94	15.08
MC1120	1.000	.375	.500	1.563	.56	.29	.3750	2.419	5.63	14.29
MC1523	1.000	.375	.625	3.000	.88	.70	.3750	2.419	8.75	22.23
MC1222	1.000	.375	.750	1.313	.56	.37	.3750	2.419	5.63	14.29
MC1746	1.000	.375	.750	1.565	.61	.44	.3750	2.419	6.13	15.57
MC1241	1.000	.375	.750	3.000	.90	.84	.3750	2.419	9.00	22.86

*Area calculated as solid. For true area, multiply by these stacking factors:
.5 mil — .60 2 mils — .85
1 mil — .80 4-6 mils — .90

STANDARD C CORES Continued

Part No.	(DIMENSIONS ARE IN INCHES) D	E	F	G	Weight (lbs.)	Power Handling (in.⁴)	Area* (in²)	(cm²)	Mean Length (in)	(cm)
MC1748	1.000	.375	.938	2.000	.74	.70	.3750	2.419	7.37	18.73
MC1588	1.000	.375	1.060	1.750	.71	.70	.3750	2.419	7.12	18.08
MC1747	1.000	.375	1.250	3.000	1.00	1.41	.3750	2.419	10.00	25.40
MC1000	1.000	.390	.625	1.313	.57	.32	.3900	2.516	5.44	13.81
MC1749	1.000	.390	.750	1.940	.72	.57	.3900	2.516	6.94	17.63
MC1750	1.000	.390	.750	2.940	.93	.86	.3900	2.516	8.94	22.71
MC1787	1.000	.390	1.250	1.313	.70	.64	.3900	2.516	6.68	16.98
MC2000	1.000	.390	1.250	1.937	.83	.94	.3900	2.516	7.93	20.15
MC1209	1.000	.438	.875	2.250	.94	.86	.4380	2.825	8.00	20.33
MC1542	1.000	.450	.350	1.500	.66	.24	.4500	2.903	5.50	13.97
MC0017	1.000	.500	.500	1.563	.82	.39	.5000	3.225	6.13	15.56
MC0019	1.000	.500	.625	1.563	.85	.49	.5000	3.225	6.38	16.20
MC1243	1.000	.500	.750	3.000	1.27	1.13	.5000	3.225	9.50	24.13
MC1218	1.000	.500	1.000	2.563	1.22	1.28	.5000	3.225	9.13	23.18
MC1548	1.000	.500	1.125	2.750	1.30	1.55	.5000	3.225	9.75	24.77
MC1644	1.000	.500	1.375	1.375	1.00	.95	.5000	3.225	7.50	19.05
MC1751	1.000	.562	.500	1.690	1.00	.47	.5620	3.625	6.63	16.84
MC0020	1.000	.625	.625	1.563	1.15	.61	.6250	4.031	6.88	17.47
MC0022	1.000	.625	.625	1.938	1.27	.76	.6250	4.031	7.63	19.37
MC1752	1.000	.625	.625	1.940	1.27	.75	.6250	4.031	7.63	19.38
MC0098	1.000	.625	2.000	3.000	2.09	3.75	.6250	4.031	12.50	31.75
MC1671	1.000	.780	2.000	3.060	2.76	4.77	.7800	5.031	13.24	33.63
MC0025	1.000	.875	.938	2.500	2.42	2.05	.8750	5.644	10.38	26.36
MC1658	1.000	.938	.938	2.500	2.66	2.20	.9380	6.050	10.63	27.00
MC1754	1.000	1.000	1.030	2.625	3.02	2.70	1.000	6.450	11.31	28.73
MC1753	1.000	1.000	1.125	3.000	3.27	3.38	1.000	6.450	12.25	31.12
MC1672	1.000	1.000	1.200	4.000	3.85	4.80	1.000	6.450	14.40	36.58
MC0168	1.000	1.000	2.000	4.000	4.27	8.00	1.000	6.450	16.00	40.64
MC1755	1.000	1.000	2.225	4.490	4.67	10.00	1.000	6.450	17.43	44.27
MC1565	1.000	1.000	3.560	6.000	6.18	21.36	1.000	6.450	23.12	58.72
MC1600	1.000	1.000	8.000	8.000	9.64	64.00	1.000	6.450	36.00	91.44
MC1756	1.000	1.250	1.000	1.500	3.34	1.88	1.250	8.063	10.00	25.40
MC1639	1.000	1.250	1.250	2.500	4.17	3.91	1.250	8.063	12.50	31.75
MC1384	1.000	1.250	3.375	3.375	6.17	1.423	1.250	8.063	18.50	46.99
MC1655	1.000	1.500	4.000	7.000	11.22	42.00	1.500	9.675	28.00	71.12
MC1152	1.000	2.000	3.000	6.000	13.89	36.00	2.000	12.90	26.00	66.04
MC1520	1.125	.560	.810	2.125	1.36	1.08	.6300	4.064	8.11	20.60
MC0248	1.125	.750	1.125	2.875	2.48	2.73	.8438	5.442	11.00	27.94
MC1514	1.250	.313	.750	2.938	.91	.86	.3913	2.524	8.63	21.92
MC1567	1.250	.344	1.500	1.375	.82	.89	.4300	2.774	7.13	18.10
MC1428	1.250	.375	.375	1.125	.56	.20	.4688	3.023	4.50	11.43
MC1531	1.250	.375	.750	2.250	.94	.79	.4688	3.023	7.50	19.05
MC1210	1.250	.375	1.313	1.313	.85	.81	.4688	3.023	6.75	17.15
MC1232	1.250	.500	1.000	2.563	1.52	1.60	.6250	4.031	9.13	23.18
MC1758	1.250	.520	2.500	2.060	1.95	3.35	.6500	4.193	11.20	28.45
MC1578	1.250	.563	.875	2.000	1.50	1.23	.7038	4.539	8.00	20.33
MC1524	1.250	.563	1.000	2.750	1.83	1.93	.7038	4.539	9.75	24.77
MC0023	1.250	.625	.625	1.938	1.59	.95	.7813	5.039	7.63	19.37
MC1631	1.250	.625	.625	1.988	1.61	.97	.7813	5.039	7.72	19.62
MC1757	1.250	.625	.625	6.000	3.29	2.93	.7813	5.039	15.75	40.01
MC1271	1.375	.188	.438	1.016	.25	.11	.2585	1.667	3.66	9.296
MC1587	1.500	.250	1.250	3.750	1.11	1.76	.3750	2.419	11.00	27.94
MC6800	1.500	.375	.750	2.313	1.15	.98	.5625	3.628	7.63	19.37
MC1231	1.500	.375	.875	1.500	.94	.74	.5625	3.628	6.25	15.88
MC1566	1.500	.375	1.000	5.250	2.10	2.95	.5625	3.628	14.00	35.56
MC1535	1.500	.500	1.625	1.875	1.80	2.29	.7500	4.838	9.00	22.86
MC1759	1.500	.625	.875	1.815	1.97	1.49	.9375	6.047	7.88	20.03
MC1579	1.500	.750	.750	1.750	2.40	1.48	1.125	7.256	8.00	20.32
MC1652	1.500	.938	.815	1.938	3.48	2.22	1.407	9.075	9.26	23.52
MC1674	1.500	1.000	1.000	2.000	4.01	3.00	1.500	9.675	10.00	25.40
MC0130	1.500	1.000	1.000	3.000	4.81	4.50	1.500	9.675	12.00	30.48
MC1534	1.500	1.000	1.000	4.000	5.61	6.00	1.500	9.675	14.00	35.56
MC1481	1.500	1.000	1.125	2.875	4.81	4.85	1.500	9.675	12.00	30.48
MC1616	1.500	1.000	1.750	5.000	7.01	13.13	1.500	9.675	17.50	44.45
MC1637	1.500	1.375	1.250	4.250	9.09	10.96	2.063	13.30	16.50	41.91
MC1761	1.500	1.500	1.000	1.440	6.54	3.24	2.250	14.51	10.88	27.64
MC1762	1.500	1.500	1.188	4.125	9.99	11.03	2.250	14.51	16.63	42.23
MC1760	1.500	1.500	1.315	4.190	10.22	12.40	2.250	14.51	17.01	43.21
MC1763	1.500	1.500	1.500	2.565	8.49	8.66	2.250	14.51	14.13	35.89
MC1416	2.000	.875	1.310	3.500	6.13	8.02	1.750	11.29	13.12	33.32
MC1619	2.250	1.000	1.375	2.750	7.36	8.51	2.250	14.51	12.25	31.12
MC1680	2.500	1.500	2.000	3.500	17.03	26.25	3.750	24.19	17.00	43.18
MC1596	2.685	.988	.940	2.750	8.03	6.86	2.653	17.11	11.33	28.78
MC1676	2.750	1.500	.875	3.500	16.25	12.63	4.125	26.61	14.75	37.47

*Area calculated as solid. For true area, multiply by these stacking factors:
.5 mil — .60 2 mils — .85
1 mil — .80 4-6 mils — .90

MECHANICAL TOLERANCES for C CORES

AS DEFINED BY EIA STANDARD FOR WOUND CUT CORES RS-217

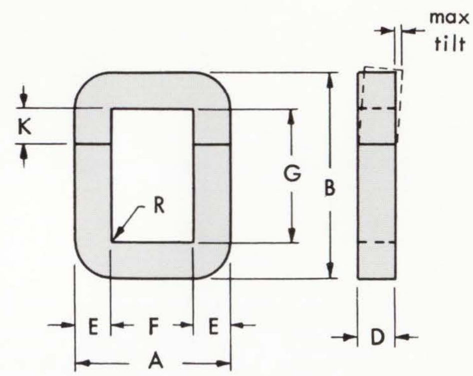
EXPLANATION OF TOLERANCES

Exterior dimensions A and B are held to maximum tolerance only to insure overall enclosure fit.

Dimensions D and E are held to ± tolerance to insure magnetic qualities under all applications.

Window dimensions F and G are held to a minimum tolerance only to insure coil fit.

Dimensions K and R are reference dimensions only.



HOW TO MEASURE

Dimension D is measured by caliper at any point on either core half.

Dimension E is measured at the butt joint.

Dimensions F and G are measured at the shortest point but at least twice the radius "R" from the edge of the window.

ALL DIMENSIONS ARE NOMINAL

A = F + 2E

B = G + 2E

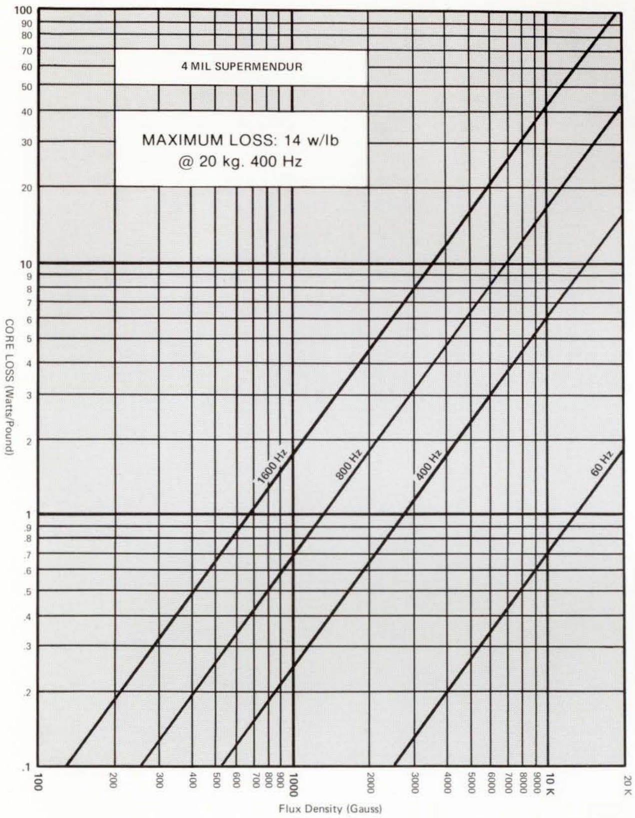
K = G/2 if G < 3-3/4
K = 1-11/16 if G ≧ 3-3/4

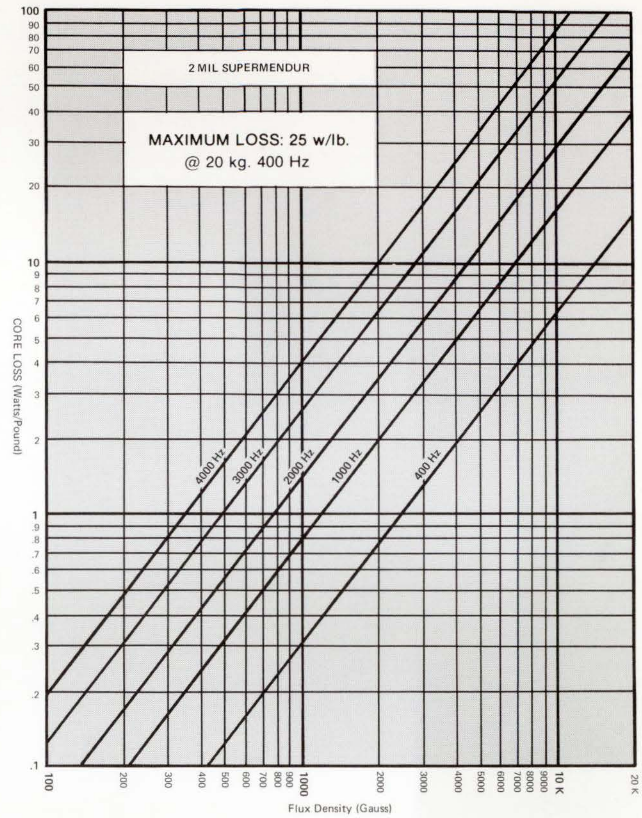
When F ≦ 2 and G ≦ 2
R = 1/32 for 1, 2 and 4 mil
R = 1/16 for 12 mil

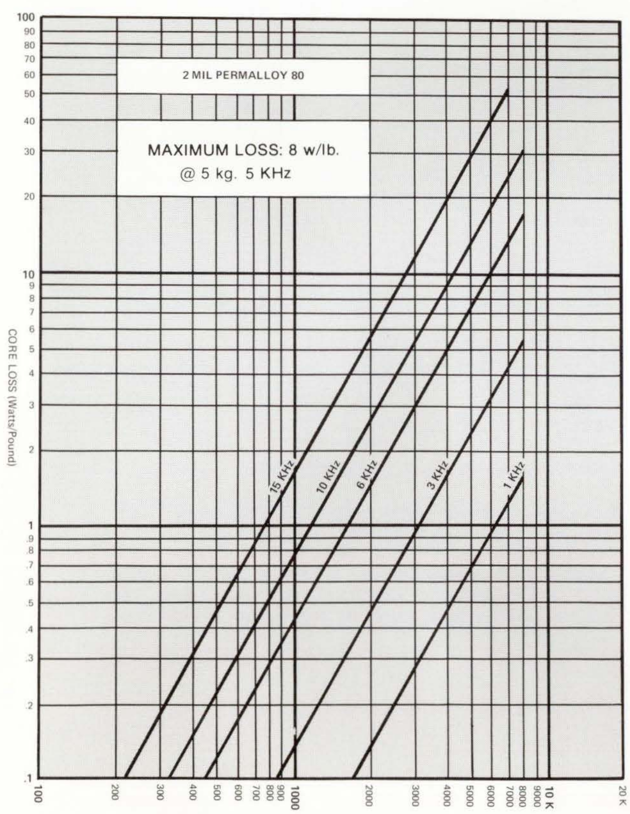
When F or G > 2 and F or G ≦ 5
R = 1/8 for 1, 2, 4 and 12 mil

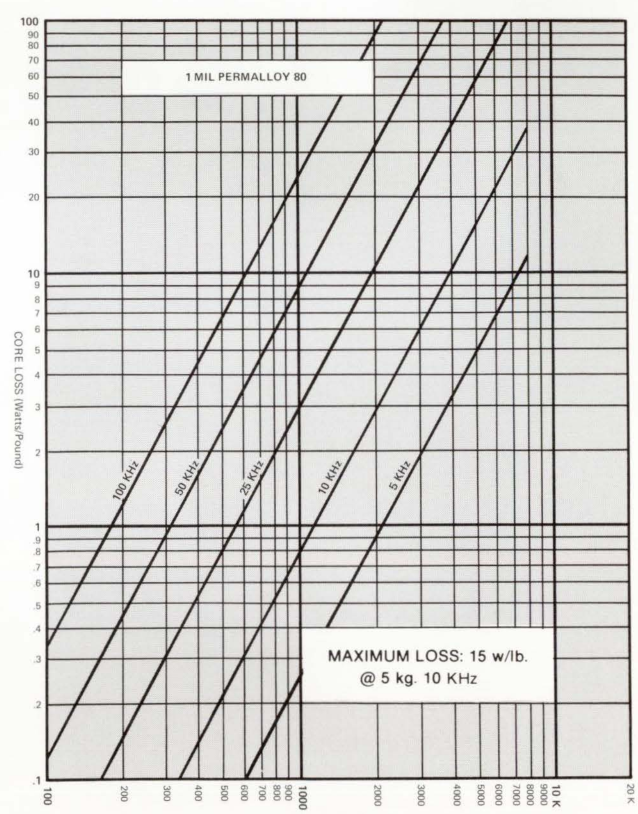
When F or G > 5
R = 5/32 for 1, 2, 4 and 12 mil

DIMENSION	ALLOWABLE TOLERANCES FINISHED CORES
A	+ 1/32 max when A ≦ 1-1/2 + 3/64 max when A > 1-1/2 ≦ 2-1/2 + 1/16 max when A > 2-1/2 ≦ 3-1/2 + 3/32 max when A > 3-1/2
B	+ 1/16 max when B ≦ 2 + 3/16 max when B > 2 ≦ 4 + 3/8 max when B > 4
D	+ 1/32 – 0 when D ≦ 1 + 3/64 – 0 when D > 1 ≦ 2-13/16 + 1/16 – 0 when D > 2-13/16 + 3/32 – 0 when E > 2-1/2
E	± 1/64 when E ≦ 1/4 + 1/32 – 1/64 when E > 1/4 ≦ 1 ± 1/32 when E > 1
F	– 1/64 minimum
G	– 1/64 minimum

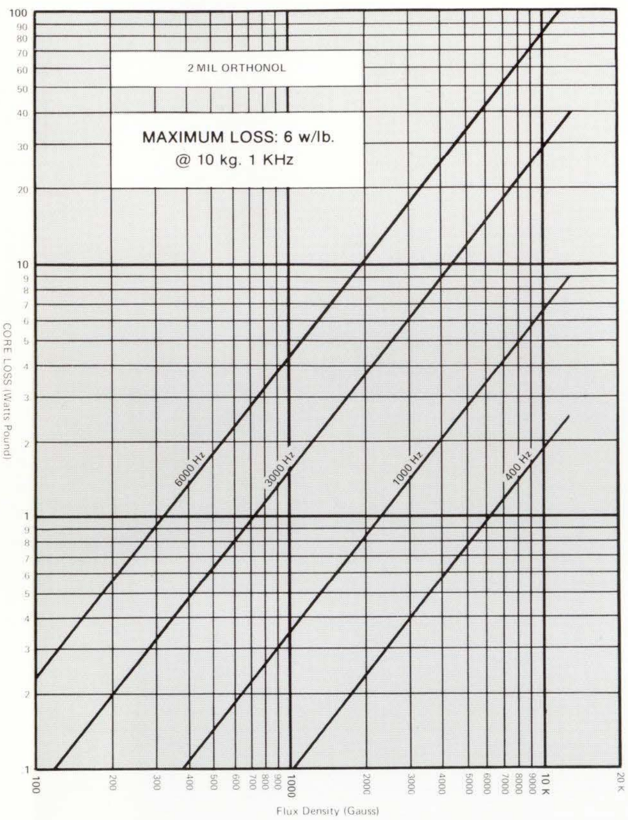

4 MIL SUPERMENDUR
MAXIMUM LOSS: 14 w/lb
@ 20 kg. 400 Hz
1600 Hz
800 Hz
400 Hz
60 Hz
CORE LOSS (Watts/Pound)
Flux Density (Gauss)

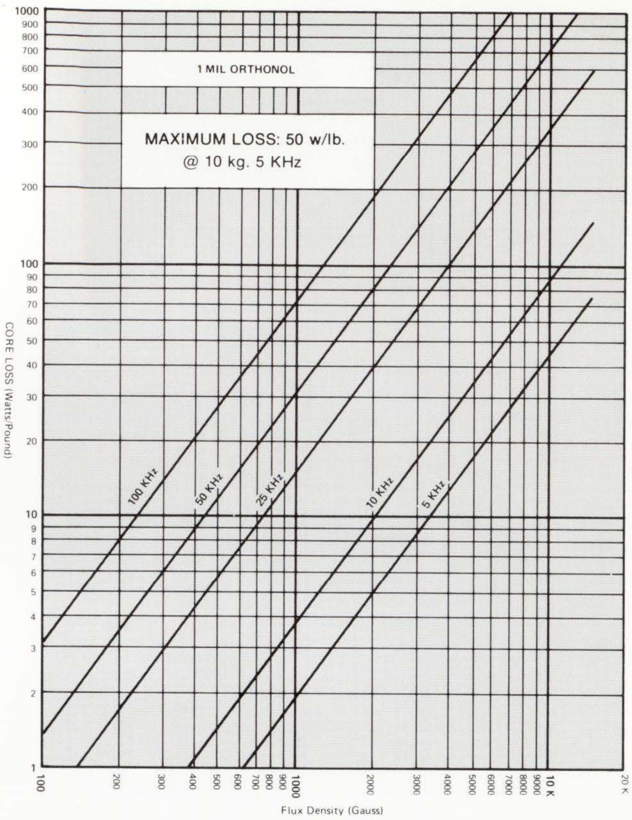

2 MIL SUPERMENDUR
MAXIMUM LOSS: 25 w/lb.
@ 20 kg. 400 Hz
4000 Hz
3000 Hz
2000 Hz
1000 Hz
400 Hz
CORE LOSS (Watts/Pound)
Flux Density (Gauss)


2 MIL PERMALLOY 80
MAXIMUM LOSS: 8 w/lb.
@ 5 kg. 5 KHz
15 KHz
10 KHz
6 KHz
3 KHz
1 KHz
CORE LOSS (Watts/Pound)
Flux Density (Gauss)


1 MIL PERMALLOY 80
100 KHz
50 KHz
25 KHz
10 KHz
5 KHz
MAXIMUM LOSS: 15 w/lb.
@ 5 kg. 10 KHz
CORE LOSS (Watts/Pound)
Flux Density (Gauss)

TYPICAL C CORE LOSS CURVES





HOW TO ORDER

Each core is coded by a part number that describes it in detail. Knowing the code will simplify purchasing. A typical number is:

MC 0006 – 2 D

- D — Material
- 2 — Thickness in mils
- 0006 — Size Description
- MC — Magnetics C Core

1. **MC is used for cut C Cores and ME for cut E Cores.**
2. **The size code is the four digit number listed on pages 6 to 10 for standard core sizes.**
3. **The letter codes for the various core materials are shown on pages 1 and 2.**

SPECIAL CORES

The core sizes in this catalog represent only a partial list of available items. For sizes not shown, please contact your nearest sales representative or the Sales Department of the Components Division of Magnetics.

Special cores of many types and configurations are manufactured on a custom basis. The following are capabilities within which these special parts can be produced.

RECTANGULAR CUT CORES

A) Tape thickness—.0005" to .014"
B) Tape Width—$\frac{1}{8}$" to 4"
C) Window Dimensions—$\frac{1}{8}$" x $\frac{1}{8}$" to 21" x 21"
D) Materials—all magnetic materials.
E) Cutting
   1. Single cut through parallel legs
   2. Multiple cuts through parallel legs
   3. Cuts at angles other than 90° to the plane of the core
F) Vacuum-impregnating—to 24" OD
G) Testing
   1. Exciting current and watt loss to 100 KHz—square or sine wave excitation—with or without DC bias.
   2. Test equipment available—CCFR, series & parallel bridge inductance, pulse permeability.

TOROIDAL CORES

A) OD—to 36"
B) Cutting wheels available—.008" to .062" thick
C) Smallest effective air gap after cutting and lapping—approx. .00025". Normal effective gap is .0005"
D) Spacer material for banding with controlled gap—.0002" and up
E) Multiple cuts to specific segment dimensions
F) Composite cores—D material core nested inside A material core

FERRITE SHAPES

A) Dimensions obtainable from pressed blocks ($\frac{1}{2}$" x 1" x $2\frac{1}{2}$")
B) U—I—E—toroids—thin plates
C) Diamond wheels available—.010" to .500" thick
D Tolerances ±.001" to ±.005" depending upon dimension and configuration

OTHER TYPES OF PARTS

A) Formed, annealed shapes
B) Milling machine capability for slotting tape cores
C) Laminated bars

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SAN FRANCISCO AREA
Regional Office
1777 Saratoga Ave.
San Jose, Calif. 95129
Phone: (408) 253-0591 TWX: 910-338-0046

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Permalloy Powder Cores • Ferrite Cores

Laminations • Custom Components

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Nickel Alloys • Silicon-Iron Alloys

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