MAGNETICS INC

Tape Wound Core Specialists

The MK Magnetics Team is a highly specialized group of tape wound core veterans. This team has been assembled to fill an industry need for high quality tape cores both, standard or highly customized.

- A modern 45,000 ft^2 facility located on 5 acres in a building specifically designed and built in 1990 for the manufacture of tape wound cores
- Equipment and processes tailored for superior product quality and productivity
- Highly skilled Engineering and Customer Service veterans for world-class support

A comprehensive line of products manufactured from a broad range of materials:

- Nanocrystalline, an exciting new high performance material
- 3% grain-oriented silicon steel materials (GOS)
- 50% & 80% nickel materials
- Amorphous materials
- Supermendur®, cobalt-iron high flux materials
- 6.5% non-oriented silicon steel materials
- Other specialized materials

Custom and standard core configurations:

- C-cores
- E-cores
- Uncased toroids including: epoxy coated, cut in half, gapped, etc.
- Cased toroids including: machined nylon, injection molded, aluminum, etc.
- Pie type 3-phase cores, D-cores, bars and other custom shapes
- Other special configurations available

Core sizes from small to very large, weights from .002 to 4000 lbs, sizes up to 7 ½’ tall & 3’ wide

We are **“The Tape Wound Core Specialists”**

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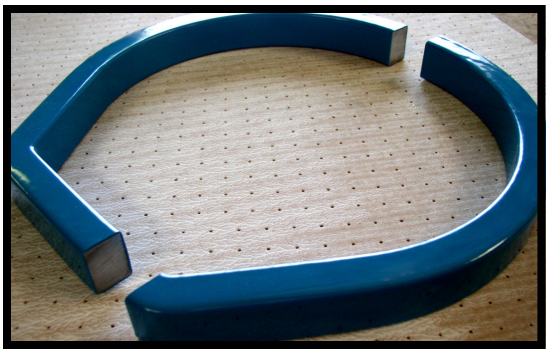
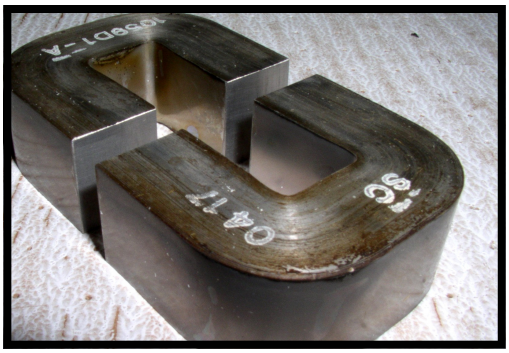
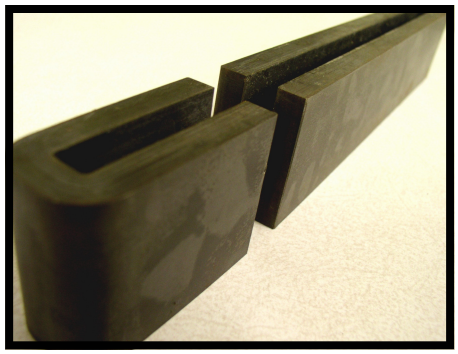


Unique Shapes & Cuts
Special Applications



High Quality Nickel Products
High Frequency Applications



Large G:F Ratio
Oil Exploration

17030 Muskrat Ave, Adelanto CA 92301 ph: 760-246-6373 800-605-9565 fax: 760-246-6378 www.mkmagnetics.com info@mkmagnetics.com

New Product Announcement

Optifficient Core Series

Ultra Low Loss Amorphous Cores Utilizing Metglas® 2605SA1 Mat'l

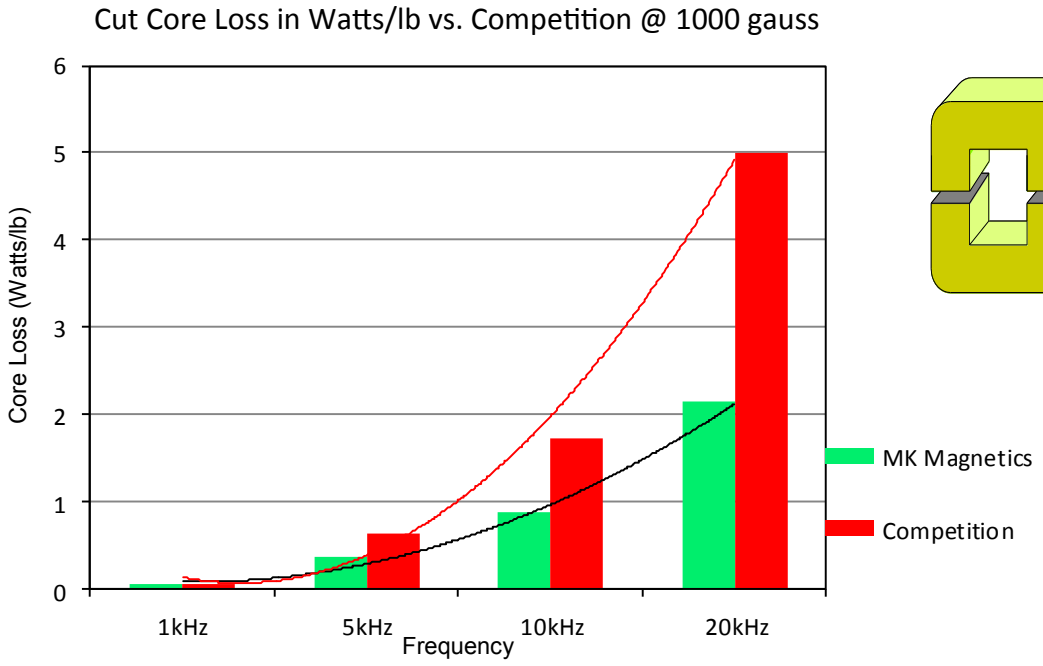
* **30%+ Lower Loss** than the Competition: MK Magnetics' uniquely processed cores: Optimized anneal, Higher interlaminar resistance, Superior bond = **Superior Performance**

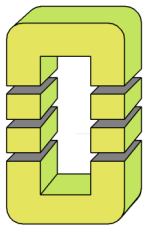
Ideal for Renewable Energy Applications: PV & Wind Power

* Optimized for Low Loss, High Frequency Gapped Filters: **Inverters & Converters**

Features

* Single & Multi-gapped C&E-Cores
* Single & Multi-gapped Toroids
* AMCC-size equivalents
* Custom shapes & sizes, to 1000's/lbs
* One-off to millions/year
* 4 week typical starting lead times
* Expedited Prototypes available
* Engineering design support





IS09001:2008 Registered

Release Date: 09/19/2011

DFARS, ITAR, RoHS, REACH

Manufactured in the USA

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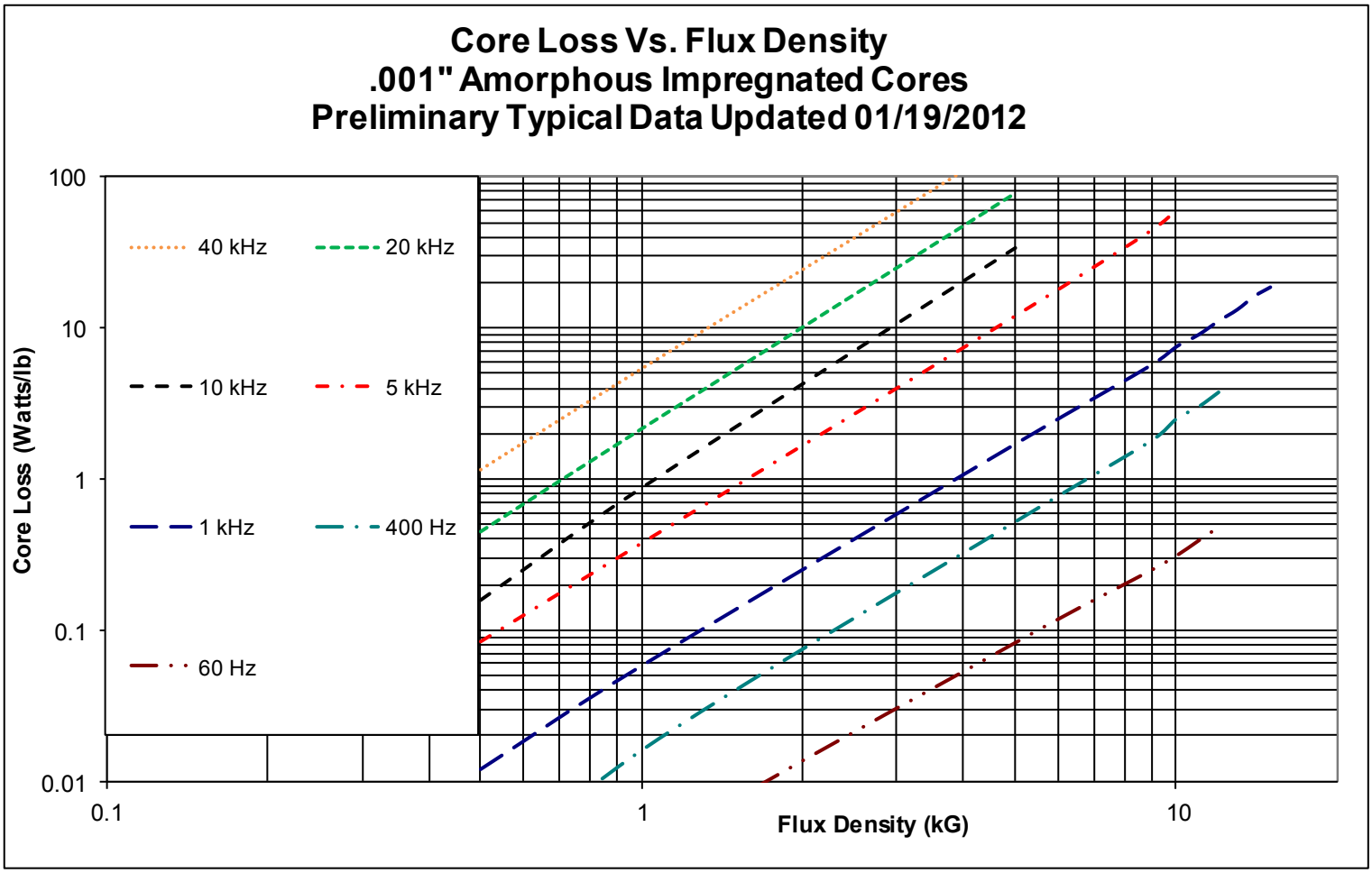

Release Date: 01/19/2012

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Metglas® is a registered trademark of Metglas Inc.

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Tape Wound Core Specialists

Metglas Inc. "AMCC" to MK Magnetics Inc. Part Number Cross Reference

Hitachi-Metglas	MK Magnetics	MK Magnetics	MK Magnetics Dimensioning (in.)				Hitachi-Metglas Dimensioning (mm)			
.001" 2605SA1 Metglas®	.001" 2605SA1 Metglas®	.0007" Nanocrys-talline	D (strip)	E (build)	F (window width)	G (window height)	d (strip)	a (build)	b (window width)	c (window height)
AMCC-4	SC2105L1	SC2105M1	0.590	0.354	0.394	1.291	15.0	9.0	10.0	32.8
AMCC-6.3	SC2043L1	SC2043M1	0.787	0.394	0.433	1.299	20.0	10.0	11.0	33.0
AMCC-8	SC2044L1	SC2044M1	0.787	0.433	0.512	1.181	20.0	11.0	13.0	30.0
AMCC-10	SC2045L1	SC2045M1	0.787	0.433	0.512	1.575	20.0	11.0	13.0	40.0
AMCC-16A	SC2047L1	SC2047M1	0.984	0.433	0.512	1.575	25.0	11.0	13.0	40.0
AMCC-16B	SC2048L1	SC2048M1	0.984	0.433	0.512	1.969	25.0	11.0	13.0	50.0
AMCC-20	SC2049L1	SC2049M1	1.181	0.433	0.512	1.969	30.0	11.0	13.0	50.0
AMCC-25	SC2051L1	SC2051M1	0.984	0.512	0.591	2.205	25.0	13.0	15.0	56.0
AMCC-32	SC2052L1	SC2052M1	1.181	0.512	0.591	2.205	30.0	13.0	15.0	56.0
AMCC-40	SC2053L1	SC2053M1	1.378	0.512	0.591	2.205	35.0	13.0	15.0	56.0
AMCC-50	SC2054L1	SC2054M1	0.984	0.630	0.787	2.756	25.0	16.0	20.0	70.0
AMCC-63	SC2055L1	SC2055M1	1.181	0.630	0.787	2.756	30.0	16.0	20.0	70.0
AMCC-80	SC2056L1	SC2056M1	1.575	0.630	0.787	2.756	40.0	16.0	20.0	70.0
AMCC-100	SC2057L1	SC2057M1	1.771	0.630	0.787	2.756	45.0	16.0	20.0	70.0
AMCC-125	SC2058L1	SC2058M1	1.378	0.748	0.984	3.268	35.0	19.0	25.0	83.0
AMCC-160	SC2059L1	SC2059M1	1.575	0.748	0.984	3.268	40.0	19.0	25.0	83.0
AMCC-200	SC2060L1	SC2060M1	1.969	0.748	0.984	3.268	50.0	19.0	25.0	83.0
AMCC-250	SC2061L1	SC2061M1	2.362	0.748	0.984	3.543	60.0	19.0	25.0	90.0
AMCC-320	SC2062L1	SC2062M1	1.969	0.866	1.378	3.346	50.0	22.0	35.0	85.0
AMCC-400	SC2063L1	SC2063M1	2.559	0.866	1.378	3.346	65.0	22.0	35.0	85.0
AMCC-500	SC2064L1	SC2064M1	2.165	0.984	1.575	3.346	55.0	25.0	40.0	85.0
AMCC-630	SC2065L1	SC2065M1	2.756	0.984	1.575	3.346	70.0	25.0	40.0	85.0
AMCC-800A	SC2066L1	SC2066M1	3.346	0.984	1.575	3.346	85.0	25.0	40.0	85.0
AMCC-800B	SC2067L1	SC2067M1	3.346	1.181	1.575	3.740	85.0	30.0	40.0	95.0
AMCC-1000	SC2068L1	SC2068M1	3.346	1.299	1.575	4.134	85.0	33.0	40.0	105.0

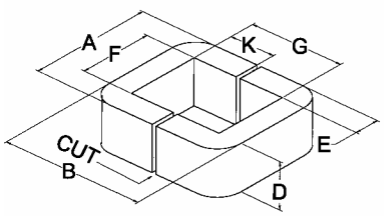
MK Magnetics Amorphous 2605SA1 & Nanocrystalline cut cores—a step above the rest:

- Superior bond strength resulting in: minimal core flaking, excellent core shape and appearance
- 180c continuous operating temperature
- Proprietary processes for increased interlaminar resistance for minimal high frequency losses (36watts/kg max @ 0.2 Tesla, 20kHz)
- Drop in replacement for Metglas Inc cores. Manufactured to meet or exceed Metglas Inc.'s standards.
- **Short lead times typically 4-5 weeks!**

Customizable To Meet Your Needs

- Available in c-cores, e-cores, toroids
- Custom shapes & sizes, from several grams to 1800kg+
- **Multiple cuts when airgap distribution is required**
- Tighter dimensional tolerances and magnetics when required
- Call for more details about these and other possibilities

MK Magnetics dimensional standard



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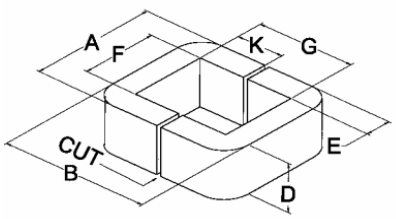
Metglas Inc. “AMCC” to MK Magnetics Inc. Dimensional Tolerances

Metglas Inc. 2605SA1®	MK Magnetics 2605SA1®	MK Magnetics Nanocrystalline	E	±	F	ref	G	ref	D	±	A	±	B	±
AMCC-4	SC2105L1	SC2105M1	9.0	0.5	10.0	-	32.8	-	15.0	0.5	28.0	1.5	50.8	1.3
AMCC-6.3	SC2043L1	SC2043M1	10.0	0.5	11.0	-	33.0	-	20.0	0.5	31.0	1.0	53.0	2.0
AMCC-8	SC2044L1	SC2044M1	11.0	0.8	13.0	-	30.0	-	20.0	0.5	35.0	1.0	52.0	2.0
AMCC-10	SC2045L1	SC2045M1	11.0	0.8	13.0	-	40.0	-	20.0	0.5	35.0	1.0	62.0	2.0
AMCC-16A	SC2047L1	SC2047M1	11.0	0.8	13.0	-	40.0	-	25.0	0.5	35.0	1.0	62.0	2.0
AMCC-16B	SC2048L1	SC2048M1	11.0	0.8	13.0	-	50.0	-	25.0	0.5	35.0	1.0	72.0	2.0
AMCC-20	SC2049L1	SC2049M1	11.0	0.8	13.0	-	50.0	-	30.0	0.5	35.0	1.0	72.0	2.0
AMCC-25	SC2051L1	SC2051M1	13.0	0.8	15.0	-	56.0	-	25.0	0.5	41.0	1.0	82.0	2.0
AMCC-32	SC2052L1	SC2052M1	13.0	0.8	15.0	-	56.0	-	30.0	0.5	41.0	1.0	82.0	2.0
AMCC-40	SC2053L1	SC2053M1	13.0	0.8	15.0	-	56.0	-	35.0	0.5	41.0	1.0	82.0	2.0
AMCC-50	SC2054L1	SC2054M1	16.0	1.0	20.0	-	70.0	-	25.0	0.5	52.0	1.0	102.0	3.0
AMCC-63	SC2055L1	SC2055M1	16.0	1.0	20.0	-	70.0	-	30.0	0.5	52.0	1.0	102.0	3.0
AMCC-80	SC2056L1	SC2056M1	16.0	1.0	20.0	-	70.0	-	40.0	1.0	52.0	1.0	102.0	3.0
AMCC-100	SC2057L1	SC2057M1	16.0	1.0	20.0	-	70.0	-	45.0	1.0	52.0	1.0	102.0	3.0
AMCC-125	SC2058L1	SC2058M1	19.0	1.0	25.0	-	83.0	-	35.0	1.0	63.0	1.0	121.0	3.0
AMCC-160	SC2059L1	SC2059M1	19.0	1.0	25.0	-	83.0	-	40.0	1.0	63.0	1.0	121.0	3.0
AMCC-200	SC2060L1	SC2060M1	19.0	1.0	25.0	-	83.0	-	50.0	1.0	63.0	1.0	121.0	3.0
AMCC-250	SC2061L1	SC2061M1	19.0	1.0	25.0	-	90.0	-	60.0	1.0	63.0	1.0	128.0	3.0
AMCC-320	SC2062L1	SC2062M1	22.0	1.0	35.0	-	85.0	-	50.0	1.0	79.0	1.0	129.0	4.0
AMCC-400	SC2063L1	SC2063M1	22.0	1.0	35.0	-	85.0	-	65.0	1.0	79.0	1.0	129.0	4.0
AMCC-500	SC2064L1	SC2064M1	25.0	1.0	40.0	-	85.0	-	55.0	1.0	90.0	1.0	135.0	4.0
AMCC-630	SC2065L1	SC2065M1	25.0	1.0	40.0	-	85.0	-	70.0	1.0	90.0	1.0	135.0	4.0
AMCC-800A	SC2066L1	SC2066M1	25.0	1.0	40.0	-	85.0	-	85.0	1.5	90.0	1.0	135.0	4.0
AMCC-800B	SC2067L1	SC2067M1	30.0	1.0	40.0	-	95.0	-	85.0	1.5	100.0	1.0	155.0	4.0
AMCC-1000	SC2068L1	SC2068M1	33.0	1.0	40.0	-	105.0	-	85.0	1.5	106.0	1.0	171.0	5.0

MK Magnetics dimensional standard



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MAGNETICS INC

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Core Magnetic Specifications

Material Specifications for C-Cores & Uncased Toroids

Material Description	Material Type Letter	Thickness (Inches)	Space Factor	Watts/lb	VA/lb	B (kG)	Freq (Hz)	Gap VA per inch^2 @ .001"
3% Silicon Steel Silectron®1	A	.001"	.83	12.0	20.3	12.5	400	16.3
	A&B	.002"	.89	10.0	15.0	15.0	400	29.2
	A	.004"	.90	10.0	13.1	15.0	400	29.9
	B&C	.004"	.90	15.0	39.5	17.6	400	41.1
	B	.007"	.92	15.0	39.5	17.6	400	43.0
	A	.009"	.95	0.89	1.7	15.0	60	5.0
	B&C	.009"	.95	0.89	1.5	17.6	60	6.9
	T	.011"	.95	0.89	1.7	15.0	60	5.0
	B&C	.011"	.95	0.89	1.5	17.6	60	6.9
	A	.012"	.95	0.89	1.7	15.0	60	5.0
80% Nickel-Iron Supermalloy®2	D	.0005"	.65	12.0	18.0	5.0	10,000	57.7
	D	.001"	.83	14.0	21.0	5.0	10,000	70.6
	D	.002"	.89	20.0	30.0	5.0	10,000	81.2
	D	.004"	.90	15.0	22.0	5.0	5000	41.5
50% Nickel-Iron Deltamax®3	G	.0005"	.65	30.0	40.0	10.0	5000	115.3
	G	.001"	.83	37.0	47.0	10.0	5000	141.2
	G	.002"	.89	55.0	70.0	10.0	5000	162.4
	G	.004"	.90	3.5	6.0	10.0	400	13.0
50% Cobalt-Iron Supermendur®4	J	.002"	.89	20.0	72.0	20.0	400	52.0
	J	.004"	.90	19.0	66.0	21.0	400	58.6
Metglas®5 2605SA1	L	.001"	.83	20.0	N/A	2.0	20,000	18.5
Nanocrystalline Finemet Finemet®6 FT3	M	.0007"	.83	5.5	N/A	2.0	20,000	18.5

B (kG) is flux density in kilogauss. Watts/lb & VA/lb are power loss and excitation VA when measured at the indicated flux (B) and frequency (Hz) under sine wave excitation. Gap VA for a 0.001" total air gap was calculated using the following formula: Gap VA = $4.1 \times 10^{-4} \times B^2 \times$ frequency (Hz) $\times SF^2 \times A_g$. Cores under 25lbs use 0.001" air gap and those in excess of 25lbs use 0.002" air gap. Total core watts = material watts/lb × core wgt in lbs. Total core excitation VA = material VA/lb × core wgt in lbs + gap VA. Note: Odd or small core geometry may impact performance.

Material Specifications for E-Cores

3% Silicon Steel Silectron®1	A	.004"	.90	12.0	22.7	15.0	400	51.8
	B&C	.004"	.90	18.0	68.4	17.6	400	71.0
	B	.007"	.92	18.0	68.4	17.6	400	74.0
	B&C	.009"	.95	1.1	4.0	17.6	60	11.9
	A	.012"	.95	1.1	2.9	15.0	60	8.7
	T	.011"	.95	1.1	2.9	15.0	60	8.7
	B&C	.011"	.95	1.1	4.0	17.6	60	11.9
50% Cobalt-Iron Supermendur®4	J	.004"	.90	22.0	120.0	21.0	400	101.0

Total 3-phase core excitation VA = material VA/lb × core wgt in lbs + gap VA. VA for a total air gap of 0.0015" was calculated with the following formula: Gap VA = $6.15 \times 10^{-4} \times B^2$ x frequency (Hz) $\times SF^2 \times A_g$. E-cores under 25 lbs use 0.0015" total air gap, E-cores over 25lbs use total air gap of 0.003". Total 3-phase core excitation VA = material VA/lb × core wgt in lbs + gap VA. Note: Odd or small core geometry may impact performance.

1. *Silectron*® is a registered trademark of Allegheny Ludlum Steel Corp. 2. *Supermalloy*® is the discontinued product name of Western Electric Co. 3. *Deltamax*® is the discontinued product name of Alleghney Ludlum Steel Corp. 4. *Supermendur*® is the discontinued product name of Carpenter Technology. 5. *Metglas*® is a registered trademark of Honeywell Metglas Solutions. 6. *Finemet*® is a registered trademark of Hitachi Metals Corp.

- **MK Magnetics will gladly test cores to your specific needs**

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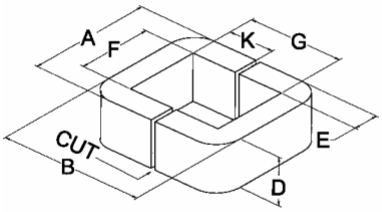
Core Mechanical Tolerances



C-Core

Customizable To Meet Your Needs

- Custom sizes
- Custom shapes
- Multiple cuts
- Special air gap cuts
- Tighter tolerances
- Low noise applications
- Diamond-lapped mating surfaces
- Special high temperature heat stabilization processes
- Special edge chamfering
- Epoxy coating
- Special stack resistance requirements
- Special part marking
- Custom assemblies
- Custom grinding & machining
- Small Planar-type geometries
- Call for more details about these and other possibilities

Mechanical Tolerances for Cut C-Cores, per EIA Standard RS-217

Core Dimension	Material Thickness (inches)	Allowable Tolerances (inches)
A = Outside Core Width	All	+0.031 max when A ≤ 1.500 +0.047 max when 1.500 < A ≤ 2.500 +0.062 max when 2.500 < A ≤ 3.500 +0.094 max when A > 3.500
B = Outside Core Height	0.0005, 0.001, 0.002	+0.062 max when B ≤ 2.000 +0.188 max when 2.000 < B ≤ 4.000 +0.375 max when B > 4.000
	0.004 through 0.014	+0.062 max when B < 3.000 +0.156 max when 3.000 ≤ B ≤ 4.000 +0.188 max when 4.000 < B ≤ 6.000 +0.375 max when 6.000 < B ≤ 12.000 +0.438 max when B > 12.000
D = Core Strip Width	All *	+0.031, -0 when D ≤ 1.000 +0.047, -0 when 1.000 < D ≤ 2.812 +0.062, -0 when D > 2.812 *+0.094, -0 when E > 2.500*
E = Core Leg Buildup	0.0005 through 0.004	±0.016 when E ≤ 0.250 +0.031, -0.016 when 0.250 < E ≤ 1.000 ±0.031 when E > 1.000
	0.007 through 0.014	±0.016 when E < 0.250 +0.031, -0.016 when 0.250 ≤ E < 0.562 ±0.031 when E ≥ 0.562
F = Inside Window Width	All	-0.016 minimum
G = Inside Window Width	All	-0.016 minimum
K = Cut Dimension	All	G÷2 if G < 3.750, ± 0.062 1.687 if G ≥ 3.750, ±0.062
R = Inside Window Corner Radius (Reference Only)	0.0005 through 0.004 0.007 through 0.014 All All	0.031 when F & G ≤ 2.000 0.062 when F & G ≤ 2.000 0.125 when F or G > 2.000 and F & G ≤ 5.000 0.156 when F > 5.000
Maximum Core Tilt	All	0.031 when B < 3.500 0.062 when B ≥ 3.500

A & B dimensions are held to a maximum tolerance only, negative tolerances are controlled by the F, G, & E dimensions. F & G dimensions are held to a minimum tolerance only, positive tolerances are controlled by the A, B & E dimensions.

* Nanocrystalline tolerance on the D dimension is ± the stated positive tolerance to accommodate material shrinkage during the annealing process. Other tolerances may be different depending on core geometry. Contact our engineering department for more details.

➢ **MK Magnetics will gladly manufacture cores to your specific dimensional and physical requirements such as: non-standard mechanical tolerances, multiple cuts, or diamond lapped for low excitation or low noise**

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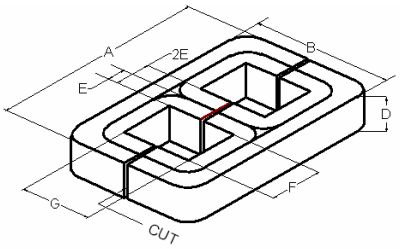
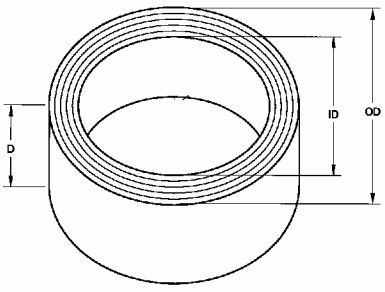
Core Tolerances Continued



E-Core

Customizable To Meet Your Needs

- Same as C-cores



Toroid

Customizable To Meet Your Needs

- Cut in half
- Diamond lapped if cut in half
- Epoxy coated
- Gapped to meet your inductance requirements
- Air gapped for Hall sensors
- Chamfered or radiused ID & OD
- Special stack resistance requirements
- Nylon & Aluminum cased
- Call for more details about these and other possibilities

Standard Mechanical Tolerances for Cut E-Cores

Core Dimension	Material Thickness (inches)	Allowable Tolerances (inches)
A = Outside Core Width	0.001 through 0.004	+0.094 max when A ≤ 5.000 +0.188 max when 5.000 < A ≤ 10.000 +0.312 max when A > 10.000
	0.007 through .014	+0.125 max when A ≤ 5.000 +0.250 max when 5.000 < A ≤ 10.000 +0.375 max when A > 10.000
B = Outside Core Height	0.001, 0.002, 0.004	+0.094 max when B ≤ 5.000 +0.156 max when 5.000 < B ≤ 10.000 +0.250 max when B > 10.000
	0.007 through 0.014	+0.125 max when B ≤ 5.000 +0.188 max when 5.000 < B ≤ 10.000 +0.312 max when B > 10.000
D = Core Strip Width	All	+0.031, -0 when D < 1.000 +0.047, -0 when 1.000 ≤ D < 2.000 +0.062, -0 when D ≥ 2.000 *+0.156, -0 when 2E > 2.000*
2E = Core Leg Buildup	All	±0.031 when 2E ≤ 1.000 +0.062, -0.031 when 1.000 < 2E ≤ 2.000 ±0.062 when 2E > 2.000
F = Inside Window Width	All	-0.016 minimum
G = Inside Window Height	All	-0.016 minimum
K = Cut Dimension	All	G ÷ 2.000, ± 0.062
R = Inside Window Corner Radius (Reference Only)	0.0005 through 0.004 0.007 through 0.014 All All	0.031 when F & G ≤ 2.000 0.062 when F & G ≤ 2.000 0.125 when F or G > 2.000 and F & G ≤ 5.000 0.156 when F > 5.000
Maximum Tilt	All	0.031 when F < 2.500 0.062 when F ≥ 2.500

A&B dimensions are held to a maximum tolerance only, negative tolerances are controlled by the F, G, & 2E dimensions. F&G dimensions are held to a minimum tolerance only, positive tolerances are controlled by the A, B & 2E dimensions.

Standard Mechanical Tolerances for Uncased Toroids

Core Dimension	Material Thickness (inches)	Allowable Tolerances (inches)
OD = Outside Core Width or Diameter	All	+0.031, -0.016 when OD ≤ 1.500 ±0.031 when 1.500 < OD ≤ 2.500 +0.062, -0.031 when 2.500 < OD ≤ 3.500 ±0.062 when 3.500 < OD ≤ 12.000 +0.125, -0.062 when 12.000 < OD ≤ 24.000 ±0.125 when OD > 24.000
ID = Inside Core Width or Diameter	All	±0.016 when ID ≤ 2.500 +0.031, -0.016 when 2.500 < ID ≤ 3.500 ±0.031 when 3.500 < ID ≤ 12.000 +0.062, -0.031 when 12.000 < ID ≤ 24.000 ±0.062 when ID > 24.000
D = Core Strip Width	All	+0.031, -0 when D ≤ 1.000 +0.047, -0 when 1.000 < D ≤ 2.812 +0.062, -0 when D > 2.812
E = Core Buildup	All	±0.016 when E ≤ 0.250 +0.031, -0.016 when 0.250 < E ≤ 1.000 ±0.031 when E > 1.000

For unimpregnated cores, measurements will be made with core shaped into the most favorable position because these cores are often flexible.

For epoxy coated (cased or encapsulated) cores add .0040" to the maximum "OD" and "D" dimensions, subtract 0.040" from the minimum "ID" dimension. "E" dimension tolerance applies before coating only.

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MAGNETICS INC

Tape Wound Core Specialists

Nanocrystalline
A Special Product Announcement

Nanocrystalline soft magnetic material is a fairly new development. The material composition is 82% iron with the remaining balance silicon, boron, niobium, copper, carbon, molybdenum, and nickel. The raw material is manufactured and supplied in an amorphous state. It is recrystalized into a precise mix of amorphous and Nanocrystalline phases when annealed, giving the material it's unique magnetic properties.

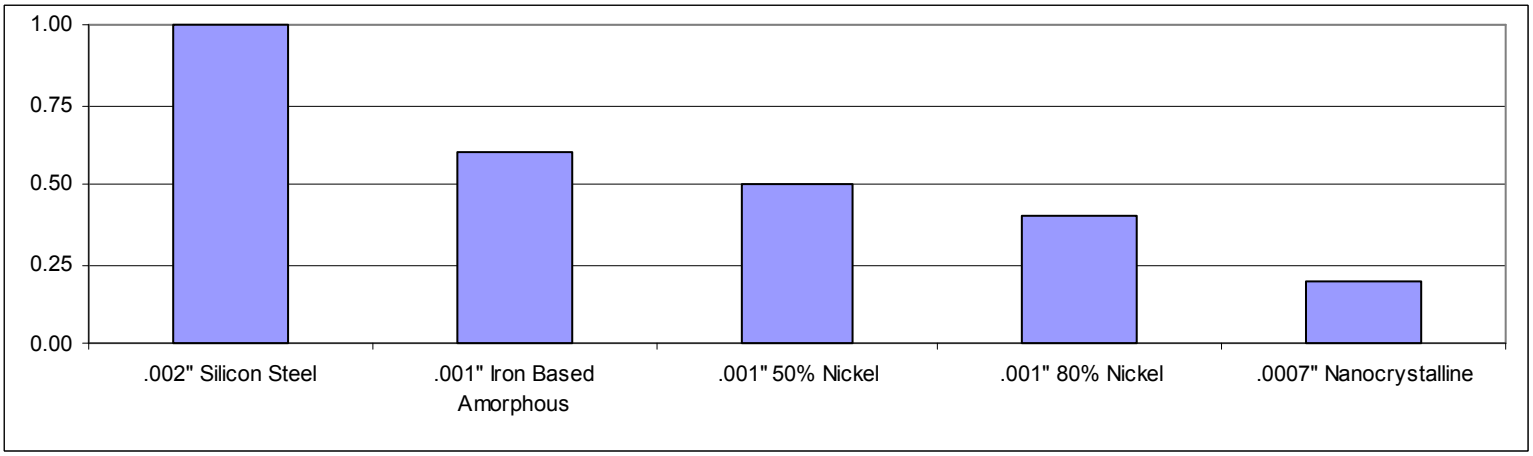
Why use Nanocrystalline material in your tape core applications?

- Typically 1/3rd the core loss of .001" 80% Nickel (Supermalloy®) cut cores, 1/6th for toroids
- Typically 1/5th the core loss of .001" 50% Nickel (Deltamax®) cut cores, 1/10th for toroids
- Typically 1/10th the core loss of .001" iron based Amorphous cut cores, 1/12th for toroids
- Typical initial permeability in excess of 60,000 @ 40 gauss, 100Hz for cased toroids, greater than .001" 80% Nickel material (Supermalloy®)
- 12,300 gauss saturation flux density
- Approximately zero ppm magnetostriction at up to 130ºC operating temperature making it stress insensitive and low noise
- High curie temperature of approximately 570ºC
- Minimal change in magnetic performance over the operating range of -50ºC to +130ºC, max 200ºC
- High value substitution of nickel based (Supermalloy®) and iron based amorphous materials
- Size reduction potential when substituting for higher loss materials
- Ferrite substitution when flux density, temperature, and shock problems are present
- 7.3 grams/cc density, 17% lighter than 80% nickel reducing effective loss per unit of volume even lower
- Typical stacking densities greater than 83%

Cores manufactured out of Nanocrystalline material, in most cases are a drop in replacement for cores manufactured or designed out of .001" & .002" 80% nickel (Supermalloy®) materials, and can be higher performing. **They may also be an ideal substitute for larger ferrite cores**, when the application is in the lower frequency range for ferrites, and when flux density and performance over a wide temperature range is a must or has been a problem.

There appears to be no limitation to the types of cores that can be manufactured from Nanocrystalline material. C-cores, E-cores, Uncased Toroids, Cased Toroids, Multiple cuts, Gapped Toroids, etc.

Potential Core Weight Reductions When Operating at 2000 Gauss, 20,000 Hz



This material has the best overall performance over a broad range of frequencies when compared to other available materials, including .001" 80% nickel (Supermalloy®). It's relatively high saturation flux density, combined with its incredible low loss and high permeability through a wide frequency range, makes it useful in many applications such as, but not limited to:

- High frequency or broadband transformers
- Broadband current sensors
- High frequency filter chokes (inductors)
- Pulse transformers

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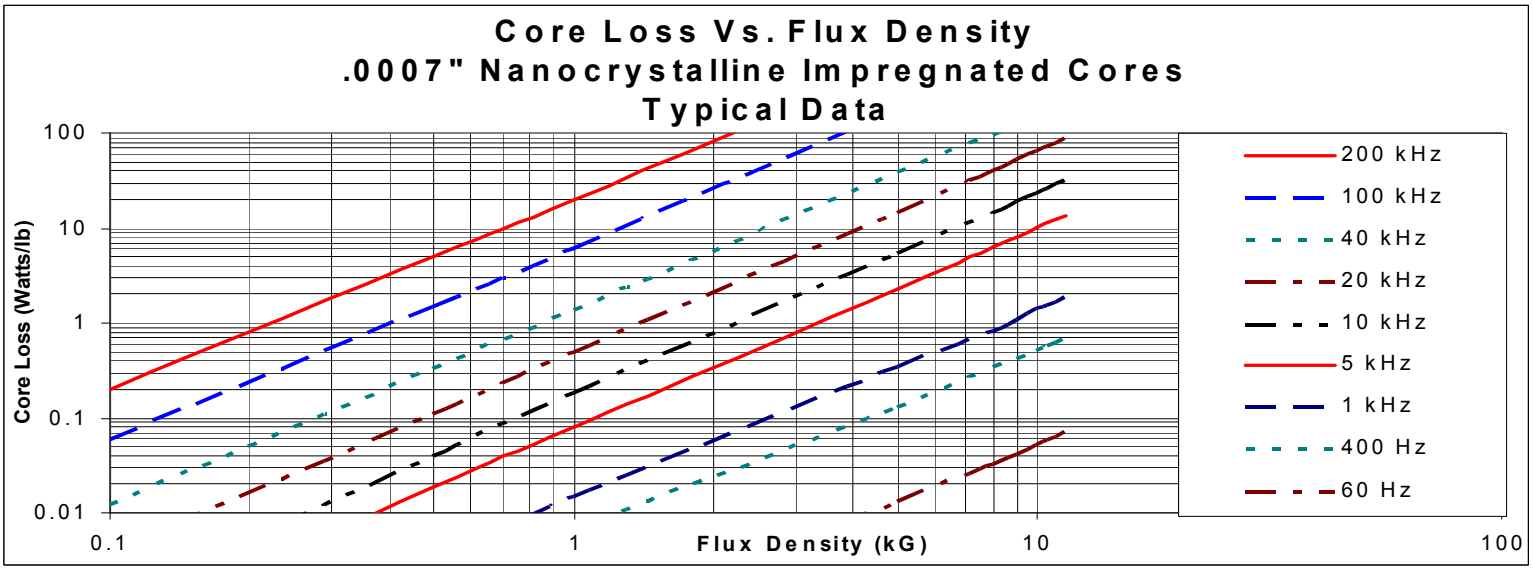
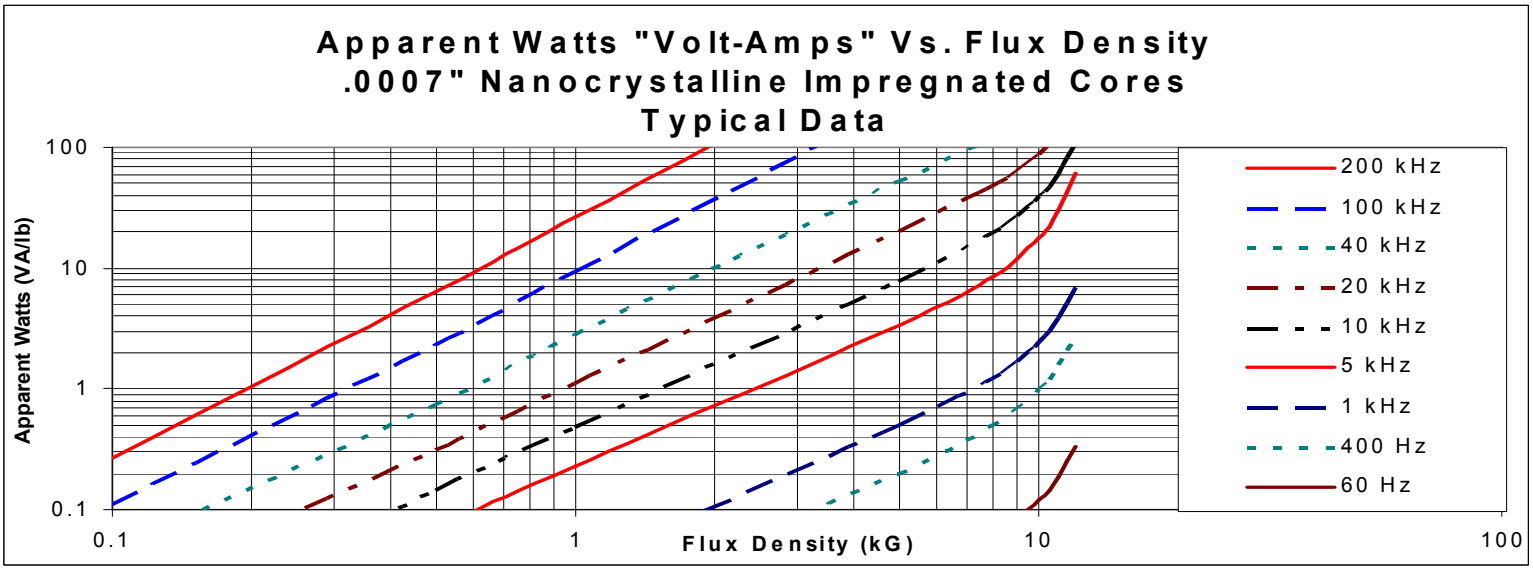
MAGNETICS INC

Tape Wound Core Specialists

Nanocrystalline Characteristic Curves





The following are some guidelines to follow when ordering Nanocrystalline cores

- Cores up to 6.0 feet by 6.0 feet, strip widths from 0.125" to 24.0", core weights from 0.002 lbs to 4000 lbs plus
- Cores ordered with strip widths of 25mm, 30mm, 45mm eliminate the need for slitting, as the material is supplied in these standard sizes from our supplier. Cores ordered from these sizes cost less because there is no slitting process involved or slitting scrap. Core strip widths can be manufactured as narrow as 0.125".
- Virtually no limit on maximum strip width with stacked assemblies . Cores can be supplied as an assembly of multiple cores stacked and bonded together to meet your wide width needs. Stacked cores actually perform better, since the voltage per lamination supported is divided by the number of cores stacked together.
- Tolerance on the "D" is ± due to the approximate 1% shrinkage factor that occurs during annealing.
- Cores can be ordered with a very thin layer of epoxy, encapsulating the core to help improve handling and to minimize sloughing of outer core layer, which may be important in high voltage or oil filled applications.

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MAGNETICS INC

MK Magnetics Part Numbering System

MK Magnetics	Core Type	Case Type	Core Size	Material	Thickness	Loop Type	Customer Specific
S	X	X	XXXX	X	X	X	- X

C-Core Part Number Example

Example: **SC1000M1**, "**S**" = MK Magnetics, "**C**" = C-core, **no** "**Case Type**" call out means no case or epoxy coating, "**1000**" = part size, "**M**" = Nanocrystalline, "**1**" = .001" thick material, **no** "**Loop Type**" (BH loop) call out immediately after material thickness means standard loop, not ending with a "**dash**" & "**Customer Specific**" call out means it is a standard part number

SC1000M1F, Same as above, but with non-standard "**Loop Type**" letter indicator when needed, "**F**" = flat loop

SCX1000M1F, Same as above, but with "**Case Type**" letter indicator when needed, "**X**" = epoxy coated

SC1000M1F-A, Same as above but with non-standard "**Customer Specific**" letter indicator when needed, "**A**" = customer specific part number, this letter indexes for each customer ordering this same part with a special requirement

E-Core & T-Core Part Number Example

Same as C-core, but "Core Type" becomes an "**E**" for E-core and "**T**" for toroid

Core Type Indicator		Description	Core Dimensional Parameters			
C	=	C-core	D	E	F	G
E	=	E-core	D	2E	F	G
T	=	Toroid	D	ID	OD	
P	=	Pie/Circular core	D	IR	OR	
D	=	D-core	D	E	OR	
B	=	Bar	D	E	L	

Core Material Type Indicators

A	=	Standard Grade, 3% grain-oriented silicon steel, .001", .002", .004", .009" M3, .012" M5
B	=	Z-Type, High Flux Grade, 3% grain-oriented silicon steel, .002", .004", .007" M2, .009" & .011" Tran-Core-H
C	=	Premium-Z-Type, Super Oriented High Flux Grade, 3% grain-oriented silicon steel, .004", .009", .011"
D	=	Supermalloy, 80% Nickel, Molybdenum 5.0%-6.0%, Balance Iron, .0005", .001", .002", .004"
E	=	Permalloy-80, 80% Nickel, Molybdenum 4.0%-5.0%, Balance Iron, .0005", .001", .002", .004"
F	=	Square Permalloy-80, 80% Nickel, Molybdenum 4.0%-5.0%, Balance Iron, .0005", .001", .002", .004"
G	=	Square 50% Nickel, 50% Nickel, Balance Iron, .0005", .001", .002", .004"
H	=	Round 50% Nickel 4750 alloy, Transformer Grade, 50% Nickel, Balance Iron, .001", .002", .004"
J	=	Supermendur®, 49% Cobalt, 49% Iron, 2% Vanadium, .002", .004", round, square loop
K	=	2V-Permendur, 49% Cobalt, Balance Iron, Special order
L	=	Amorphous Metglas® 2605SA1, .001", round, square, flat, transverse loop
M	=	Nanocrystalline, Finemet® FT3,.0007", round, square, transverse loop
N	=	High Purity Iron, ultra low carbon, .003"
P	=	NKK 6.5% non-oriented silicon steel, .002", .004"
R	=	Non-oriented 3% silicon steel, .005", .007"
S	=	M19, 3% non-oriented silicon steel, .014"
T	=	M4, 3% grain-oriented silicon steel, .011"

Thickness Indicator

.0004"-.0006"	=	5
.0007"-.001"	=	1
.002"	=	2
.004"	=	4
.007"	=	7
.009"	=	9
.011"	=	A
.012"	=	B
.014"	=	C

Special Hysteresis Loop Type Modifiers

F	=	Flat Loop Anneal
R	=	Round Loop Anneal
S	=	Square Loop Anneal
T	=	Transverse Loop Anneal

Case Type Indicator For Cased Toroids

A	=	Machined nylon, silicone grease damped, unsealed
B	=	Glass filled injection molded nylon, silicone grease damped, unsealed
C	=	Phenolic case, customer specified damping, unsealed
D	=	Aluminum epoxy coated, silicone rubber damped, sealed
E	=	Anodized aluminum, silicone rubber damped, unsealed
F	=	Customer supplied case, customer specified damping
X	=	Epoxy fluidize coated

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