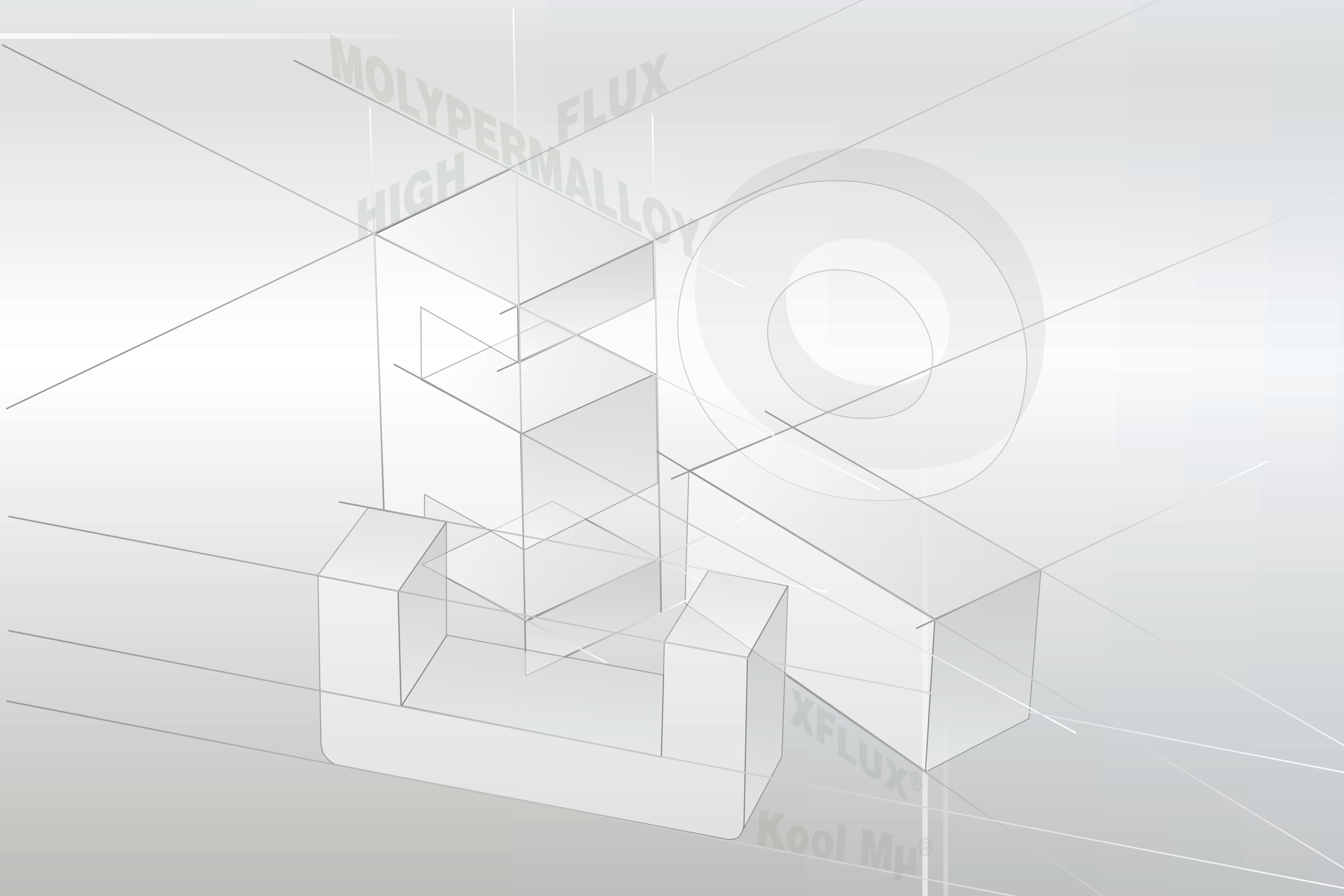
MAGNETICS®

POWDER CORES

Molypermalloy | High Flux | Kool Mμ® | XFlux®



We offer the confidence of over fifty years of expertise in the research, design, manufacture and support of high quality magnetic materials and components.

A major manufacturer of the highest performance materials in the industry including: MPP, High Flux, Kool Mµ®, XFLUX®, power ferrites, high permeability ferrites and strip wound cores, Magnetics' products set the standard for providing consistent and reliable electrical properties for a comprehensive range of core materials and geometries. Magnetics is the best choice for a variety of applications ranging from simple chokes and transformers used in telecommunications equipment to sophisticated devices for aerospace electronics.

Magnetics backs it products with unsurpassed technical expertise and customer service. Magnetics' Sales Engineers offer the experience necessary to assist the designer from the initial design phase through prototype approval. Knowledgeable Sales Managers provide dedicated account management. Skilled Customer Service Representatives are easily accessible to provide exceptional sales support. This support, combined with a global presence via a worldwide distribution network, including a Hong Kong distribution center, makes Magnetics a superior supplier to the international electronics industry.

Contents

Click on a page number to go directly to the page

Core Locator & Unit Pack Quantity

MPP Toroids

P/N	PAGE	QTY
55014	57	10,000
55015	57	10,000
55016	57	10,000
55017	57	10,000
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55586	74	300
55587	74	300
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55715	79	90
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55927	72	400
55928	72	400
55929	72	400
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55932	72	400
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MAGNETICS®

Core Locator & Unit Pack Quantity

High Flux Toroids

P/N	PAGE	QTY
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58021	57	10,000
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58076	75	220
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58089	77	120
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58091	77	120
58092	77	120
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P/N	PAGE	QTY
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58928	72	400
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58930	72	400
58932	72	400
58933	72	400

Core Locator & Unit Pack Quantity

Kool Mμ® Toroids

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77031	61	10,000
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77083	76	180
77089	77	120
77090	77	120
77091	77	120
77093	77	120
77094	77	120
77095	77	120
77098	86	25
77099	86	25
77100	86	25
77102	86	25
77109	80	90
77110	80	90
77111	80	90
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77121	67	2,000
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77193	81	80
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77410	60	10,000
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77414	60	10,000
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77444	54	7,500
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77844	64	8,000
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77847	69	1,600
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77908	85	40
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77930	72	400
77932	72	400
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77935	72	400
77936	72	400

Core Locator & Unit Pack Quantity

XFlux® Toroids

P/N	PAGE	QTY
78051	66	5,000
78052	66	5,000
78059	70	1,000
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78076	75	220
78083	76	180
78090	77	120
78091	77	120
78110	80	90
78111	80	90
78121	67	2,000
78122	67	2,000

P/N	PAGE	QTY
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78192	81	80
78208	69	1,600
78256	76	180
78312	70	1,000
78326	75	220
78351	71	720
78352	71	720
78381	68	2,000
78382	68	2,000
78439	78	105
78440	78	105

P/N	PAGE	QTY
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78586	74	300
78587	74	300
78716	79	90
78717	79	90
78848	69	1,600
78867	84	45
78894	72	400
78907	85	40
78932	72	400

Kool Mµ® E Cores, U Cores and Blocks

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K2510E	89	1728
K3007E	89	840
K3112U	91	672
K3515E	89	840
K4017E	89	288
K4020E	89	192
K4022E	89	168
K4110U	91	720
K4111U	91	480
K4119U	91	240
K4317E	89	270

P/N	PAGE	QTY
K4741B	90	48
K5030B	90	64
K5527U	91	128
K5528B	90	64
K5528E	89	112
K5529U	91	96
K5530E	89	96
K6030B	90	80
K6527E	89	54
K6527U	91	54
K6533U	91	54
K7030B	90	60

P/N	PAGE	QTY
K7228E	89	60
K7236U	91	60
K8020E	89	63
K8020U	91	63
K8024E	89	45
K8030B	90	48
K8038U	91	63
K8044E	89	63
K114LE	89	18
K130LE	89	12
K160LE	89	16

Introduction

Magnetics Molypermalloy Powder (MPP) cores are distributed air gap toroidal cores made from a 81% nickel, 17% iron, and 2% molybdenum alloy powder for the lowest core losses of any powder core material. MPP cores (and all powder cores) exhibit soft saturation, which is a significant design advantage compared with gapped ferrites. Also, unlike ferrites, the MPP saturation curve does not need to be derated with increasing device temperature.

MPP cores possess many outstanding magnetic characteristics, such as high resistivity, low hysteresis and eddy current losses, excellent inductance stability after high DC magnetization or under high DC bias conditions and minimal inductance shift under high AC excitation.

MPP THINZ®, or washer cores, put the premium performance of Magnetics' superior MPP material into robust, low height toroid form, for low profile inductors. With MPP THINZ, exact permeability and height are easily adjusted to result in the optimum design for each application.

Magnetics High Flux powder cores are distributed air gap toroidal cores made from a 50% nickel - 50% iron alloy powder for the highest biasing capability of any powder core material. High Flux cores have advantages that result in superior performance in certain applications involving high power, high DC bias, or high AC excitation amplitude. The High Flux alloy has saturation flux density that is twice that of MPP alloy, and three times or more than that of ferrite. As a consequence, High Flux cores can support significantly more DC Bias current or AC flux density.

High Flux offers much lower core losses and superior DC bias compared with powdered iron cores. High Flux cores offer lower core losses and similar DC bias compared with XFLUX cores.

Frequently, High Flux allows the designer to reduce the size of an inductive component compared with MPP, powdered iron, or ferrite.

All Magnetics Kool Mµ®, XFLUX®, MPP and High Flux are true high temperature materials, with no thermal aging.

Magnetics Kool Mµ® powder cores are distributed air gap cores made from a ferrous alloy powder for low losses at elevated frequencies. The near zero magnetostriction alloy makes Kool Mµ ideal for eliminating audible frequency noise in filter inductors. In high frequency applications, core losses of powdered iron, for instance, can be a major factor in contributing to undesirable temperature rises. Kool Mµ cores are superior because their losses are significantly less, resulting in lower temperature rises. Kool Mµ cores generally offer a reduction in core size, or an improvement in efficiency, compared with powdered iron cores.

Inductors built with Kool Mµ cores do not have several of the disadvantages that are inherent with gapped ferrite cores:

1. Ferrite saturation flux density is 0.5T or less, which is less than half of the flux density of Kool Mµ alloy. This results in much less energy storage possible in the same volume with ferrite.
2. Moreover, saturation flux density in ferrites is reduced significantly at elevated temperatures, but in Kool Mµ it is not.
3. Ferrites exhibit sharp saturation, and thus risk complete collapse of inductance above a certain safe current level. Kool Mµ's saturation is soft, allowing for safe design to much higher currents.
4. Fringing losses at the discrete air gap in a ferrite inductor can be disastrous, a problem that is completely absent with Kool Mµ.

Kool Mµ is available in a variety of core types, for maximum flexibility. Toroids offer compact size and self-shielding. E cores and U cores afford lower cost of winding, use of foil inductors, and ease of fixturing. Very large cores and structures are available to support very high current applications. These include toroids up to 102 mm, 133 mm and 165 mm; jumbo E cores; U cores; stacked shapes; and blocks.

Magnetics XFLUX® distributed air gap cores are made from 6.5% silicon iron powder. XFLUX offers lower losses than powdered iron cores and superior DC bias performance. The soft saturation of XFLUX material offers an advantage over ferrite cores. XFLUX cores are ideal for low and medium frequency chokes where inductance at peak load is critical.

Magnetics is committed to meeting global environmental standards and initiatives. Magnetics' REACH and RoHS compliance statements and reports are available on our website: www.mag-inc.com

Applications

Magnetics powder cores are most commonly used in power inductor applications, specifically in switch-mode power supply (SMPS) filter inductors, also known as DC inductors or chokes. Other power applications include differential inductors, boost inductors, buck inductors and flyback transformers.

While all four materials are used in these applications, each has its own advantages. For the lowest loss inductor, MPP material should be used since it has the lowest core loss. For the smallest package size in a DC bias dominated design, High Flux material should be used since it has the highest flux capacity. XFLUX® can be a lower cost alternative to High Flux, in situations where the higher core losses and more limited permeability availability of XFLUX is acceptable.

The unique advantages of Magnetics' powder cores are used in a variety of other applications, including: High Q filters, high reliability inductors and filters, high temperature inductors and filters, high current CTs, telecom filters, and load coils.

	MPP	High Flux	Kool Mµ®	XFLUX®
Permeability	14-550	14-160	26-125	26-60
Core Loss	Lowest	Moderate	Low	High
Perm vs. DC Bias	Better	Best	Good	Best
Temperature Stability	Best	Very Good	Very Good	Good
Temperature Rating	200°C continuous	200°C continuous	200°C continuous	200°C continuous
Saturation Characteristic	Soft	Soft	Soft	Soft
Nickel Content	81%	50%	0%	0%
Relative Cost	High	Medium	Low	Low

A lower cost family of alternative products to Magnetics' four premium powder core materials are powdered irons. Manufacturers of powdered iron use a different production process. For comparison with the above table, powdered irons have permeabilities from 10 -100; highest core loss; good perm vs. DC bias; fair temperature stability; lower temperature ratings; soft saturation; 0% nickel content; lowest relative cost.

Kool Mµ and powdered iron cores have comparable DC Bias performance. The advantages of Kool Mµ compared with powdered iron include (1) lower core losses; (2) no thermal aging, since Kool Mµ is manufactured without the use of organic binders; (3) near zero magnetostriction, which means that Kool Mµ can be useful for addressing audible noise problems; and (4) better stability of permeability vs. AC flux density.

Core Identification

All Magnetics powder cores have unique part numbers that provide important information about the characteristics of the cores. A description of each type of part number is provided below.

TOROIDS

C 0 5 5 2 0 6 A 2

Core Finish Code	Voltage Breakdown	Material Availability	OD Size Availability
A2	2,000 V_{AC} min	MPP, High Flux	All
A7	2,000 V_{AC} min	Kool Mμ®, XFLUX®	All
AY	600 V_{AC} min	All	3.56 - 16.5 mm
A5	2,000 V_{AC} min	All	6.35 - 23.6 mm
A9	8,000 V_{AC} min	All	>4.65 mm

Catalog Number (designates size and permeability)

Material Code . . . . 55 = MPP
58 = High Flux
77 = Kool Mμ
78 = XFLUX

Grading Code . . . . . CO = Graded into 2% inductance bands – OD <4.65 mm, 5% bands
00 = Not graded

- No voltage breakdown min for A2 or A7 with OD ≤ 4.65mm
- A2 and A7 voltage breakdown is 1000 V_{AC} with 4.65mm < OD < 26.9mm
- AY finish not available for 550μ MPP
- All values wire to wire

Powder Core Toroid Stamping Summary						
Size (OD mm)	6-digit Shop Order Number	2-digit Material Code	3-digit Catalog Number	2-digit Core Finish Code	Inductance Code	Stamping Example
6.35 - 6.86	✔		✔		✔	123456 020 +6
7.87 - 12.7	✔		✔	✔	✔	123456 050A2 +6
> 12.7	✔	✔	✔	✔	✔	123456 55120A2 +6

- Inductance Code is only stamped on MPP toroids with CO Grading Code
- Cores with OD < 6.35 mm are not stamped
- Shop order number identifies the product batch, ensuring traceability of every core through the entire manufacturing process, back to raw materials

E CORES and THINZ

00K5528E060

Permeability Code ... Permeability, e.g. 060 for 60μ

Shape Code . . . . . . E = E Core
T = Toroid
U = U Core
P = I Core/Plate
B = Block

Size Code . . . . First two digits equal approximate length or OD in mm / Last two digits equal approximate height or ID in mm

Material Code . . . . . K = Kool Mμ
M = MPP*
H = High Flux*
X = XFLUX*
*consult factory

Grading Code . . . . . 00 = Not graded
- Full part number and shop order number are stamped on all shapes

LARGE E CORES

00K130LE026

Permeability Code . . Permeability, e.g. 026 for 26μ

Shape Code . . . . . . LE = Large E Core

Size Code

Material Code . . . . . M = MPP
H = High Flux
K = Kool Mμ

Grading Code . . . . . 00 = Not graded

MAGNETICS®

Inductance and Grading

Measured vs. Calculated Inductance

A_L (Inductance factor) is given for each core in this catalog. Inductance for blocks is tested in standard picture frame arrangements. Units for A_L are nH/T². A_L is related to nominal calculated inductance (L_N, in µH) by the number of turns, N.

$$L_N = A_L N^2 10^{-3}$$

Magnetics' inductance standards are measured in a Kelsall Permeameter Cup. Actual wound inductance measured outside a Kelsall Cup is greater than the nominal calculated value due to leakage flux and flux developed by the current in the winding. The difference depends on many variables; core size, permeability, core coating thickness, wire size and number of turns, in addition to the way in which the windings are put on the core. The difference is negligible for permeabilities above 125 and turns greater than 500. However, the lower the permeability and/or number of turns, the more pronounced this deviation becomes.

Example : C055930A2 (26.9 mm, 125µ, p. 72)

Number of Turns	Calculated Inductance	Measured Inductance
1,000	157 mH	+0.0%
500	39.3 mH	+0.5%
300	14.1 mH	+1%
100	1.57 mH	+3%
50	393 µH	+5%
25	98.1 µH	+9%

The following formula can be used to approximate the leakage flux to add to the expected inductance. This formula was developed from historical data of cores tested at Magnetics. Be aware that this will only give an approximation based on evenly spaced windings. You may expect as much as a ±50% deviation from this result.

$$L_{LK} = \frac{0.292\,N^{1.065}\,A_e}{l_e} \quad \text{where:}$$

L_{LK} = leakage inductance adder (µH)
N = number of turns
A_e = core cross section (mm²)
l_e = core magnetic path length (mm)

Example: C055930A2 with 25 turns (p. 72)

Catalog Data	Calculated Inductance
$A_L = 157\,nH/T^2$ $A_e = 65.4\,mm^2$ $l_e = 63.5\,mm$	$L_N = (157)(25)^2 10^{-3}$ $= 98.1 µH$
Leakage Adder	**Estimated Measured Inductance**
$L_{LK} = \frac{0.292(25)^{1.065}(65.4)}{63.5}$ $= 9.3\,µH$	$L = L_N + L_{LK}$ $= 98.1 + 9.3$ $= 107\,µH$

Core Inductance Tolerance and Grading

Magnetics powder cores are precision manufactured to an inductance tolerance of ± 8%*, using standard Kelsall Permeameter Cup measurements with a precision series inductance bridge.

MPP and High Flux cores with outside diameters > 4.65 mm are graded into 2% inductance bands as a standard practice at no additional charge. Core grading can reduce winding costs by minimizing turns adjustments when building high turns inductors to very tight inductance specifications. MPP cores 4.65 mm and smaller are graded into 5% bands. 14µ cores, 26µ cores, MPP THINZ® and parylene coated cores are not graded.

Graded Magnetics MPP cores and High Flux cores are also available with tolerances tighter than the standard ± 8%.

*THINZ and Kool Mµ cores with OD < 12.7 mm have wider tolerances.

GRADE Stamped on Core OD	INDUCTANCE % Deviation from Nominal		TURNS % Deviation from Nominal	
	From	To	From	To
+8	+8	+7	-4.0	-3.5
+6	+7	+5	-3.5	-2.5
+4	+5	+3	-2.5	-1.5
+2	+3	+1	-1.5	-0.5
+0	+1	-1	-0.5	+0.5
-2	-1	-3	+0.5	+1.5
-4	-3	-5	+1.5	+2.5
-6	-5	-7	+2.5	+3.5
-8	-7	-8	+3.5	+4.0

Core Coating

Magnetics toroidal powder cores are coated with a special epoxy finish that provides a tough, wax tight, moisture and chemical resistant barrier having excellent dielectric properties. Parylene coating is also offered.

Material	Color	Core Finish Codes
MPP	Gray	A2, A5, A9
High Flux	Khaki	A2, A5, A9
Kool Mµ®	Black	A7, A5, A9
XFlux®	Brown	A7, A5, A9

The finish is tested for voltage breakdown by inserting a core between two weighted wire mesh pads. Force is adjusted to produce a uniform pressure of 10 psi, simulating winding pressure. The test condition for each core in the random sample set, to guarantee minimum breakdown voltage in each production batch, is 60 Hz rms voltage at 1.25 the guaranteed limit. A2 and A7 samples (26.9 mm and larger) are tested to 2500 V min wire-to-wire. AY samples are tested to 750 V min wire-to-wire.

Higher minimum breakdown coatings can be applied upon request for cores larger than 4.65 mm.

Toroids as large as 16.5 mm outside diameter can be coated with parylene to minimize the constriction of the inside diameter. All finished dimensions in this catalog are for epoxy coating (A2 or A7). For a parylene coated toroid (AY), the maximum OD and HT are reduced by 0.18 mm (0.007”), and the minimum ID is increased by 0.18 mm (0.007”).

The maximum steady-state operating temperature for epoxy coating is 200°C. The maximum steady-state operating temperature for parylene coating is 130°C, but it can be used as high as 200°C for short periods, such as during board soldering. High temperature operation of Magnetics powder cores does not affect magnetic properties.

MPP, High Flux, Kool Mµ, and XFlux materials can be operated continuously at 200°C with no aging or damage.

NOTE: Special powder grades and processing were historically used with MPP for passive filter inductors. For information regarding D4, W4, M4 and L6 codes, or precision inductor processing, contact Magnetics.

Inductor Core Selection Procedure

Only two parameters of the design application must be known to select a core for a current-limited inductor; inductance required with DC bias and the DC current. Use the following procedure to determine the core size and number of turns.

1. Compute the product of LI^2 where:
   L = inductance required with DC bias (mH)
   I = DC current (A)

2. Locate the LI^2 value on the Core Selector Chart (page 20, 21 & 22). Follow this coordinate to the intersection with the first core size that lies above the diagonal permeability line. This is the smallest core size that can be used.

3. The permeability line is sectioned into standard available core permeabilities. Selecting the permeability indicated will tend to be the best trade-off between A_L and DC bias.

4. Inductance, core size, and permeability are now known. Calculate the number of turns by using the following procedure:

   (a) The inductance factor (A_L in nH/T^2) for the core is obtained from the core data sheet. Determine the minimum A_L by using the worst case negative tolerance (generally -8%). With this information, calculate the number of turns needed to obtain the required inductance from:

   $$N = \sqrt{\frac{L\,10^3}{A_L}}$$

   Where L is required inductance (µH)

   (b) Calculate the bias in A·T/cm from:

   $$H = \frac{NI}{l_e}$$

   (c) From the Permeability vs. DC Bias curves (pages 26 through 28), determine the rolloff percentage of initial permeability for the previously calculated bias level. Curve fit equations shown in the catalog can simplify this step. They are also available to use on Magnetics website: http://www.mag-inc.com/design/design-guides/Curve-Fit-Equation-Tool

   (d) Multiply the required inductance by the percentage rolloff to find the inductance with bias current applied.

   (e) Increase the number of turns by dividing the initial number of turns (from step 4(a)) by the percentage rolloff. This will yield an inductance close to the required value after steps 4 (b), (c) and (d) are repeated.

   (f) Iterate steps 4 (b), (c) and (d) if needed to adjust turns up or down until the biased inductance is satisfactorily close to the target.

5. Choose a suitable wire size using the Wire Table (page 23). Duty cycles below 100% allow smaller wire sizes and lower winding factors, but do not allow smaller core sizes.

6. Design Checks

   (a) **Winding Factor**. See p.13 for notes on checking the coil design.

   (b) **Copper Losses**. See p.13 for notes on calculating conductor resistance and losses.

   (c) **Core Losses**. See p.14 for notes on calculating AC core losses. If AC losses result in too much heating or low efficiency, then the inductor may be loss-limited rather than current-limited. Design alternatives for this case include using a larger core or a lower permeability core to reduce the AC flux density; or using a lower loss material such as MPP in place of Kool Mµ, or High Flux in place of XFLUX.

   (d) **Temperature Rise**. Dissipation of the heat generated by conductor and core losses is influenced by many factors. This means there is no simple way to predict temperature rise (ΔT) precisely. But the following equation is known to give a useful approximation for a component in still air. Surface areas for cores wound to 40% fill are given with the core data in this catalog.

$$\Delta T\,(^\circ C) = \left(\frac{\text{Total Losses (mW)}}{\text{Component Surface Area (cm}^2\text{)}}\right)^{0.833}$$

Core Selection Example

Determine core size and number of turns to meet the following requirement:

(a) Minimum inductance with DC bias of 0.6 mH (600 µH)
(b) DC current of 5.0 A

1. $LI^2 = (0.6)(5.0)^2 = 15.0$ mH·A²

2. Using the Kool Mµ Toroids LI^2 chart found on page 21, locate 15 mH·A² on the bottom axis. Following this coordinate vertically results in the selection of 0077083A7 as an appropriate core for the above requirements.

3. From the 0077083A7 core data page 76, the inductance factor (A_L) of this core is 81 nH/T² ± 8%. The minimum A_L of this core is 74.6 nH/T².

4. The number of turns needed to obtain 600 µH at no load is 90 turns. To calculate the number of turns required at full load, determine the DC bias level: $H = N \cdot I / l_e$ where l_e is the path length in cm. The DC bias is 45.7 A·T/cm, yielding 69% of initial permeability from the 60µ Kool Mµ DC bias curve on page 27.The adjusted turns are 90/0.69 =131 Turns.

5. Re-calculate the DC bias level. The permeability versus DC bias curve shows 54% of initial permeability at 66.6 A·T/cm.

6. Multiply the minimum A_L 74.6 nH/T² by 0.54 to yield effective A_L = 40.3 nH/T². The inductance of this core with 131 turns and with 66.6 A·T/cm will be 691 µH minimum. The inductance requirement has been met.

7. The wire table indicates that 17 AWG is needed to carry 5.0 A with a current density of 500 A/cm². 131 turns of 17 AWG (wire area = 1.177 mm²) equals a total wire area of 154 mm². The window area of a 0077083A7 is 427 mm². Calculating window fill, 154 mm²/427 mm² corresponds to an approximate 36% winding factor. A 0077083A7 with 131 turns of 17 AWG is a manufacturable design.

Toroid Winding

Winding Factor

Winding factor, also called fill factor, is the ratio of total conductor cross section (usually copper cross section) to the area of the core window. In other words, in a toroid, winding factor is given by:

$$N \cdot A_W / W_A$$

where:
N = Number of turns
A_W = Area of the wire
W_A = Window Area of the core $\frac{\pi}{4} \cdot ID^2$

Toroid Core Winding factors can vary from 20-60%, a typical value in many applications being 35-40%.

In practice, several approaches to toroid winding are used:

- Single layer: The number of turns is limited by the inside circumference of the core divided by the wire diameter. Advantages are lower winding capacitance, more repeatable parasitics, good cooling, and low cost. Disadvantages are reduced power handling and higher flux leakage.
- Low fill: For manufacturing ease and reduced capacitance, winding factor between single layer and 30% may be used.
- Full winding: Factors between 30% and 45% are normally a reasonable trade off between fully utilizing the space available for a given core size, while avoiding excessive manufacturing cost.
- High fill: Winding factors up to about 65% are achievable, but generally only with special expensive measures, such as completing each coil by hand after the residual hole becomes too small to fit the winding shuttle.

Estimating Wound Coil Dimensions

For each core size, wound coil dimensions are given for 40% winding factor, since this is a typical, practical value. Worst case package dimensions for coils wound completely full are also shown. These are max expected OD and max expected HT.

To estimate dimensions for other winding factors, use:

$$OD_{x\%} = \sqrt{\frac{X\%}{40\%}\left(OD_{40\%}^2 - OD_{core}^2\right) + OD_{core}^2}$$

$$HT_{x\%} = ID_{core} + HT_{core} - \sqrt{\frac{100\% - X\%}{60\%}}\left(ID_{core} + HT_{core} - HT_{40\%}\right)$$

Where: X% is the new winding factor;
$OD_{40\%}$ and $HT_{40\%}$ are the coil dimensions shown on the core data page;
OD_{core} and HT_{core} are the maximum core dimensions after finish.

MLT and DCR

MLT (Mean Length of Turn) is given for a range of winding factors for each core size. To estimate DCR, first, calculate the winding factor for the core, wire gauge, and number of turns selected. On the wire table look up resistance per unit of length for the gauge selected. On the data page for the core selected, consult the Winding Turn Length chart. Unless the winding factor is exactly one of the values listed, interpolate to find the MLT. Then,

$$DCR = (MLT)(N)\ (\Omega/\text{Length}).$$

For single layer winding, MLT is the 0% fill value on each core data page. Even easier, DCRs for single layer windings for a range of wire gauges are given in the winding tables on pages 96-99.

Wire Loss

DC copper loss is calculated directly as I^2R. Naturally, for aluminum conductors, a suitable wire table must be used. Also, the increase of wire resistance with temperature should be considered.

AC copper loss can be significant for large ripple and for high frequency. Unfortunately, calculation of AC copper loss is not a straight-forward matter. Estimates are typically used.

Powder Core Loss Calculation

Core loss is generated by the changing magnetic flux field within a material, since no magnetic materials exhibit perfectly efficient magnetic response. Core loss density (PL) is a function of half of the AC flux swing (½ $\triangle B = B_{pk}$) and frequency (f). It can be approximated from core loss charts or the curve fit loss equation:

$$PL = aB_{pk}^{\ b} f^c$$

where a, b, c are constants determined from curve fitting, and B_{pk} is defined as half of the AC flux swing:

$$B_{pk} = \frac{\triangle B}{2} = \frac{B_{AC\,max} - B_{AC\,min}}{2}$$

Units typically used are (mW/cm³) for PL; Tesla (T) for B_{pk}; and (kHz) for f.
The task of core loss calculation is to determine B_{pk} from known design parameters.

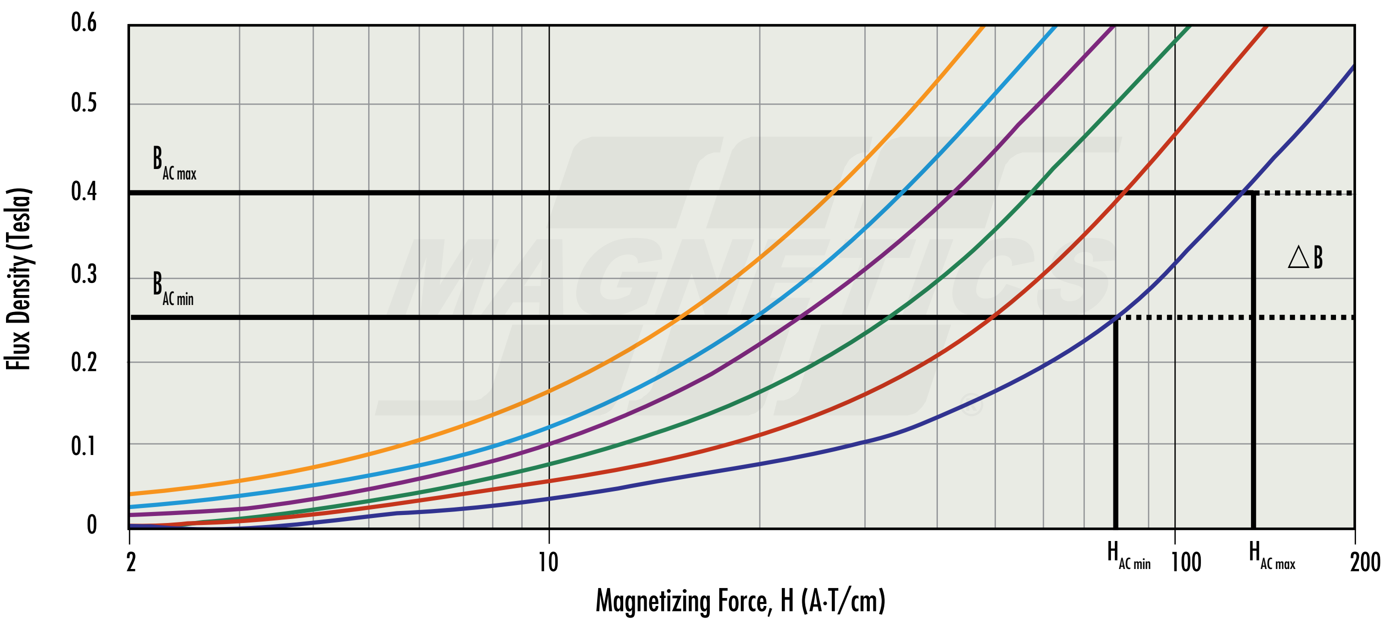
Method 1 – Determine B_{pk} from DC Magnetization Curve. $B_{pk} = f(H)$

Flux density (B) is a non-linear function of magnetizing field (H), which in turn is a function of winding number of turns (N), current (I), and magnetic path length (l_e). The value of B_{pk} can typically be determined by first calculating H at each AC extreme:

$$H_{AC\,max} = \left[\frac{N}{l_e}\left(I_{DC} + \frac{\Delta I}{2}\right)\right]$$

$$H_{AC\,min} = \left[\frac{N}{l_e}\left(I_{DC} + \frac{\Delta I}{2}\right)\right]$$

Units typically used are (A·T/cm) for H.
From $H_{AC\,max}$, $H_{AC\,min}$, and the BH curve (or BH curve fit equation), $B_{AC\,max}$, $B_{AC\,min}$ and therefore B_{pk} can be determined.



Example 1 - AC current is 10% of DC current:

Approximate the core loss of an inductor with 20 turns wound on Kool Mµ p/n 77894A7 p. 72 (60µ, l_e=6.35 cm, A_e=0.654 cm², A_L=75 nH/T²). Inductor current is 20 Amps DC with ripple of 2 Amps peak-peak at 100kHz.

1.) Calculate H and determine B from BH curve or curve fit equation p. 41:

$$H_{AC\,max} = \frac{20}{6.35}\left(20 + \frac{2}{2}\right) = 66.14\ ^{A\cdot T}\!/_{cm} \rightarrow B_{AC\,max} \cong 0.44T$$

$$H_{AC\,min} = \frac{20}{6.35}\left(20 - \frac{2}{2}\right) = 59.84\ ^{A\cdot T}\!/_{cm} \rightarrow B_{AC\,min} \cong 0.41T$$

$$\rightarrow B_{pk} = \frac{\triangle B}{2} = \frac{0.44 - 0.41}{2} = 0.015T$$

2.) Determine Core Loss density from chart or calculate from loss equation p. 36:

$$PL = (193)(0.015^{2.01})(100^{1.20}) \cong 16\,\frac{mW}{cm^3}$$

3.) Calculate core loss:

$$P_{fe} = (PL)(l_e)(A_e) \sim (16)(6.35)(0.654) \cong 65mW$$

Powder Core Loss Calculation

Example 2 - AC current is 40% of DC current:

Approximate the core loss for the same 20-turn inductor, with same inductor current of 20 Amps DC but ripple of 8 Amps peak-peak at 100kHz.

1.) Calculate *H* and determine *B* from BH curve fit equation p. 41:

$$H_{AC\,max} = \frac{20}{6.35}\left(20 + \frac{8}{2}\right) = 75.59\ {}^{A\cdot T}\!/\!_{cm} \rightarrow B_{AC\,max} \cong 0.48T$$

$$H_{AC\,min} = \frac{20}{6.35}\left(20 - \frac{8}{2}\right) = 50.39\ {}^{A\cdot T}\!/\!_{cm} \rightarrow B_{AC\,min} \cong 0.36T$$

$$\rightarrow B_{pk} = \frac{\triangle B}{2} = \frac{0.48 - 0.36}{2} = 0.06T$$

2.) Determine Core Loss density from chart or calculate from loss equation p.36: $PL = (193)(0.06^{2.01})(100^{1.20}) \sim 260\ \frac{mW}{cm^3}$

3.) Calculate core loss: $P_{fe} = (PL)(l_e)(A_e) = (260)(6.35)(0.654) \sim 1W$

Note: Core losses result only from AC excitation. DC bias applied to any core does not cause any core losses, regardless of the magnitude of the bias.

Example 3 – pure AC, no DC:

Approximate the core loss for the same 20-turn inductor, now with 0 Amps DC and 8 Amps peak-peak at 100kHz.

1.) Calculate H and determine B from BH curve fit equation p. 41:

$$H_{AC\,max} = \frac{20}{6.35}\left(+\frac{8}{2}\right) = 12.60\ {}^{A\cdot T}\!/\!_{cm} \rightarrow B_{AC\,max} \cong 0.11T$$

$$H_{AC\,min} = \frac{20}{6.35}\left(-\frac{8}{2}\right) = -12.60\ {}^{A\cdot T}\!/\!_{cm} \rightarrow B_{AC\,min} \cong -0.11T$$

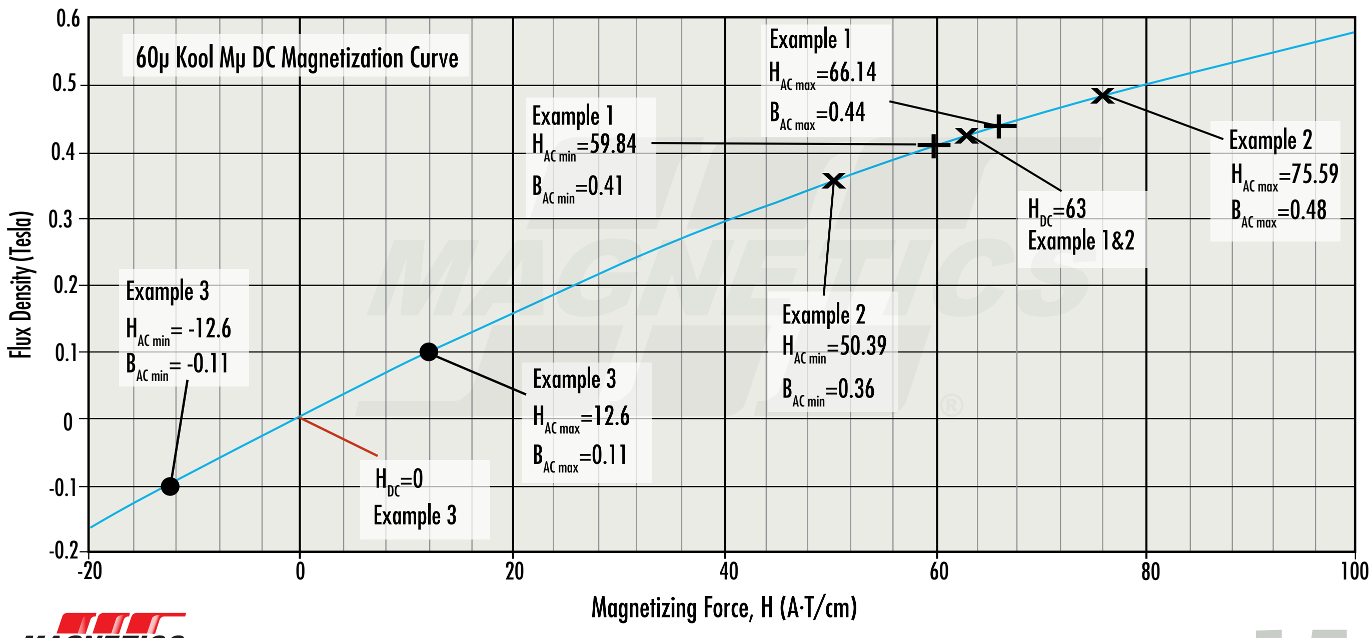
$$\rightarrow B_{pk} = \frac{\triangle B}{2} \sim 0.11T$$

Note: Curve fit equations are not valid for negative values of B. Evaluate for the absolute value of B, then reverse the sign of the resulting H value.

2.) Determine Core Loss density from chart or calculate from loss equation p.36. $PL = (193)(0.11^{2.01})(100^{1.20}) \sim 900\ \frac{mW}{cm^3}$

3.) Calculate core loss: $P_{fe} = (PL)(l_e)(A_e) = (900)(6.35)(0.654) \sim 4W$

Plotted below are the operating ranges for each of the three examples.
Note the significant influence of DC bias on core loss, comparing Example 3 with Example 2. Lower permeability results in less B_{pk}, even if the current ripple is the same. This effect can be achieved with DC bias, or by selecting a lower permeability material.



Powder Core Loss Calculation

Method 2, for small $\triangle H$, approximate B_{pk} from effective perm with DC bias. $B_{pk} = f(\mu_e, \triangle H)$

The instantaneous slope of the BH curve is defined as the absolute permeability, which is the product of permeability of free space ($\mu_0 = 4\pi \times 10^{-7}$) and the material permeability (μ), which varies along the BH curve. For small AC, this slope can be modeled as a constant throughout AC excitation, with μ approximated as the effective perm at DC bias (μ_e):

$$\frac{dB}{dH} = \mu_0\mu_e \quad \rightarrow \frac{\triangle B}{\triangle H} = \mu_0\mu_e \quad \rightarrow \triangle B = \mu_0\mu_e \triangle B \quad B_{pk} = \frac{\triangle B}{2} = (0.5)\,\mu_0\mu_e \triangle H$$

The effective perm with DC bias is shown in this catalog as % of initial perm and can be obtained from the DC bias curve or curve fit equation:

$$B_{pk} = (0.5)(\mu_0)(\%\mu_i)(\mu_i)(100)(\triangle H) \quad \text{where} \quad \triangle H = \frac{N\triangle I}{l_e}$$

$\triangle H$ is multiplied by 100 because l_e is expressed in cm, while B_{pk} units include m.

Reworking Example 1 (20 Amps DC, 2 Amps p-p)

$$H_{DC} = \left[\frac{20}{6.35}(20)\right] = 63\ ^{A\cdot T}\!/\!_{cm} \quad \rightarrow \quad \text{from curve or curve fit equation}, \%\mu_i = 0.57$$

$$\mu_i = 60$$

$$\triangle H = \frac{N\triangle I}{l_e} = \frac{20(2)}{6.35} = 6.3\ ^{A\cdot T}\!/\!_{cm}$$

$$B_{pk} = 0.5(4\pi \times 10^{-7})(0.57)(60)(100)(6.3) = 0.014T \quad \text{(this compares to 0.015T using Method 1)}$$

Reworking Example 2 (20 Amps DC, 8 Amps p-p)

From example 1,

$$H_{DC} = 63\ ^{A\cdot T}\!/\!_{cm}, \%\mu_i = 0.57;\ \mu_i = 60$$

$$\triangle H = \frac{N\triangle I}{l_e} = \frac{20(8)}{6.35} = 25.2\ ^{A\cdot T}\!/\!_{cm}$$

$$B_{pk} = 0.5(4\pi \times 10^{-7})(0.57)(60)(100)(25.2) = 0.054T \quad \text{(this compares to 0.06T using Method 1)}$$

Reworking Example 3 (0 Amps DC, 8 Amps p-p)

From example 2,

$$\triangle H = 25.20\ ^{A\cdot T}\!/\!_{cm}$$

$$H_{DC} = \ ^{A\cdot T}\!/\!_{cm} \quad \%\mu_i = 1$$

$$B_{pk} = 0.5(4\pi \times 10^{-7})(1)(60)(100)(25.2) = 0.095T \quad \text{(this compares to 0.11T using Method 1)}$$

Powder Core Loss Calculation

Method 3, for small △H, determine B_{pk} from biased inductance. $B_{pk}=f(L,I)$

B can be rewritten in terms of inductance by considering Faraday's equation and its effect on inductor current:

$$V_L = NA\frac{dB}{dt} = L\frac{dI}{dt} \rightarrow dB = \frac{L}{NA}dI$$

L varies non-linearly with I. For small AC, L can be assumed constant throughout AC excitation and is approximated by the biased inductance (L_{DC}).

$$\triangle B = \frac{L_{DC}\triangle I}{NA} \rightarrow B_{pk} = \frac{L_{DC}\triangle I}{2NA_e}$$

Another way of looking at this is by rewriting the relationship between B and L as:

$$\rightarrow \frac{dB}{dH} = \frac{L}{NA}\frac{dI}{dH}$$

Substituting (dH/dI) with (N/l_e) and A with A_e:

$$\rightarrow \frac{dB}{dH} = \frac{Ll_e}{N^2A_e}$$

L varies non-linearly with H. For small AC, the slope of the BH curve is assumed constant throughout AC excitation, and L is approximated by the biased inductance (L_{DC}).

$$\frac{\triangle B}{\triangle H} = \frac{L_{DC}l_e}{N^2A_e} \rightarrow \triangle B = \frac{L_{DC}l_e}{N^2A_e}\triangle H = \frac{L_{DC}\triangle I}{NA_e} \rightarrow \triangle B_{pk} = \frac{L_{DC}\triangle I}{2NA_e}$$

Powder Core Loss Calculation

Reworking Example 1:

$$L_{nl}\,(\text{no load}) = (A_L)(N^2) = (75\,nH/T^2)(20^2) = 30\mu H$$

$$L_{DC}\,(20A) = (\%\mu_i)(L_{nl}) = (0.57)(30) = 17.1\mu H$$

$$\rightarrow B_{pk} = \frac{(17.1)(10^{-6})(2)}{2(20)(0.654)(10^{-4})} = 0.013T$$ (this compares to 0.015T per Method 1, 0.014T per Method 2).

Reworking Example 2:

From example 1, $L_{DC} = 17.1\mu H$

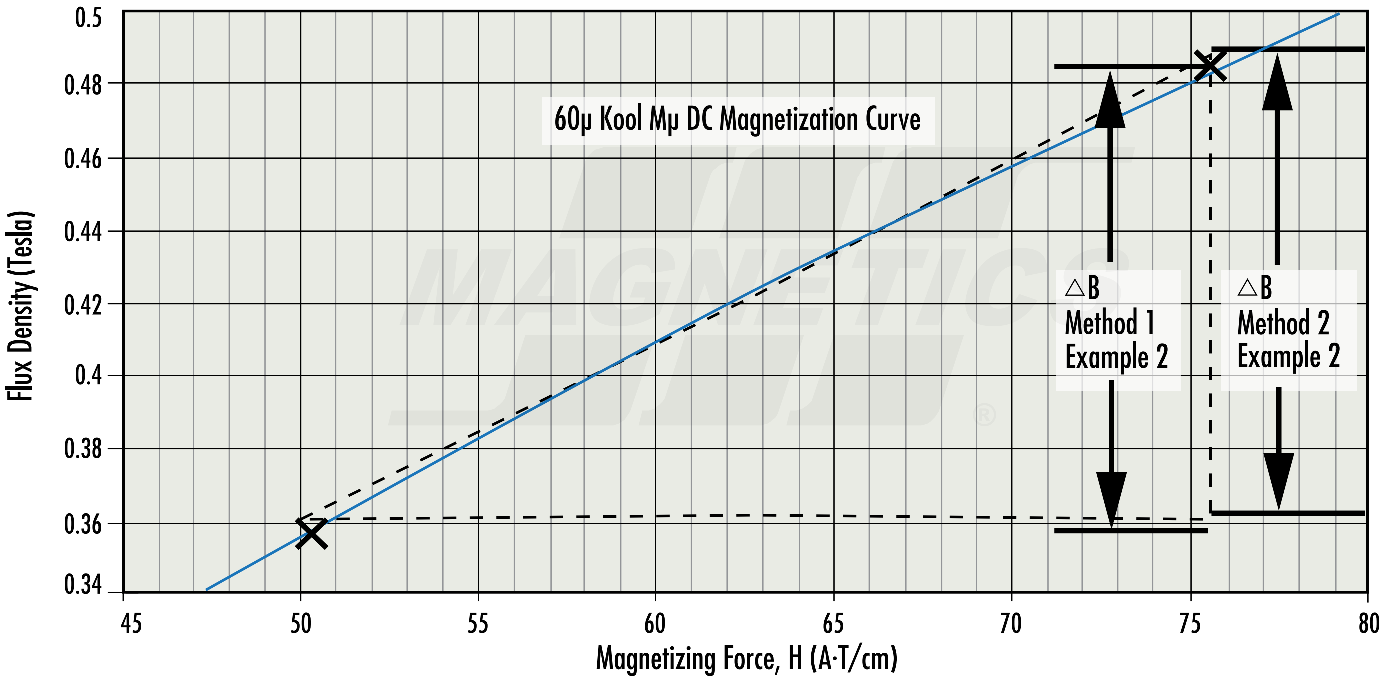
$$\rightarrow B_{pk} = \frac{(17.1)(10^{-6})(8)}{2(20)(0.654)(10^{-4})} = 0.052T$$ (this compares to 0.06T per Method 1, 0.054T per Method 2).

Reworking Example 3:

$$L_{DC} = L_{nl} = 30\mu H$$

$$\rightarrow B_{pk} = \frac{(30)(10^{-6})(8)}{2(20)(0.654)(10^{-4})} = 0.092T$$ (this compares to 0.11T per Method 1, 0.095T per Method 2).

The plot below illustrates the difference between Method 1 and Method 2



Core Selector Charts

The core selector charts are a quick guide to finding the optimum permeability and smallest core size for DC bias applications. These charts are based on a permeability reduction of not more than 50% with DC bias, typical winding factors of 40% for toroids and 60% for shapes, and an AC current that is small relative to the DC current. These charts are based on the nominal core inductance and a current density 500-600 A/cm^2.

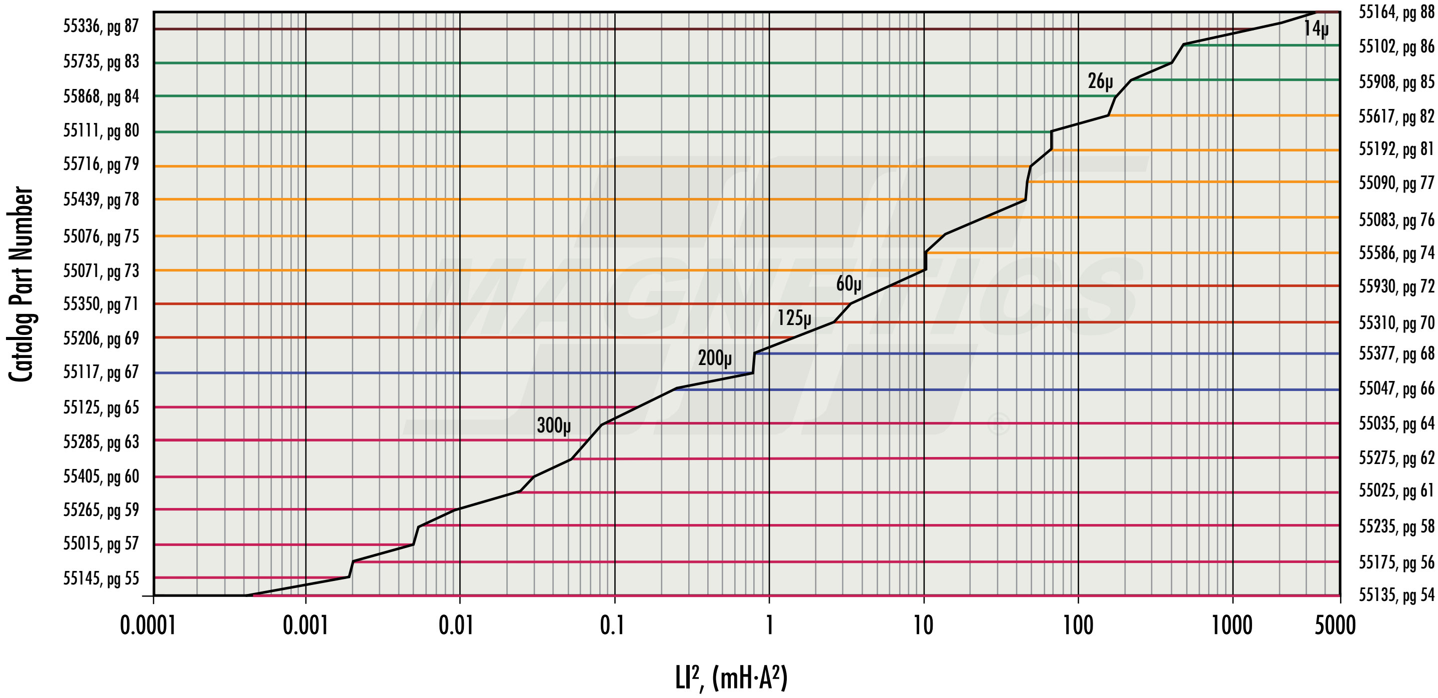
If a core is being selected for use with a large AC current relative to any DC current, such as a flyback inductor or buck/boost inductor, frequently a larger core will be needed to limit the core losses due to AC flux. In other words, the design becomes loss-limited rather than bias-limited.

For additional power handling capability, stacking of cores will yield a proportional increase in power handling. For example, double stacking of the 55908 core will result in doubled power handling capability to about 400 mH·A^2.

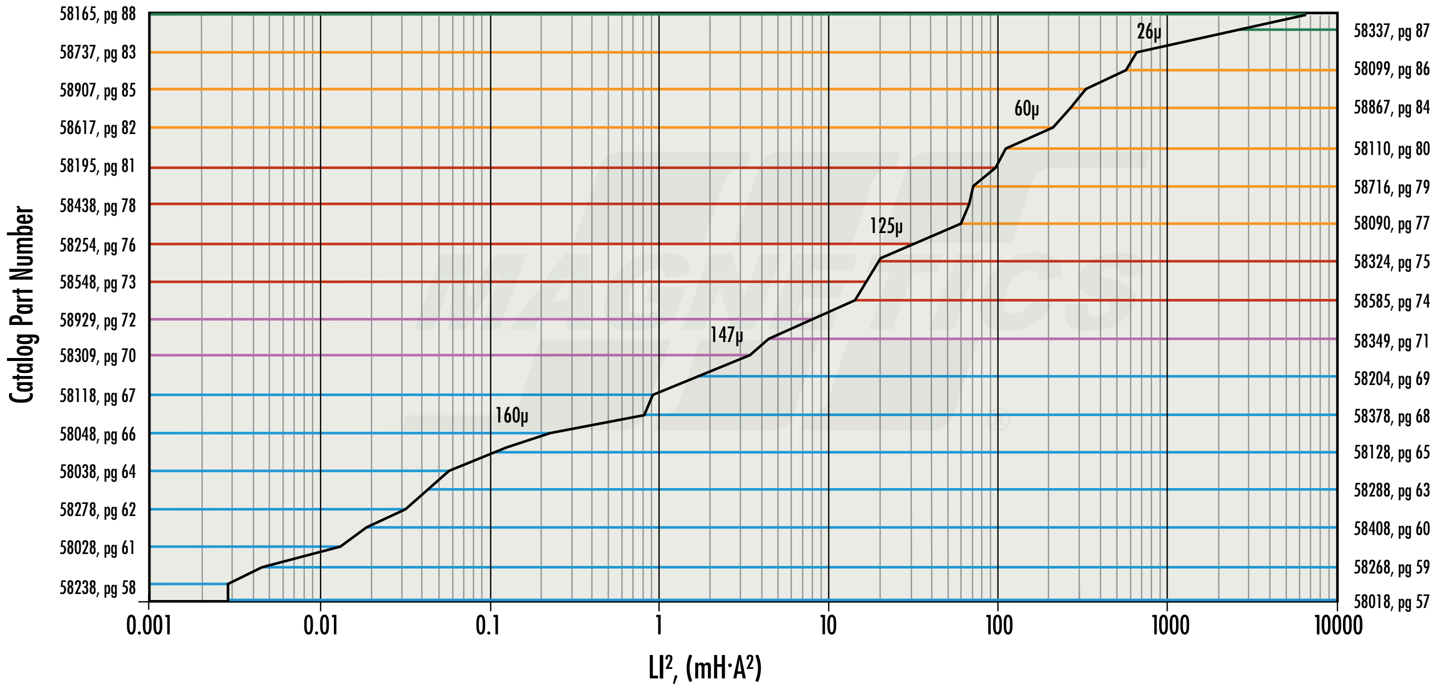
Cores with increased heights are easily ordered. Contact Magnetics for more information.

Core Selector Charts

MPP Toroids

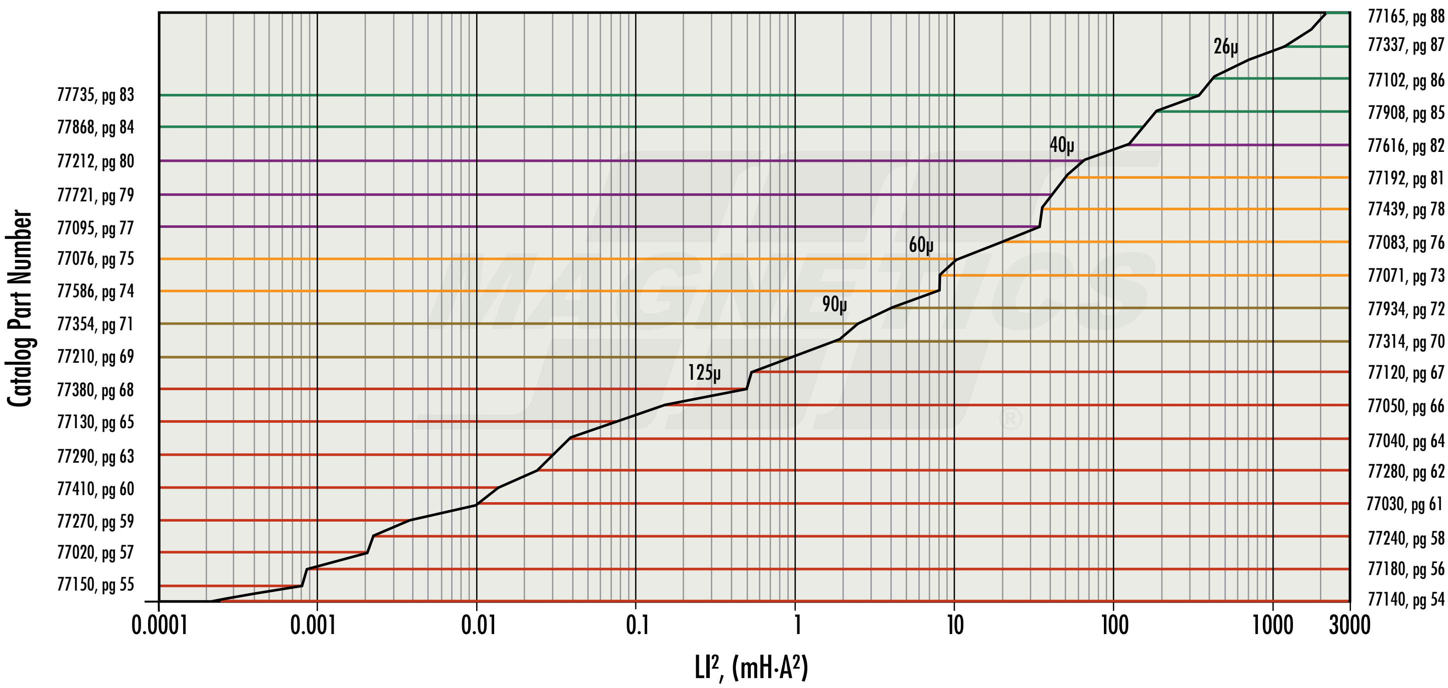


High Flux Toroids

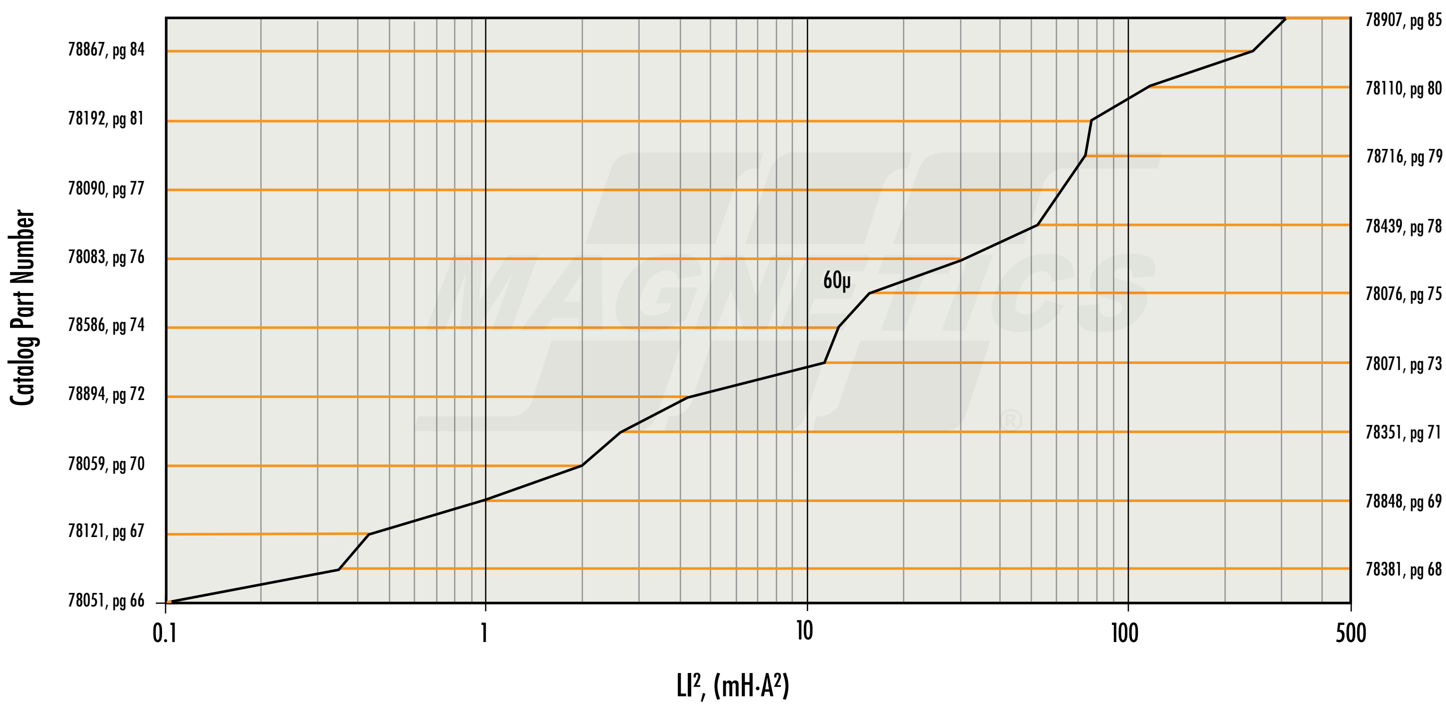


Core Selector Charts

Kool Mμ® Toroids

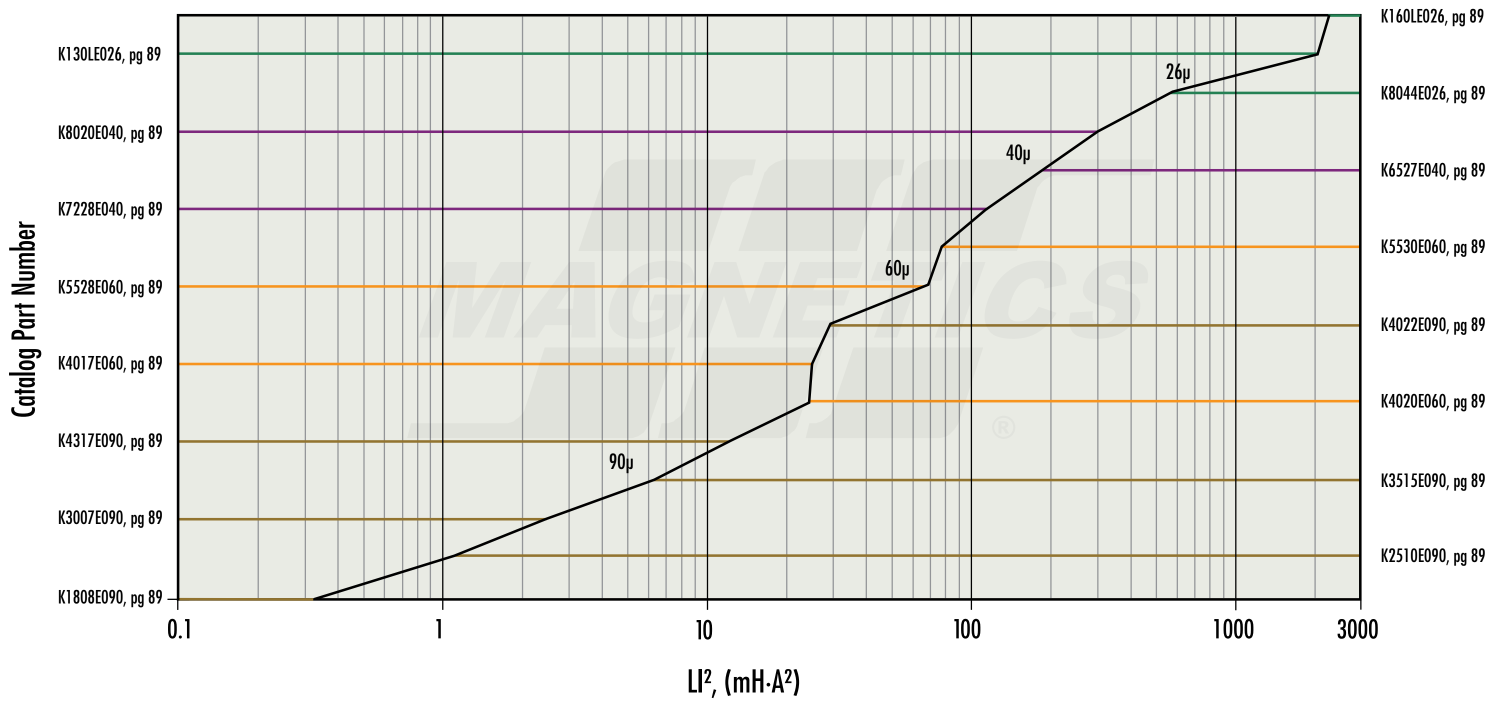


XFlux® Toroids

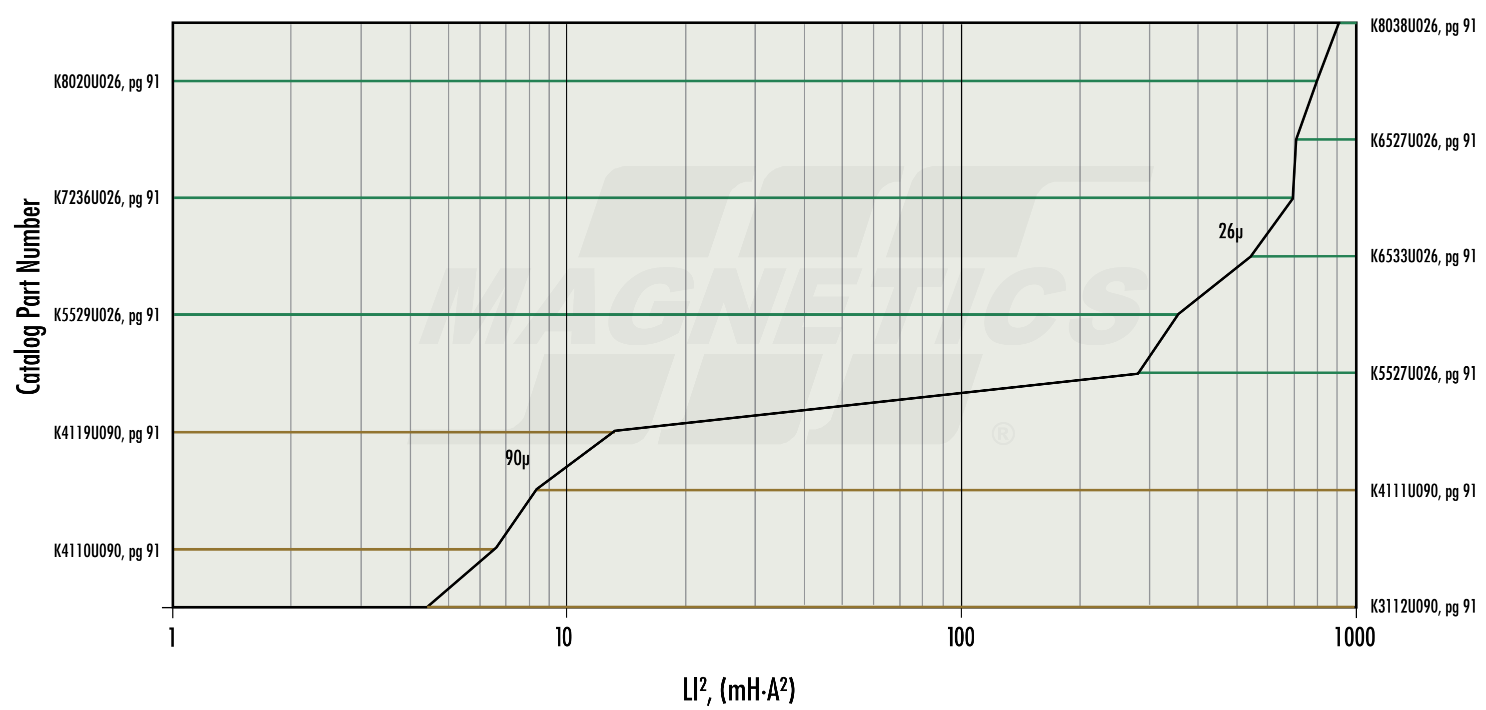


Core Selector Charts

Kool Mμ® E Cores



Kool Mμ® U Cores



Wire Table

AWG Wire Size	Resistance Ω/meter	Wire O.D. (cm) Heavy Build	Wire Area cm^2	Current Capacity, Amps (listed by columns of $Amps/cm^2$)				
				200	400	500	600	800
6	.00130	.421	0.1392	26.6	53.2	66.5	79.8	106
7	.00163	.376	0.1110	21.1	42.2	52.8	63.3	84.4
8	.00206	.336	0.0887	16.7	33.5	41.8	50.2	66.9
9	.00260	.299	0.0702	13.3	26.5	33.2	39.8	53.1
10	.00328	.267	0.0560	10.5	21.0	26.3	31.6	42.1
11	.00414	.238	0.0445	8.34	16.7	20.8	25.0	33.3
12	.00521	.213	0.0356	6.62	13.2	16.5	19.8	26.5
13	.00656	.1902	0.0284	5.25	10.5	13.1	15.8	21.0
14	.00828	.1715	0.0231	4.16	8.33	10.4	12.5	16.7
15	.01044	.1529	0.01840	3.30	6.61	8.26	9.91	13.2
16	.01319	.1369	0.01472	2.62	5.23	6.54	7.85	10.5
17	.01658	.1224	0.01177	2.08	4.16	5.20	6.24	8.32
18	.02095	.1095	0.00942	1.65	3.29	4.11	4.94	6.58
19	.02640	.0980	0.00754	1.31	2.61	3.27	3.92	5.22
20	.03323	.0879	0.00607	1.04	2.08	2.59	3.11	4.15
21	.04190	.0785	0.00484	0.823	1.65	2.06	2.47	3.29
22	.05315	.0701	0.00386	0.649	1.30	1.62	1.95	2.59
23	.06663	.0632	0.00314	0.518	1.04	1.29	1.55	2.07
24	.08422	.0566	0.00252	0.409	0.819	1.0236	1.23	1.64
25	.10620	.0505	0.00200	0.325	0.649	0.812	0.974	1.30
26	.13458	.0452	0.00160	0.256	0.512	0.641	0.769	1.02
27	.16873	.0409	0.00131	0.204	0.409	0.511	0.613	0.817
28	0.214	.0366	0.00105	0.161	0.322	0.402	0.483	0.644
29	0.266	.0330	0.000855	0.129	0.259	0.324	0.388	0.518
30	0.340	.0295	0.000683	0.101	0.203	0.253	0.304	0.405
31	0.429	.0267	0.000560	0.0803	0.161	0.201	0.241	0.321
32	0.532	.0241	0.000456	0.0649	0.130	0.162	0.195	0.259
33	0.675	.0216	0.000366	0.0511	0.102	0.128	0.153	0.204
34	0.857	.01905	0.000285	0.0402	0.0804	0.101	0.121	0.161
35	1.085	.01702	0.000228	0.0318	0.0636	0.0795	0.0953	0.127
36	1.361	.01524	0.000182	0.0253	0.0507	0.0633	0.0760	0.101
37	1.680	.01397	0.000153	0.0205	0.0410	0.0513	0.0616	0.0821
38	2.13	.01245	0.000122	0.0162	0.0324	0.0405	0.0486	0.0649
39	2.78	.01092	0.000094	0.0124	0.0248	0.0310	0.0372	0.0497
40	3.54	.00965	0.000073	0.00974	0.0195	0.0243	0.0292	0.0390
41	4.34	.00864	0.000059	0.00795	0.0159	0.0199	0.0238	0.0318
42	5.44	.00762	0.000046	0.00633	0.0127	0.0158	0.0190	0.0253
43	7.03	.00686	0.000037	0.00490	0.00981	0.0123	0.0147	0.0196
44	8.51	.00635	0.000032	0.00405	0.00811	0.0101	0.0122	0.0162
45	10.98	.00546	0.000023	0.00314	0.00628	0.00785	0.00942	0.0126
46	13.80	.00498	0.000019	0.00250	0.00500	0.00624	0.00749	0.00999
47	17.36	.00452	0.000016	0.00199	0.00397	0.00497	0.00596	0.00795
48	22.10	.00394	0.000012	0.00156	0.00312	0.00390	0.00467	0.00623
49	27.60	.00353	0.000010	0.00125	0.00250	0.00312	0.00375	0.00499

Material Properties

	PERMEABILITY vs. T, B, & f - TYPICAL			
	Permeability (μ)	μ vs. T dynamic range (-50° C TO +100° C) MATERIALS RATED TO 200° C	μ vs. B dynamic range 0 to 400 mT	μ vs. f. flat to...
MPP	14μ	0.7%	+0.4%	4 MHz
	26μ	0.9%	+0.4%	3 MHz
	60μ	1.0%	+0.8%	2 MHz
	125μ	1.3%	+1.4%	300 kHz
	147μ, 160μ, 173μ	1.5%	+1.9%	200 kHz
	200μ	1.6%	+2.8%	100 kHz
	300μ	1.6%	+4.5%	90 kHz
	550μ	8.7%	+21.0%	20 kHz
High Flux	14μ	1.5%	+5.0%	3 MHz
	26μ	2.0%	+9.0%	1.5 MHz
	60μ	2.6%	+13.5%	1 MHz
	125μ	3.6%	+19.0%	700 kHz
	147μ	4.8%	+22.0%	500 kHz
	160μ	5.5%	+25.0%	400 kHz
Kool Mμ®	26μ	1.7%	+1.0%	2 MHz
	40μ	2.2%	+1.1%	1 MHz
	60μ	3.4%	+1.4%	900 kHz
	75μ	4.5%	+2.0%	500 kHz
	90μ	5.2%	+2.8%	500 kHz
	125μ	8.3%	+3.4%	300 kHz
XFLUX®	26μ	2.5%	-	1MHz
	60μ	3.0%	+14.5%	500 kHz

	Curie Temperature	Density	Coefficient of Thermal Expansion
MPP	460°C	8.0 grams/cm^3	12.9 x 10^{-6}/°C
High Flux	500°C	7.6 grams/cm^3	5.8 x 10^{-6}/°C
Kool Mμ	500°C	5.5 grams/cm^3	10.8 x 10^{-6}/°C
XFLUX	700°C	7.5 grams/cm^3	11.6 x 10^{-6}/°C

Core Weights

Core weights listed in this catalog are for 125µ cores.*
To determine weights for other permeabilities, multiply the 125µ weight by the following factors:

Permeability	14µ	26µ	40µ	60µ	75µ	90µ	125µ	147µ 160µ 173µ	200µ 300µ	550µ
x Factor	0.80	0.86	0.90	0.94	0.96	0.97	1.00	1.02	1.03	1.04

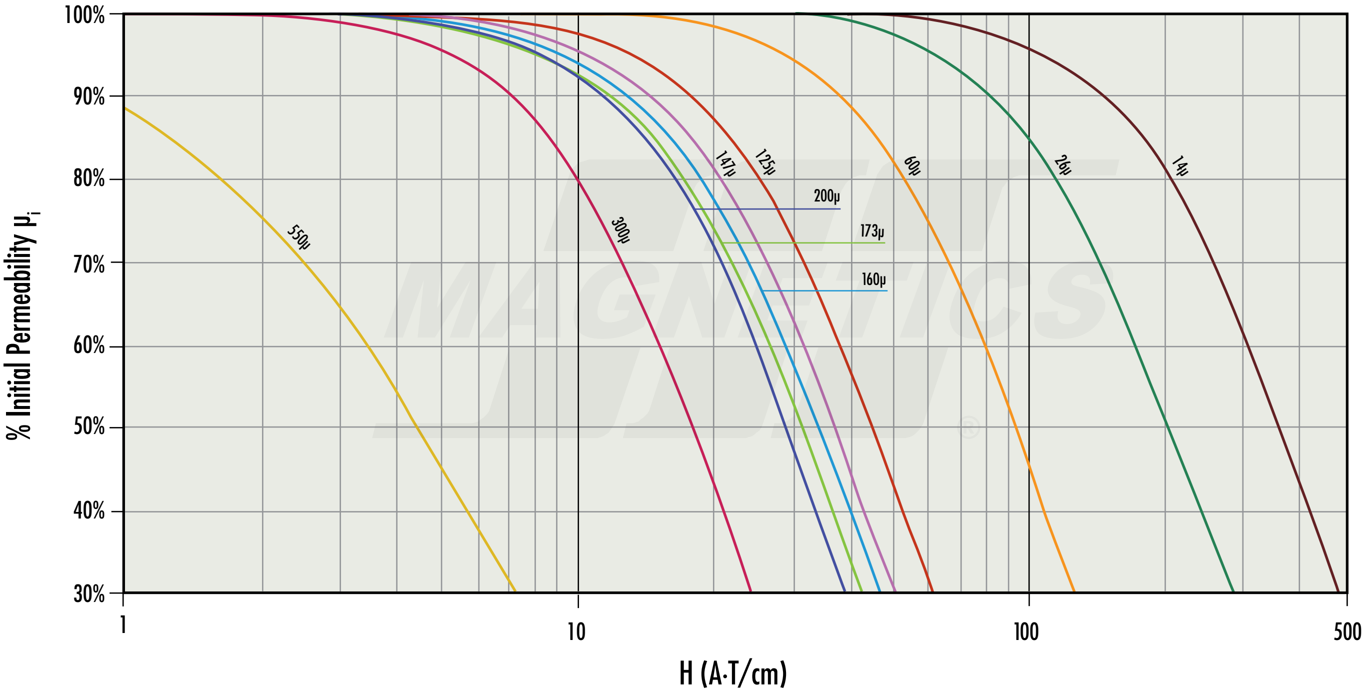
*XFLUX® is based on 60µ weight.
*MPP, High Flux, and Kool Mµ® in sizes 102, 337, and 165 weight based on 26µ.

Unit Conversions

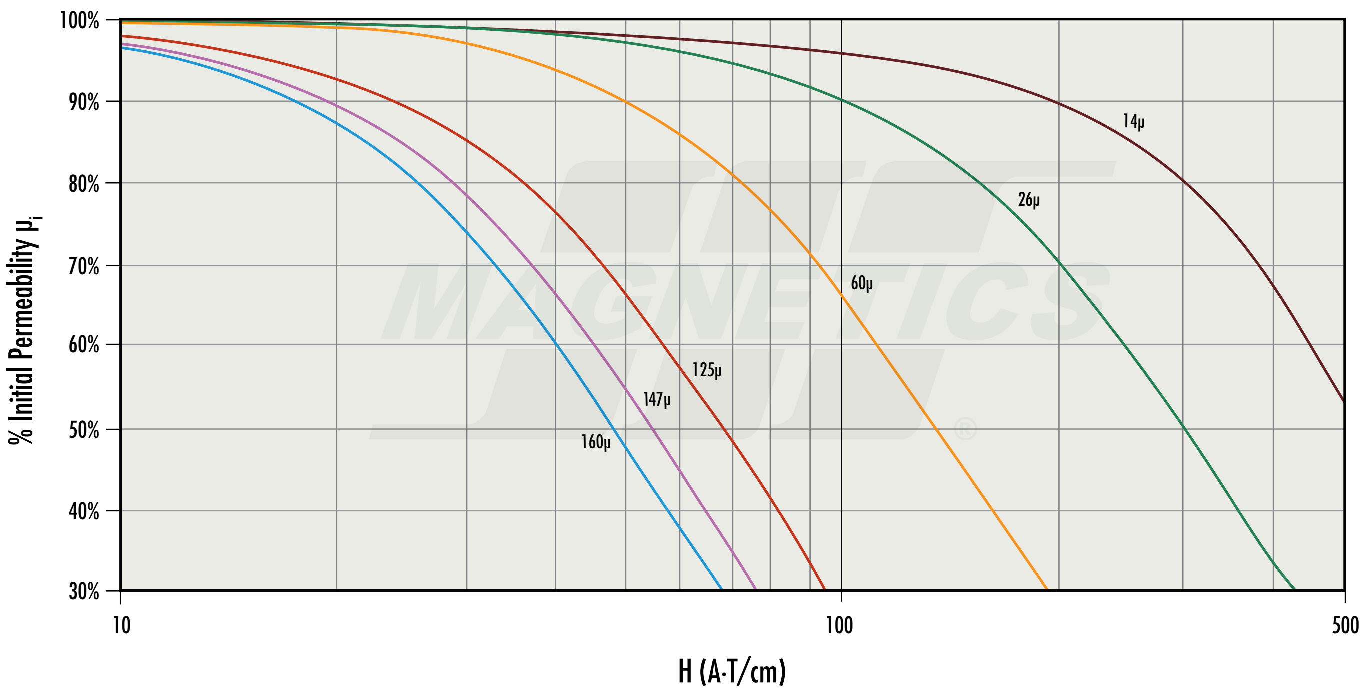
To obtain number of	Multiply number of	By
A·T/cm	oersteds	0.795
oersteds	A·T/cm	1.26
tesla	gauss	0.0001
cm^2	in^2	6.452
cm^2	circular mils	$(5.07)(10^{-6})$
Gauss	mT(milli Tesla)	10
Gauss	Tesla	10,000

Permeability versus DC Bias Curves

MPP Toroids

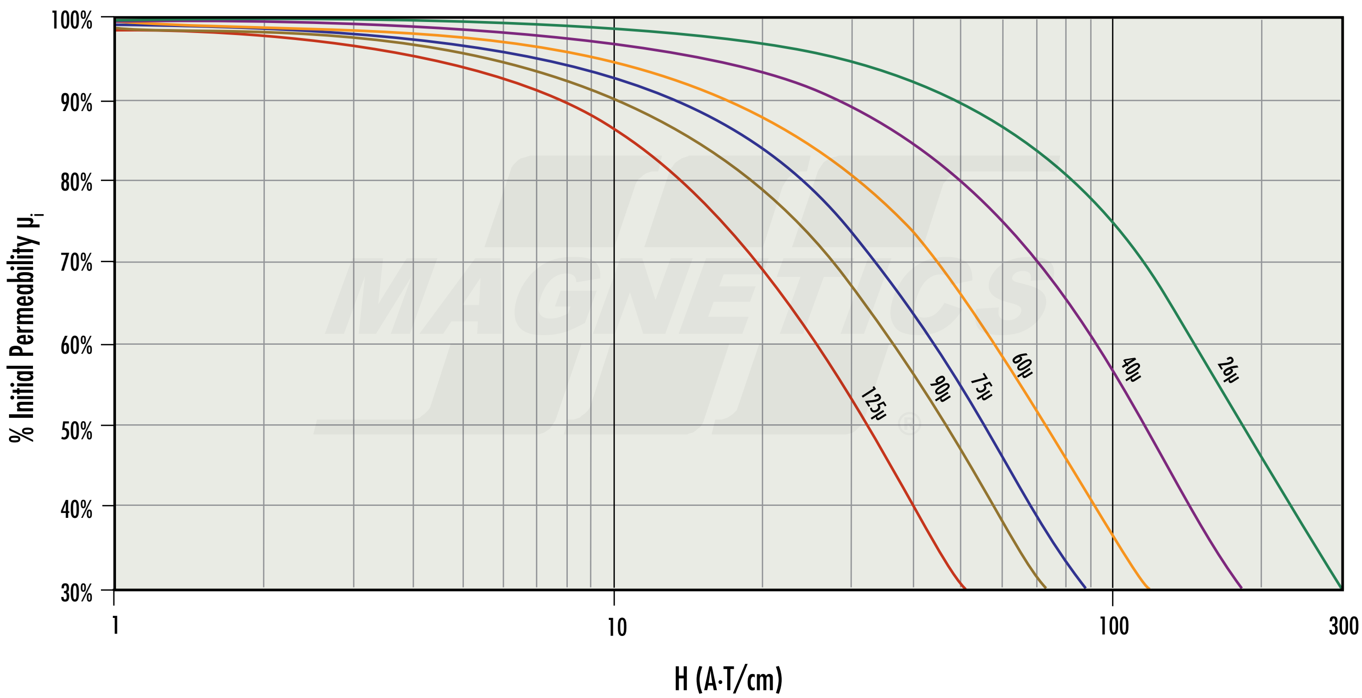


High Flux Toroids

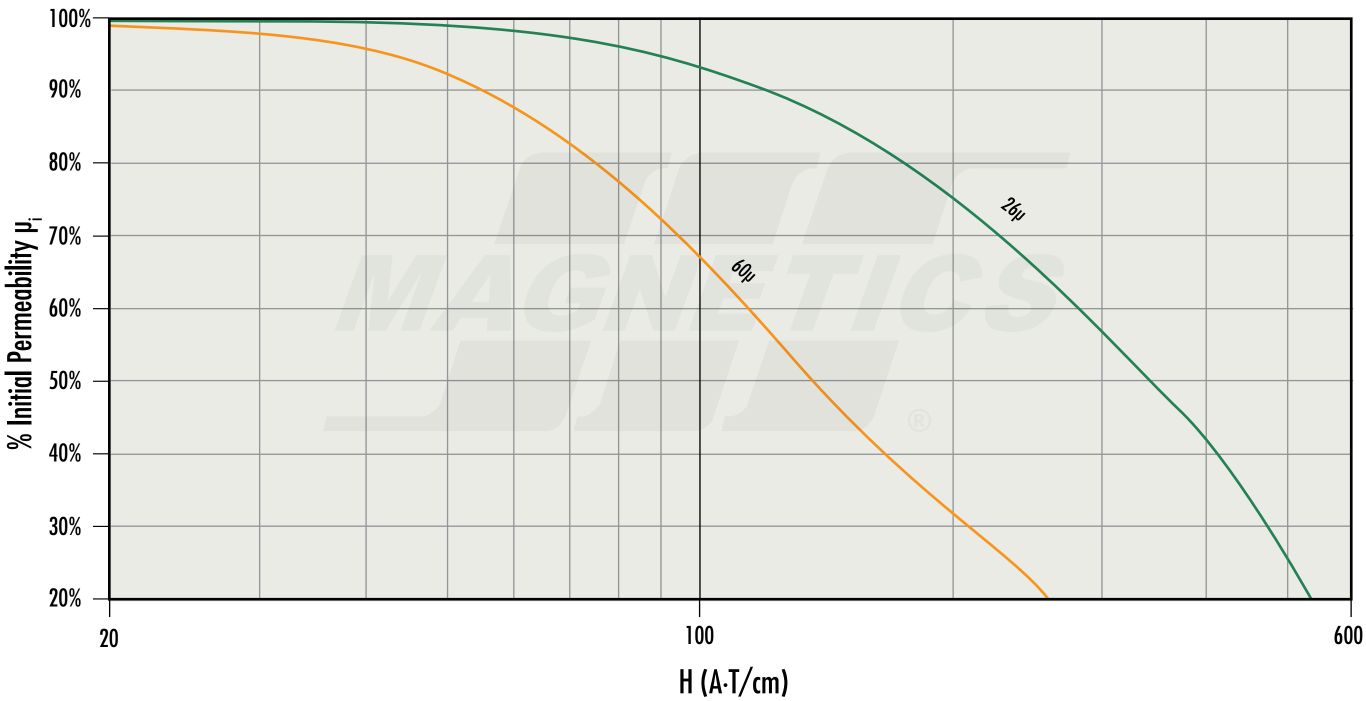


Permeability versus DC Bias Curves

Kool Mµ® Toroids

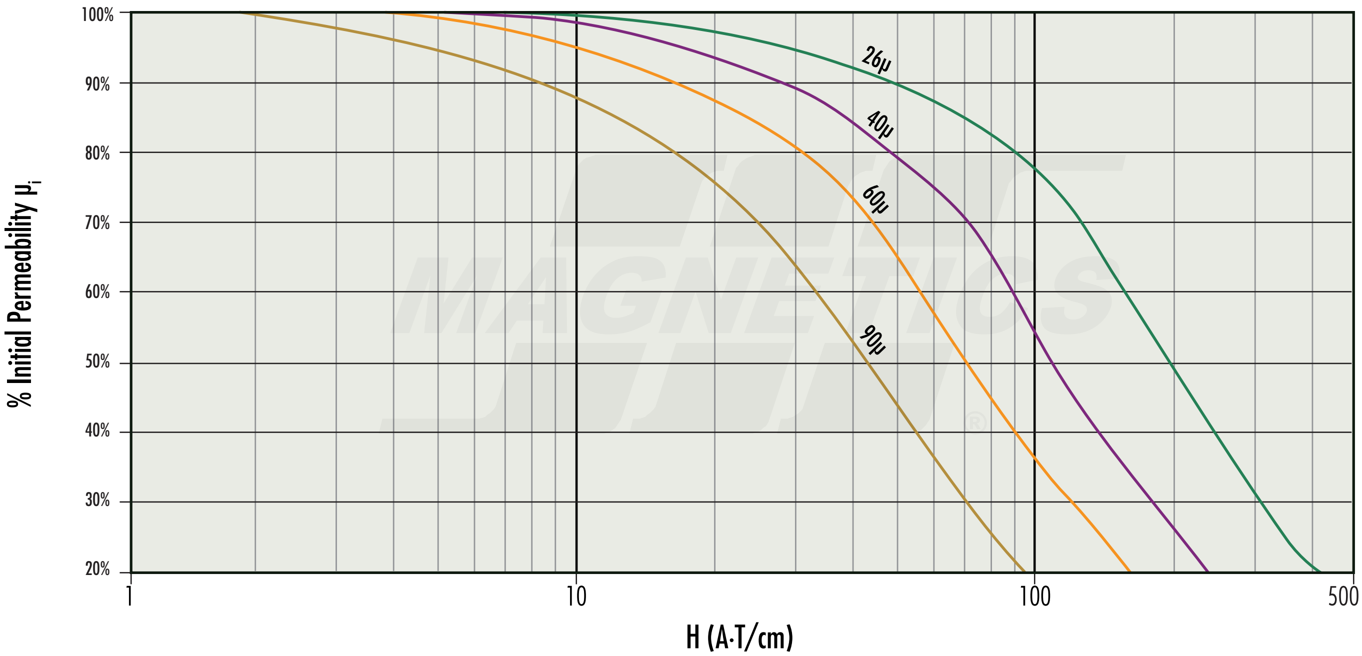


XFlux® Toroids

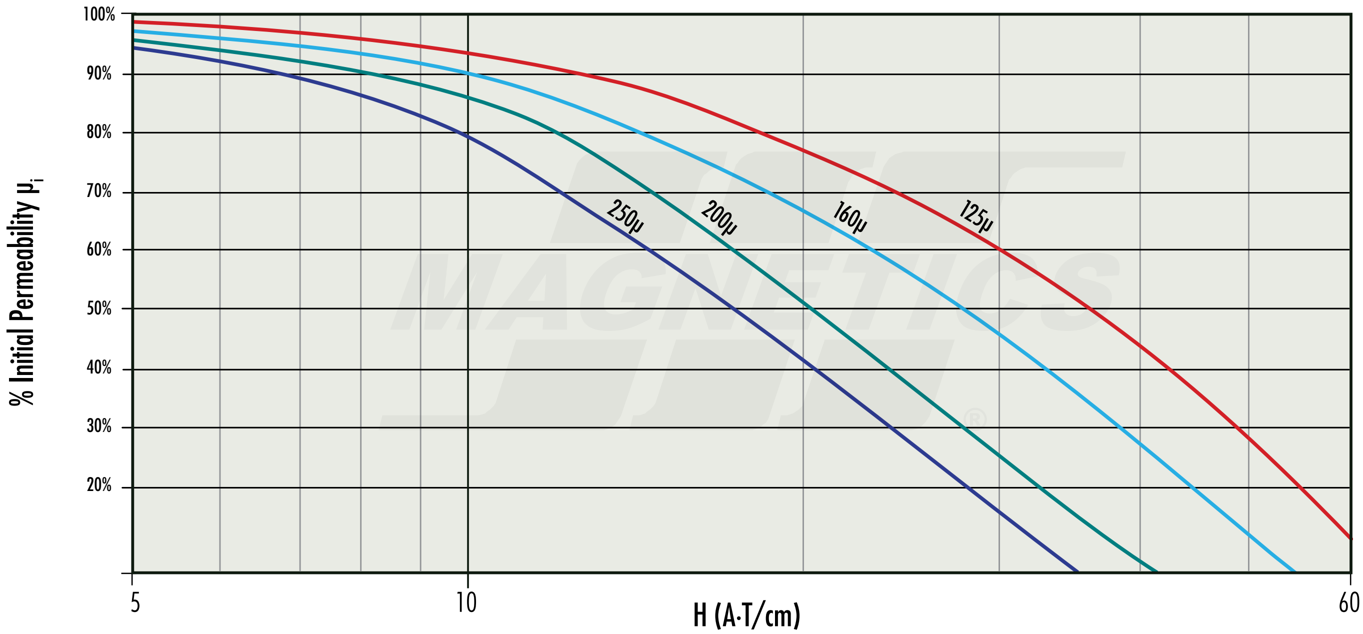


Permeability versus DC Bias Curves

Kool Mμ® Shapes



MPP THINZ®



Permeability versus DC Bias Curves

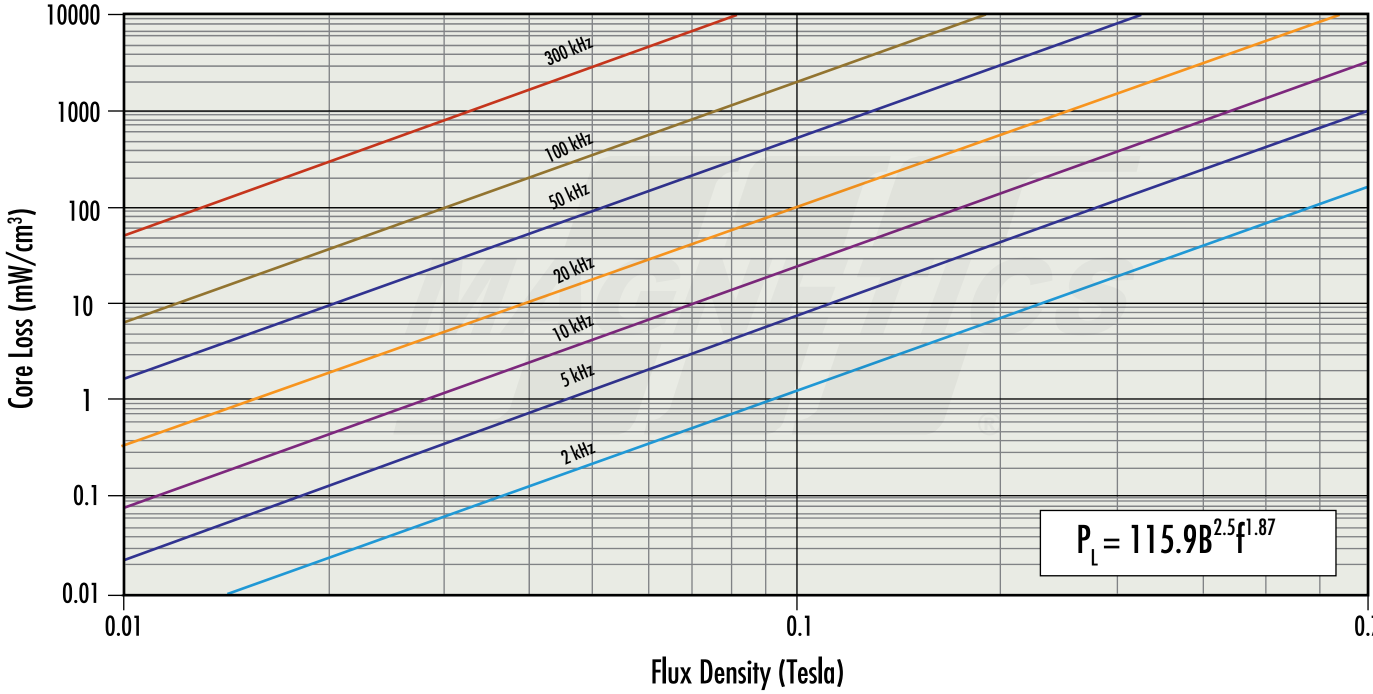
Fit Formula - Toroids

$\mu_{eff}/\mu_i = a + bH + cH^2 + dH^3 + eH^4$ H units: A·T/cm

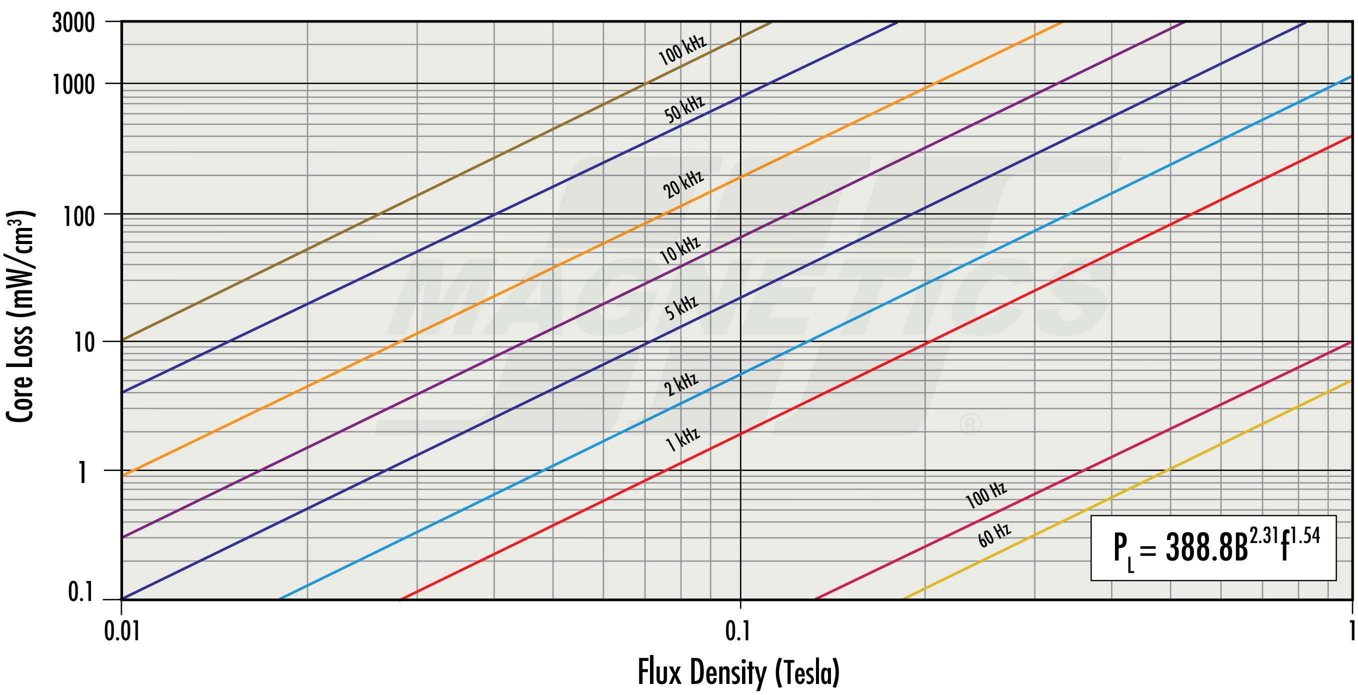
	μ_i	a	b	c	d	e
MPP	14μ	9.985E-01	4.257E-04	-9.611E-06	1.491E-08	-6.250E-12
	26μ	9.985E-01	1.142E-03	-3.762E-05	1.222E-07	-1.218E-10
	60μ	9.971E-01	2.276E-03	-1.623E-04	1.048E-06	-2.013E-09
	125μ	9.966E-01	3.597E-03	-6.530E-04	8.855E-06	-3.569E-08
	147μ	9.968E-01	4.036E-03	-9.462E-04	1.560E-05	-7.660E-08
	160μ	9.973E-01	3.442E-03	-1.060E-03	1.897E-05	-1.004E-07
	173μ	9.987E-01	2.500E-03	-1.152E-03	2.220E-05	-1.305E-07
	200μ	9.958E-01	5.128E-03	-1.499E-03	3.055E-05	-1.850E-07
	300μ	9.942E-01	9.403E-03	-4.140E-03	1.407E-04	-1.425E-06
	550μ	1.025E+00	-1.462E-01	5.685E-03	1.753E-04	-1.038E-05
High Flux	14μ	1	-3.954E-04	4.270E-07	-6.515E-09	6.938E-12
	26μ	1	-8.078E-05	-1.111E-05	2.344E-08	-1.392E-11
	60μ	1	9.701E-04	-7.570E-05	3.849E-07	-5.977E-10
	125μ	1	1.236E-04	-2.238E-04	2.065E-06	-5.613E-09
	147μ	1	3.976E-04	-3.580E-04	4.116E-06	-1.382E-08
	160μ	1	3.016E-03	-5.897E-04	8.228E-06	-3.502E-08
Kool Mμ®	26μ	1	-1.248E-03	-2.020E-05	8.354E-08	-9.503E-11
	40μ	1	-2.799E-03	-3.312E-05	2.126E-07	-3.466E-10
	60μ	1	-4.445E-03	-8.763E-05	9.446E-07	-2.616E-09
	75μ	1	-6.120E-03	-1.380E-04	1.943E-06	-6.956E-09
	90μ	1	-9.031E-03	-1.218E-04	2.254E-06	-9.287E-09
	125μ	1	-9.918E-03	-5.044E-04	1.267E-05	-8.284E-08
XFlux®	26μ	9.970E-01	5.006E-04	-1.510E-05	3.917E-08	-3.396E-11
	60μ	9.887E-01	2.740E-03	-1.091E-04	6.052E-07	-1.058E-09

Core Loss Density Curves

MPP 14µ

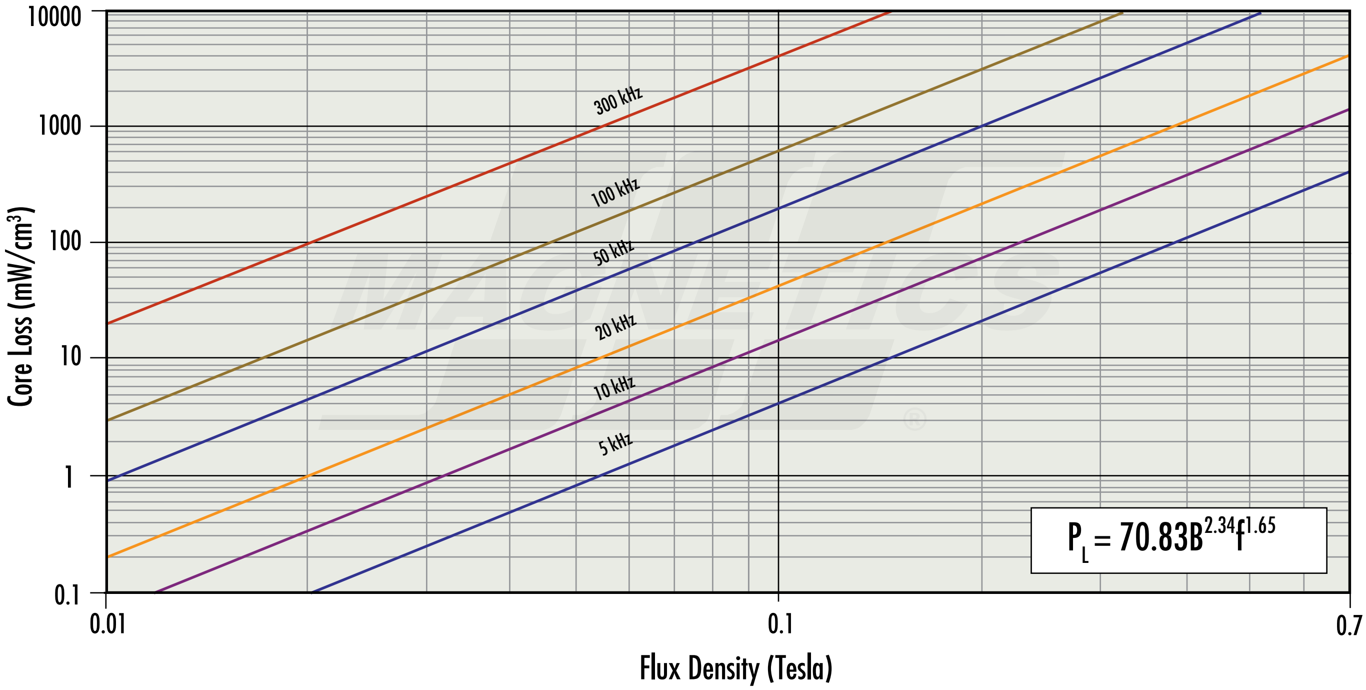


High Flux 14µ

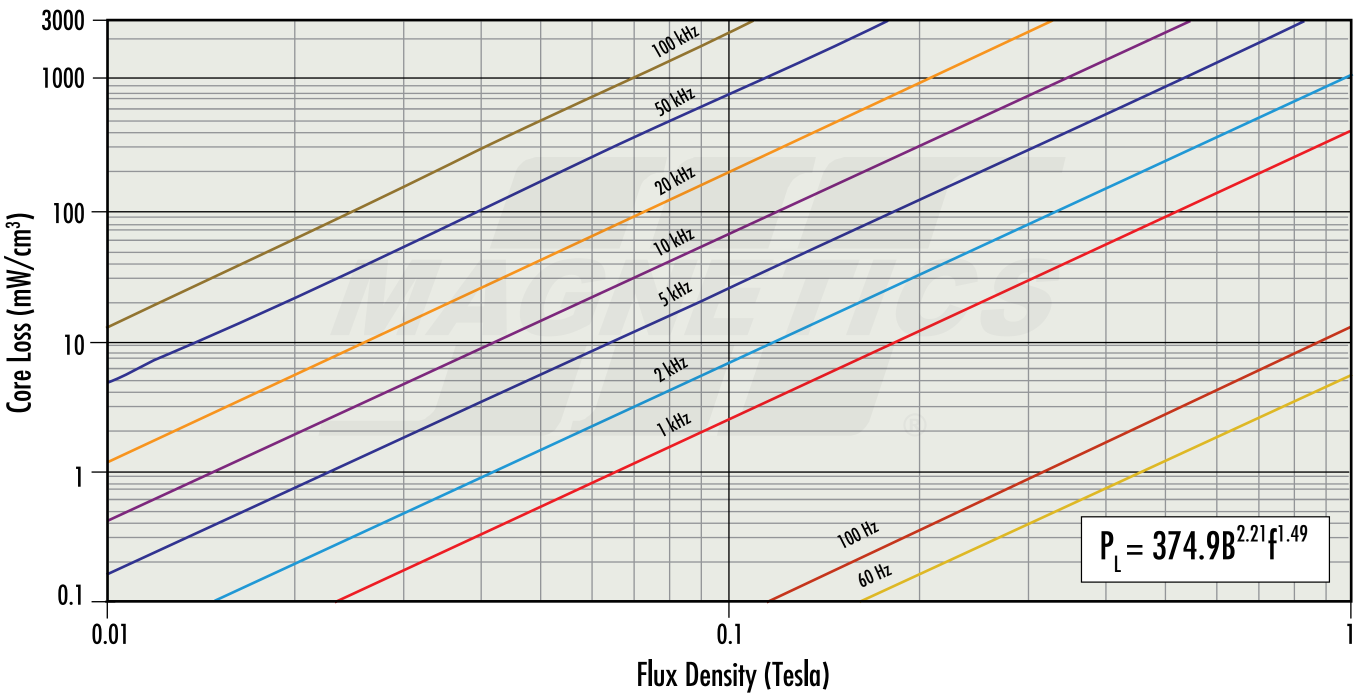


Core Loss Density Curves

MPP 26µ

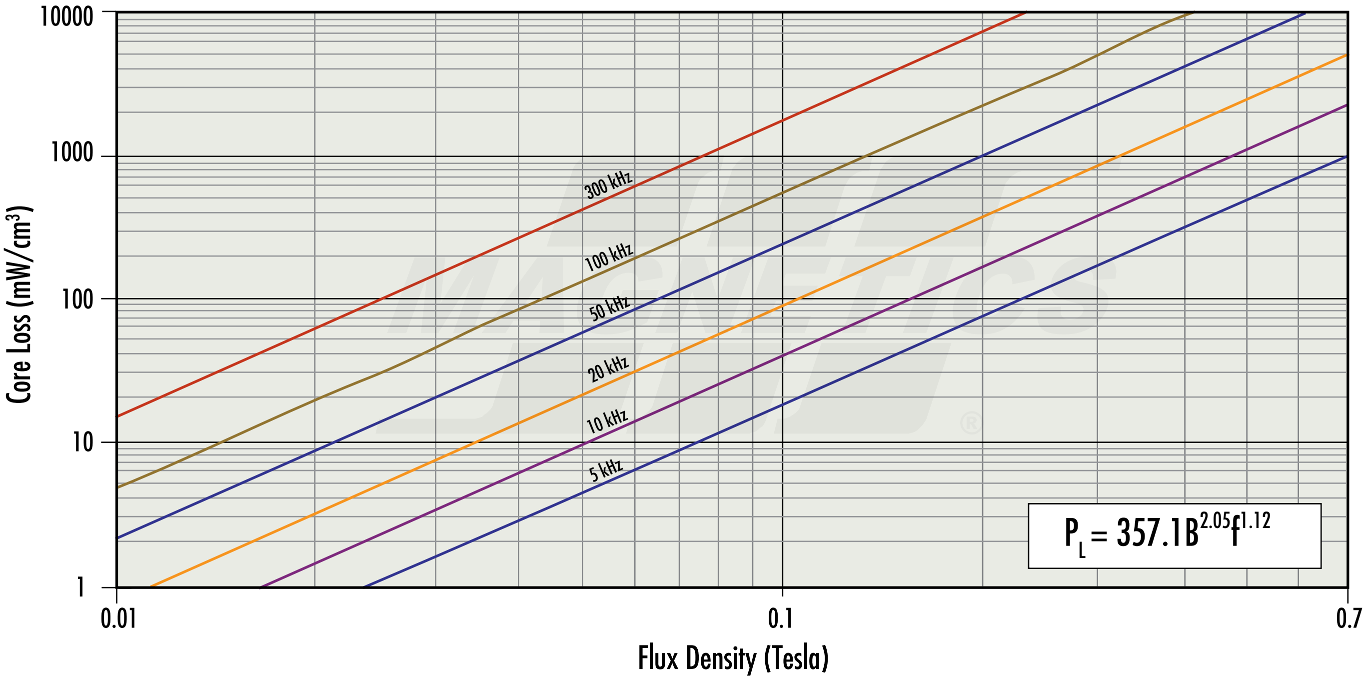


High Flux 26µ

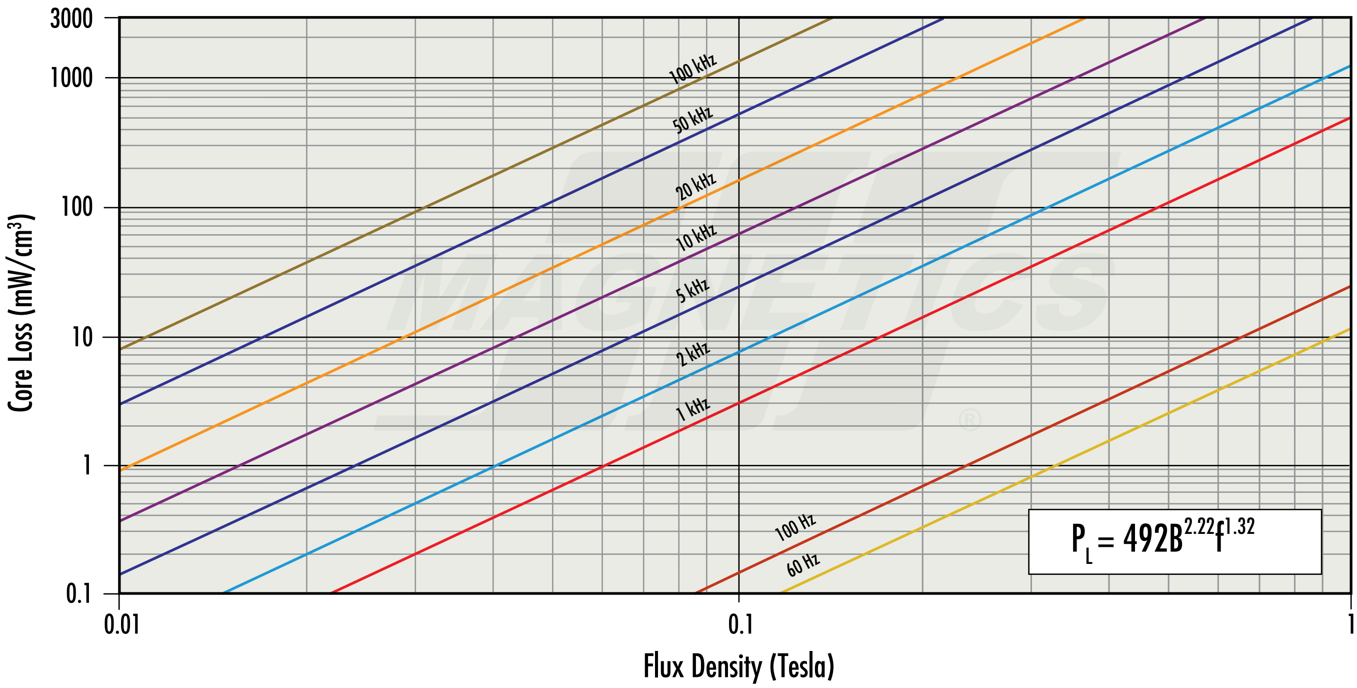


Core Loss Density Curves

MPP 60µ

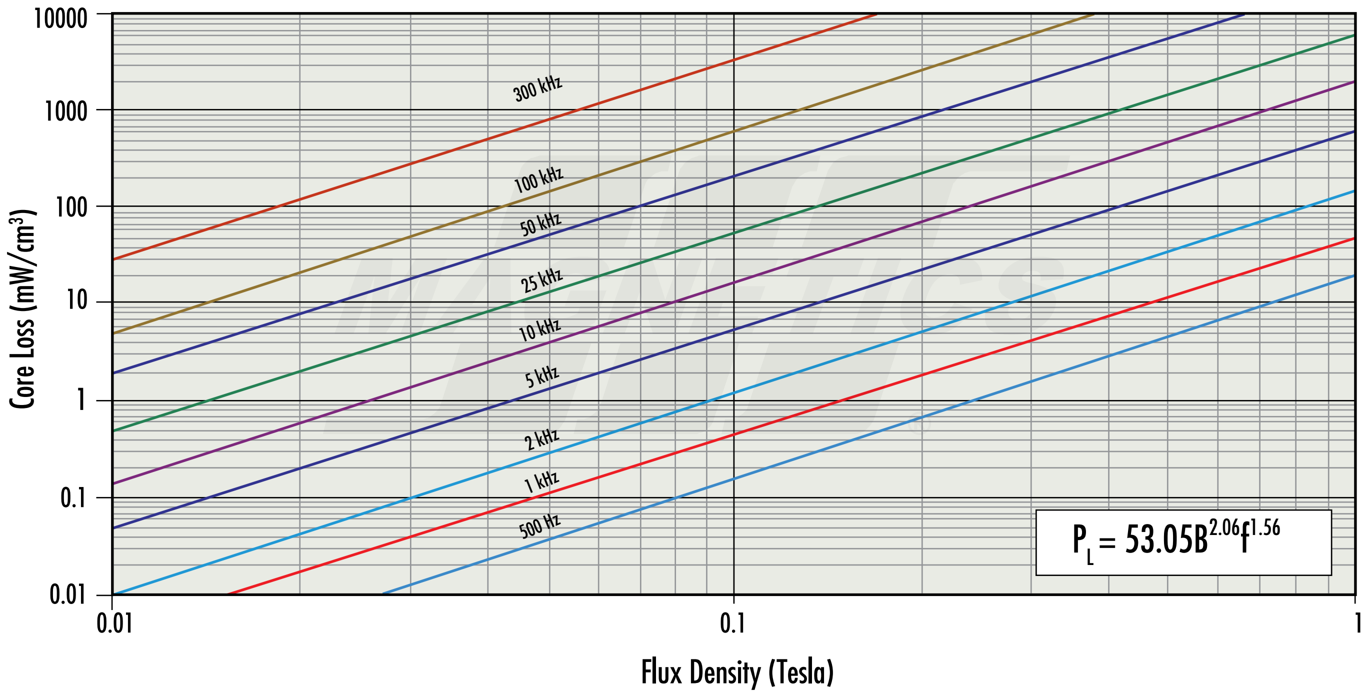


High Flux 60µ

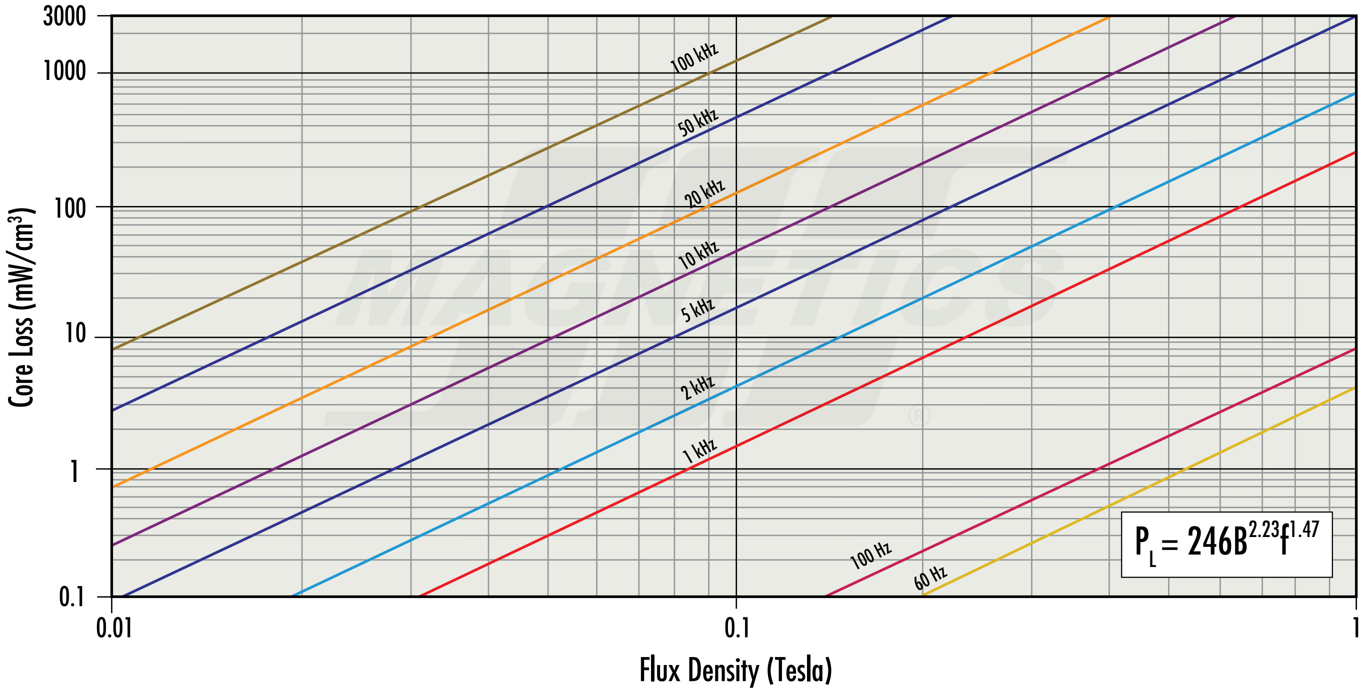


Core Loss Density Curves

MPP 125µ

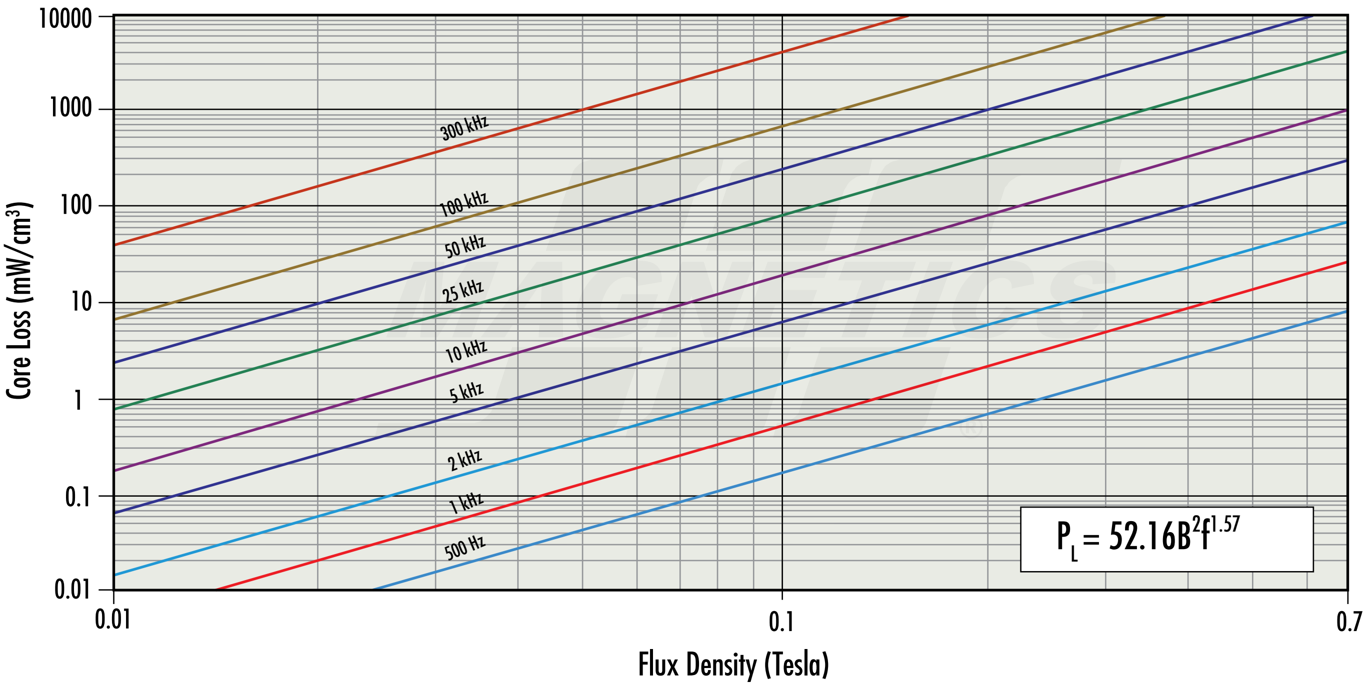


High Flux 125µ

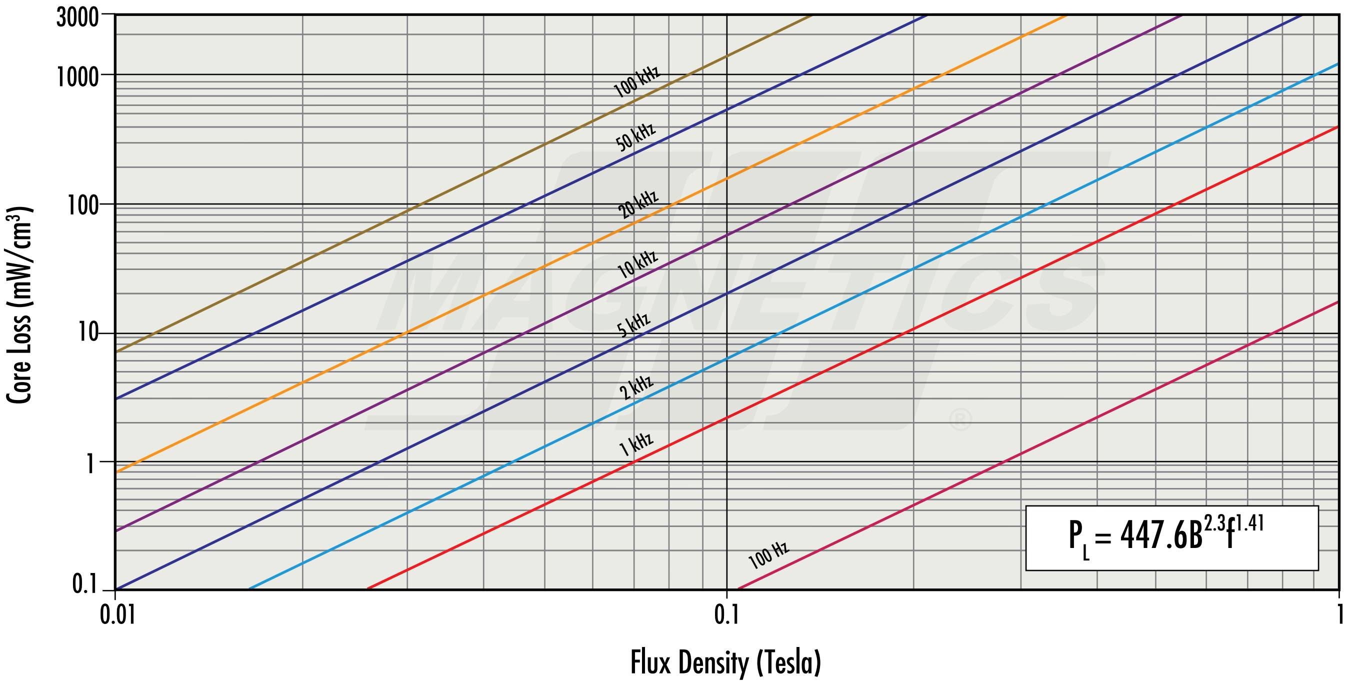


Core Loss Density Curves

MPP 147µ, 160µ, 173µ

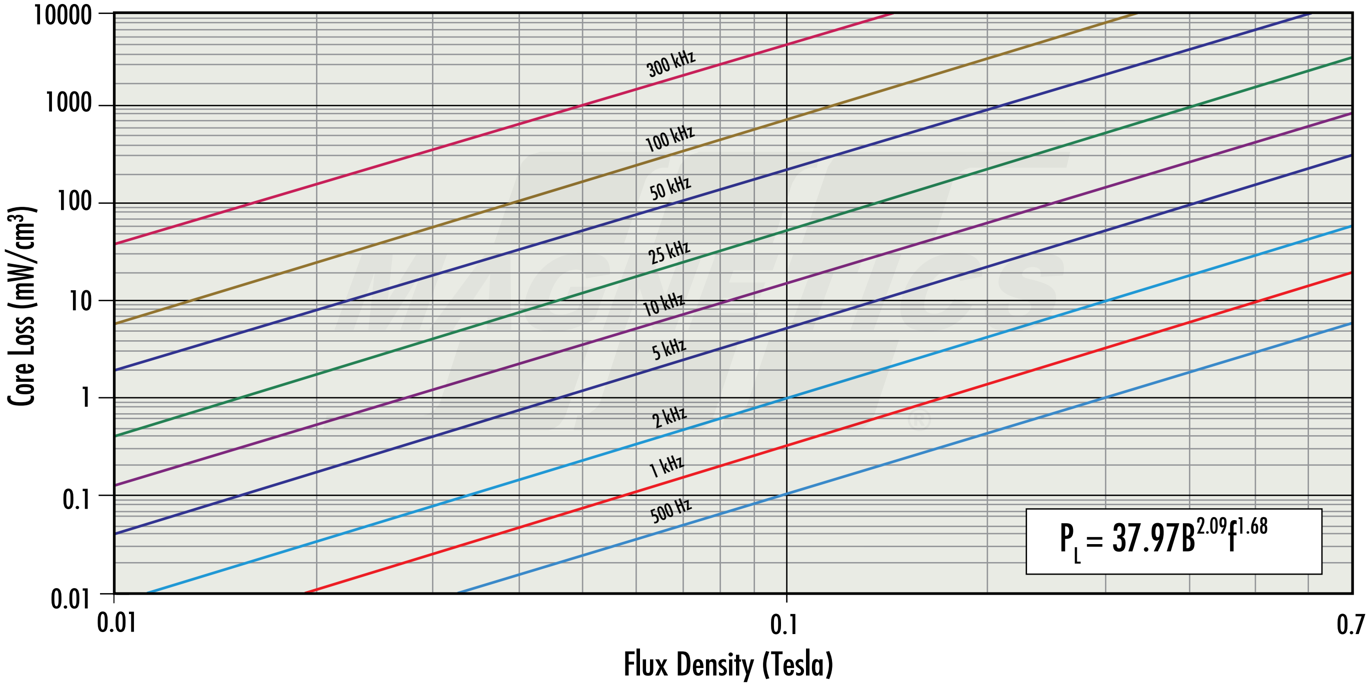


High Flux 147µ, 160µ

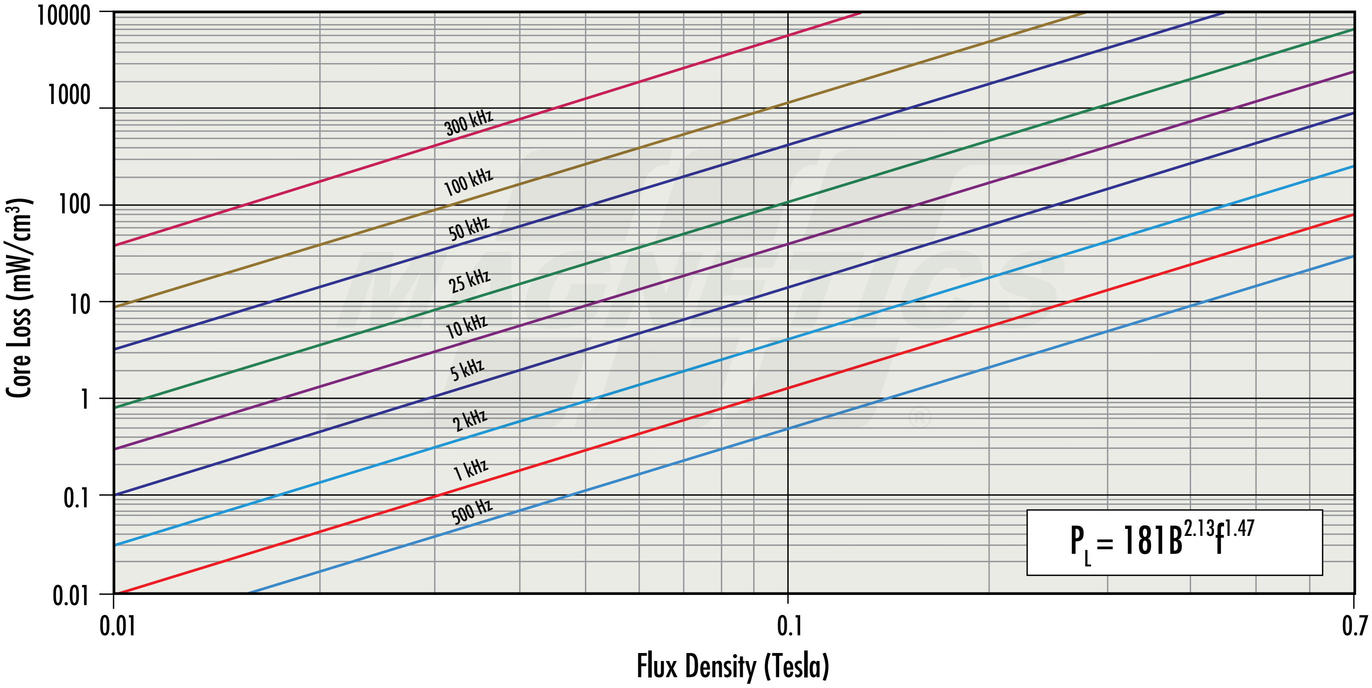


Core Loss Density Curves

MPP 200µ, 300µ

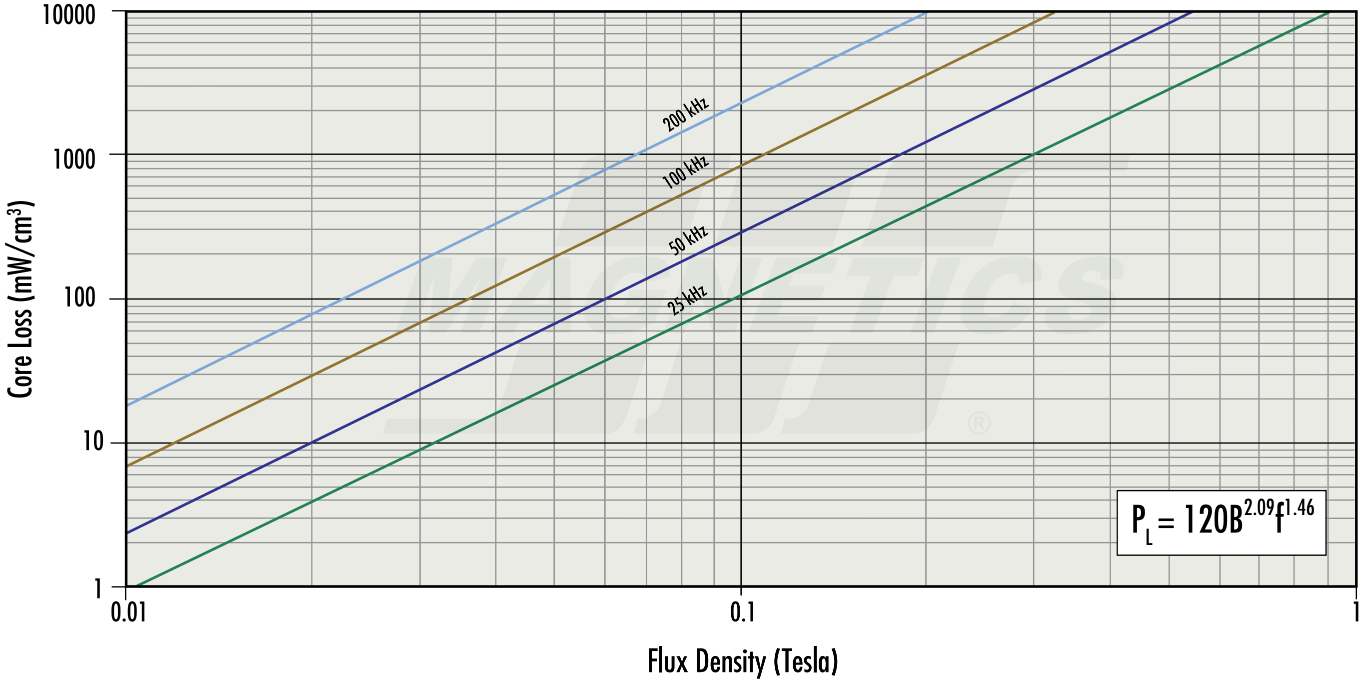


MPP 550µ

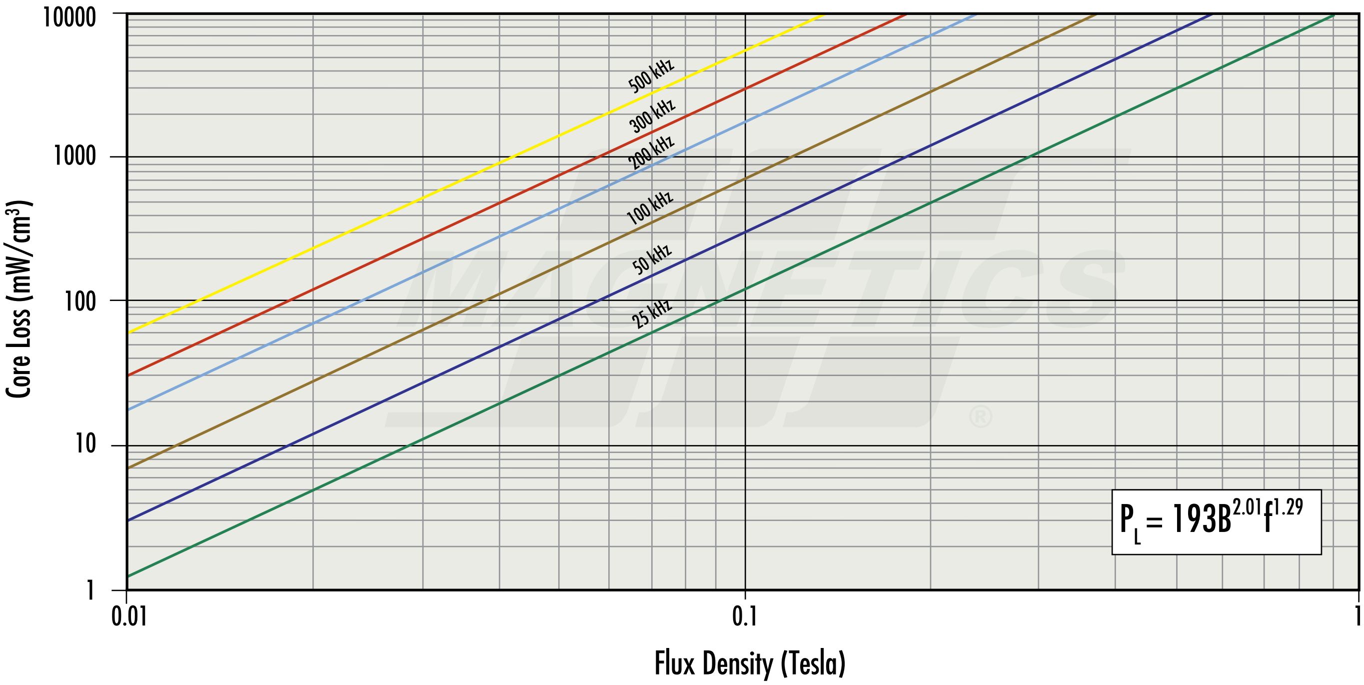


Core Loss Density Curves

Kool Mμ® 26μ, 40μ

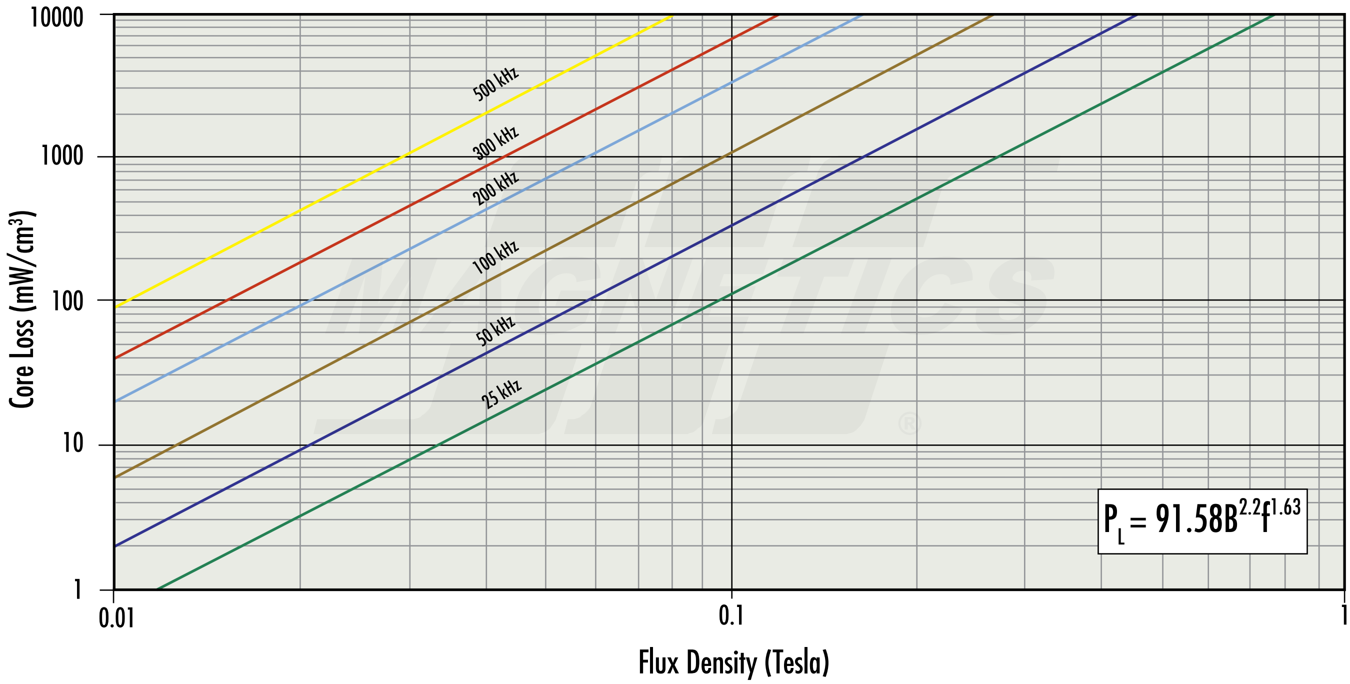


Kool Mμ® 60μ, 75μ, 90μ



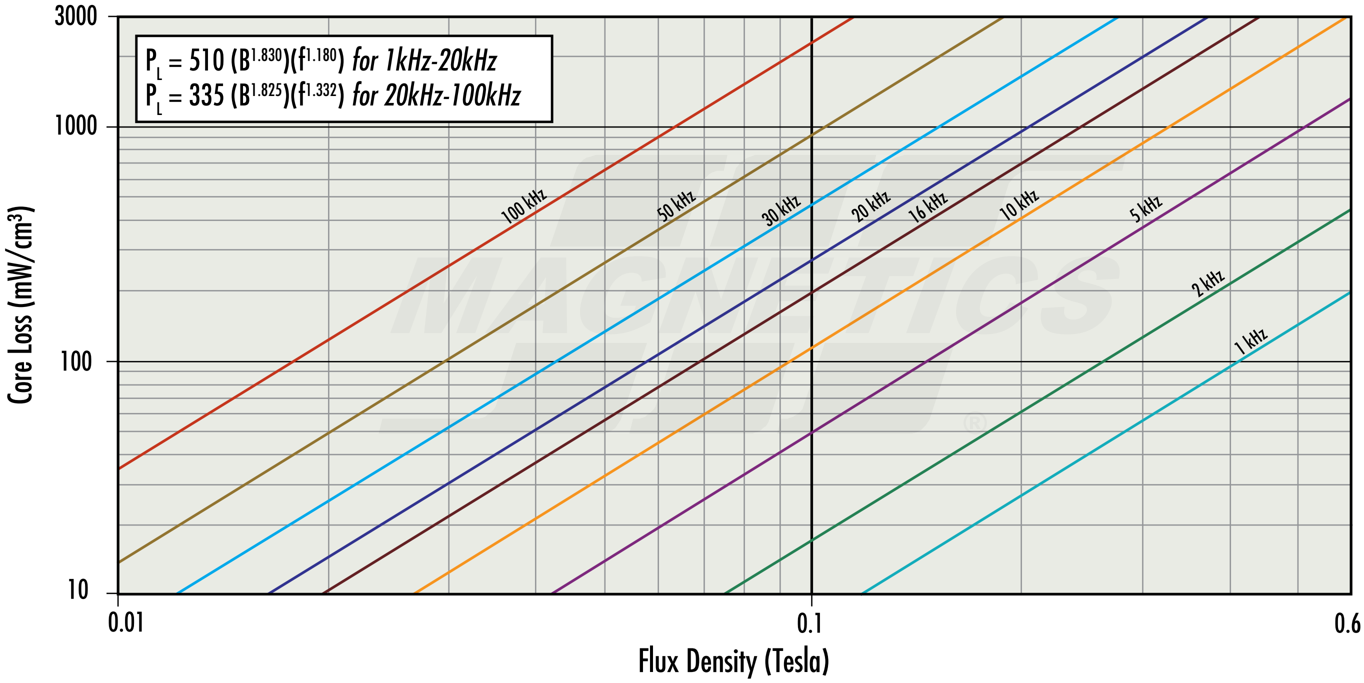
Core Loss Density Curves

Kool Mµ® 125µ

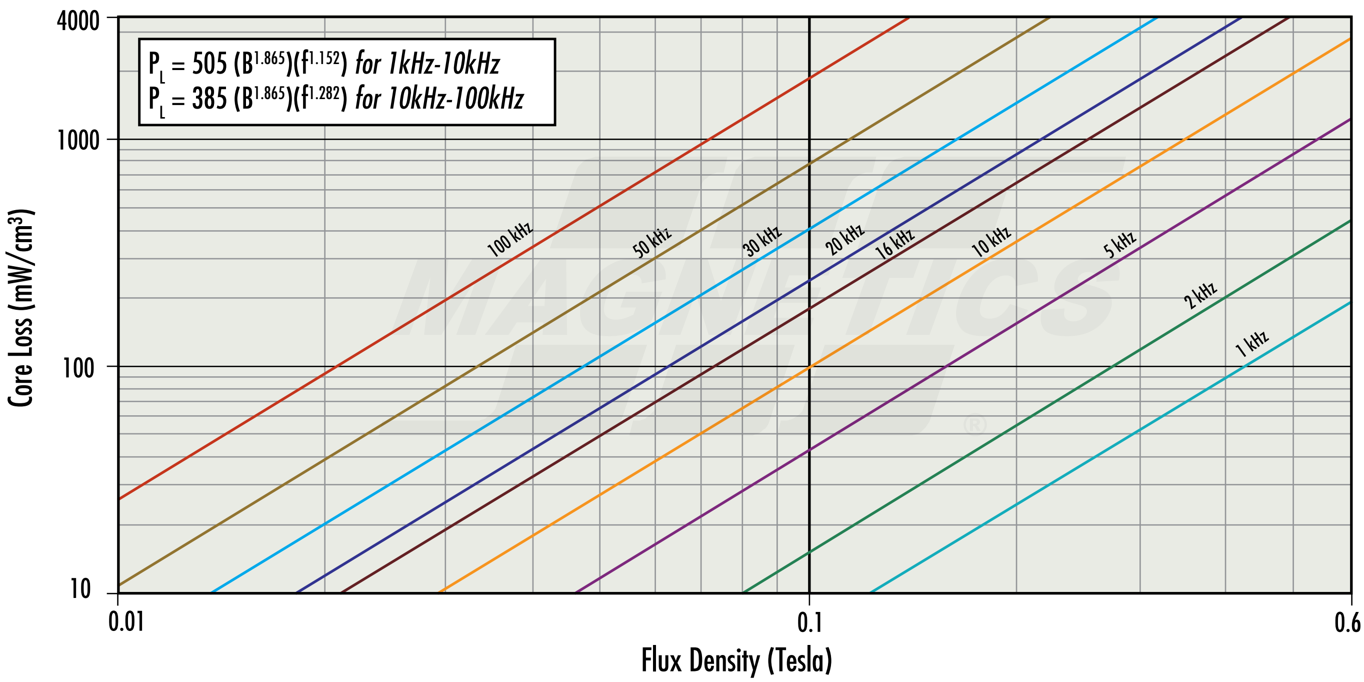


Core Loss Density Curves

XFLUX® 26µ

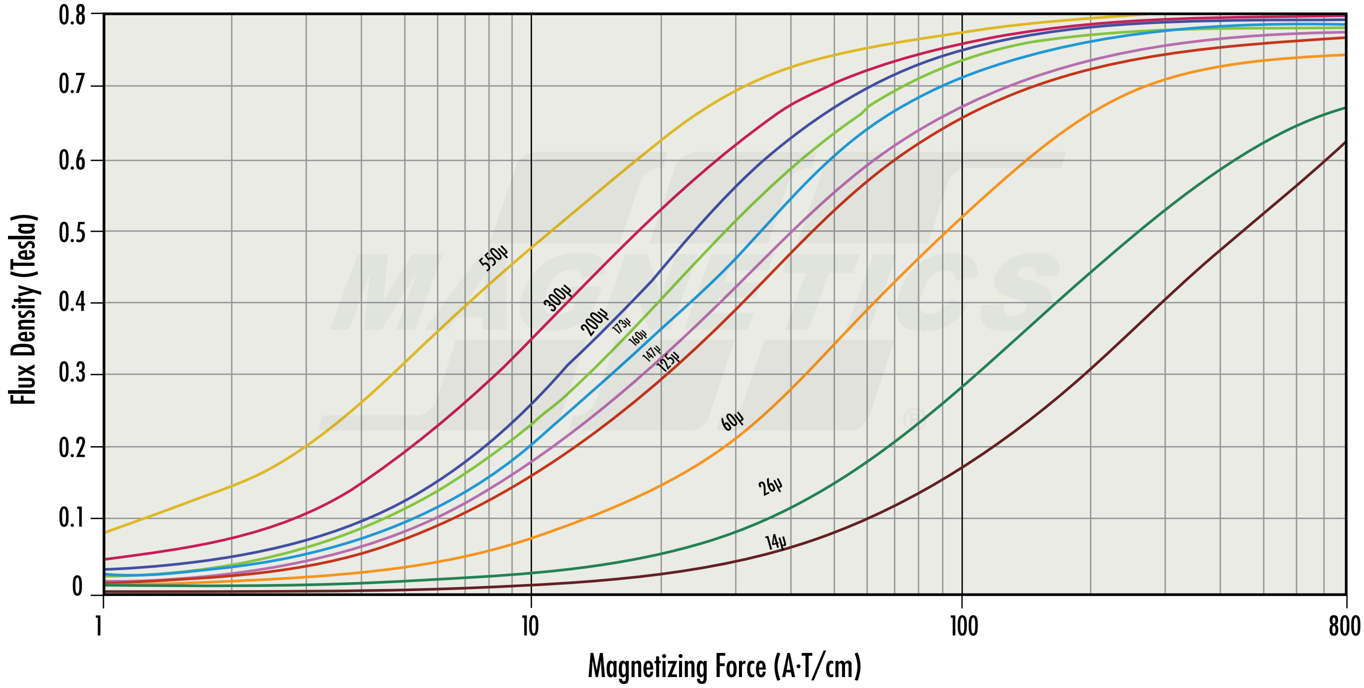


XFLUX® 60µ

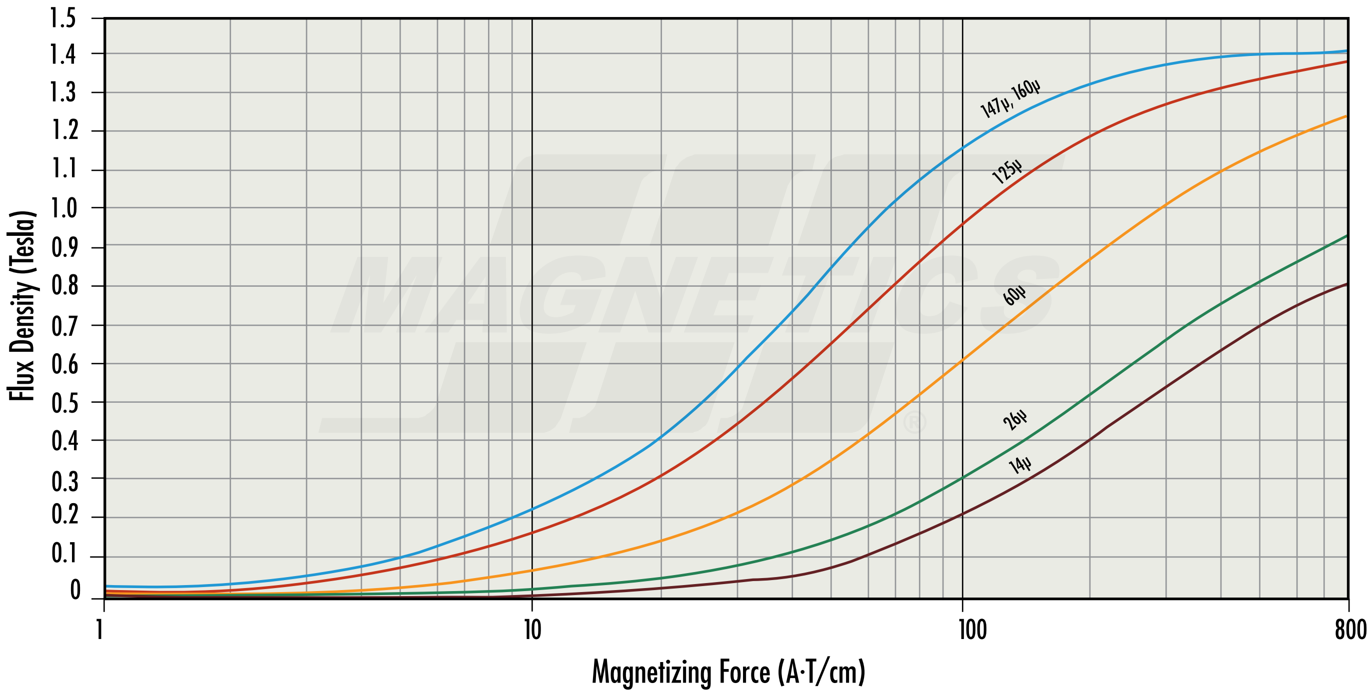


DC Magnetization Curves

MPP

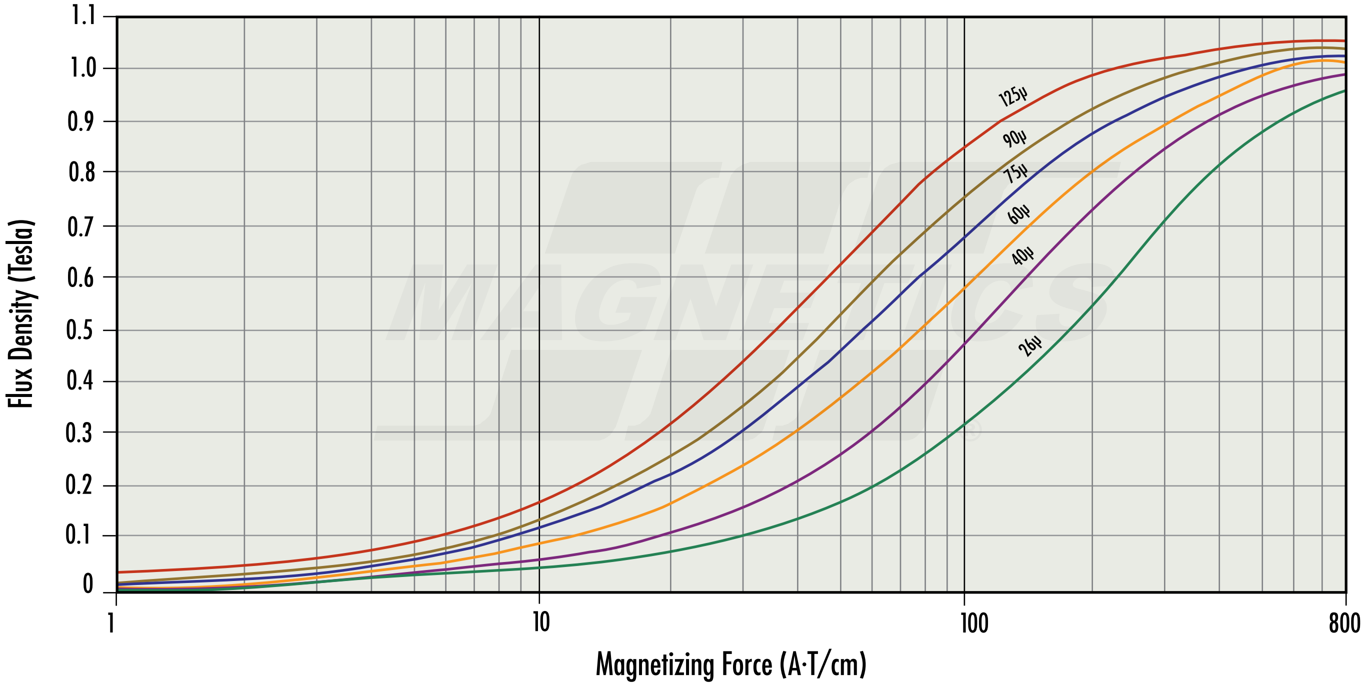


High Flux

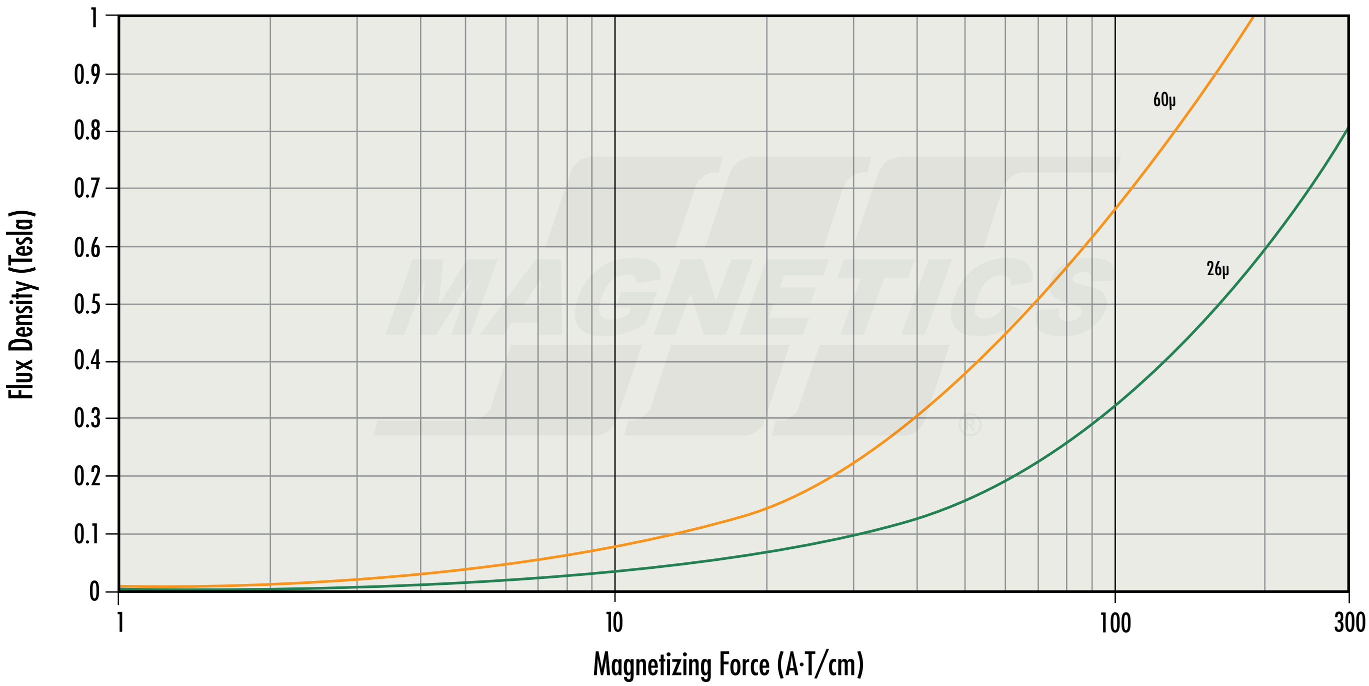


DC Magnetization Curves

Kool Mµ®



XFlux®



DC Magnetization Curves

Fit Formula

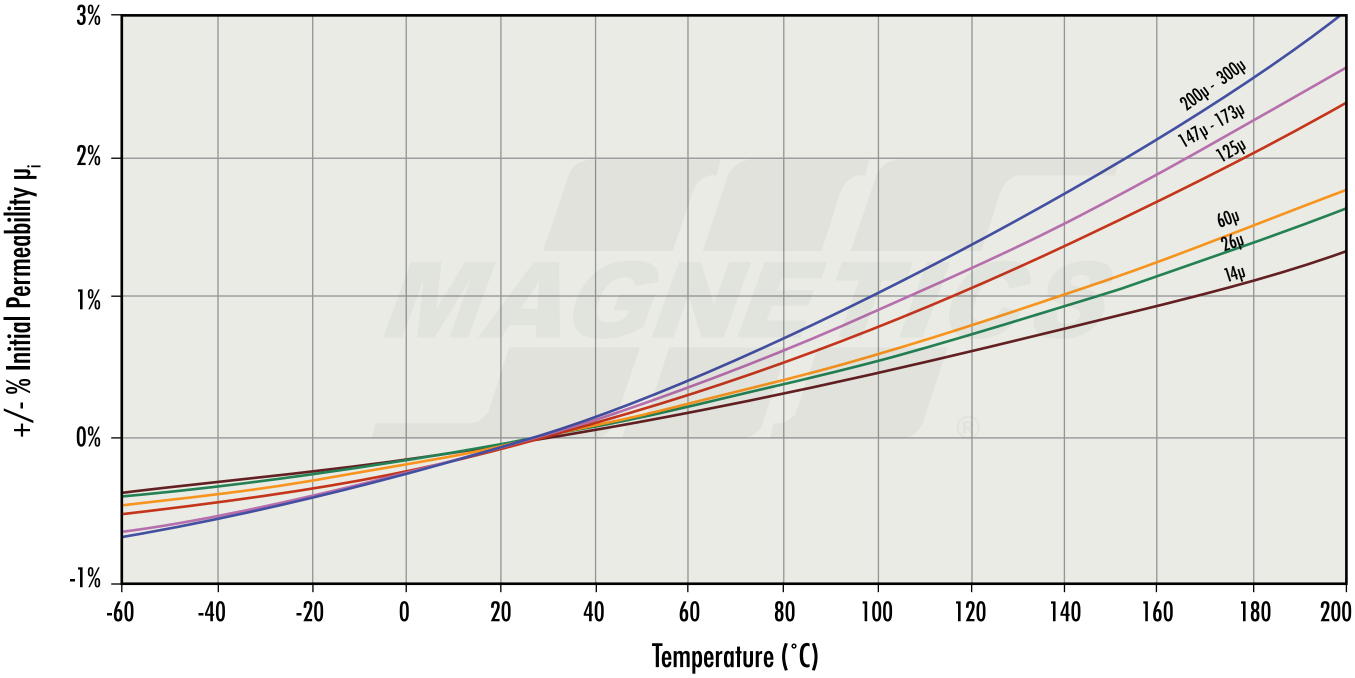
$$B = \left[\frac{a + bH + cH^2}{1 + dH + eH^2}\right]^x$$ Units: B in Tesla; H in A · Turns/cm

where:

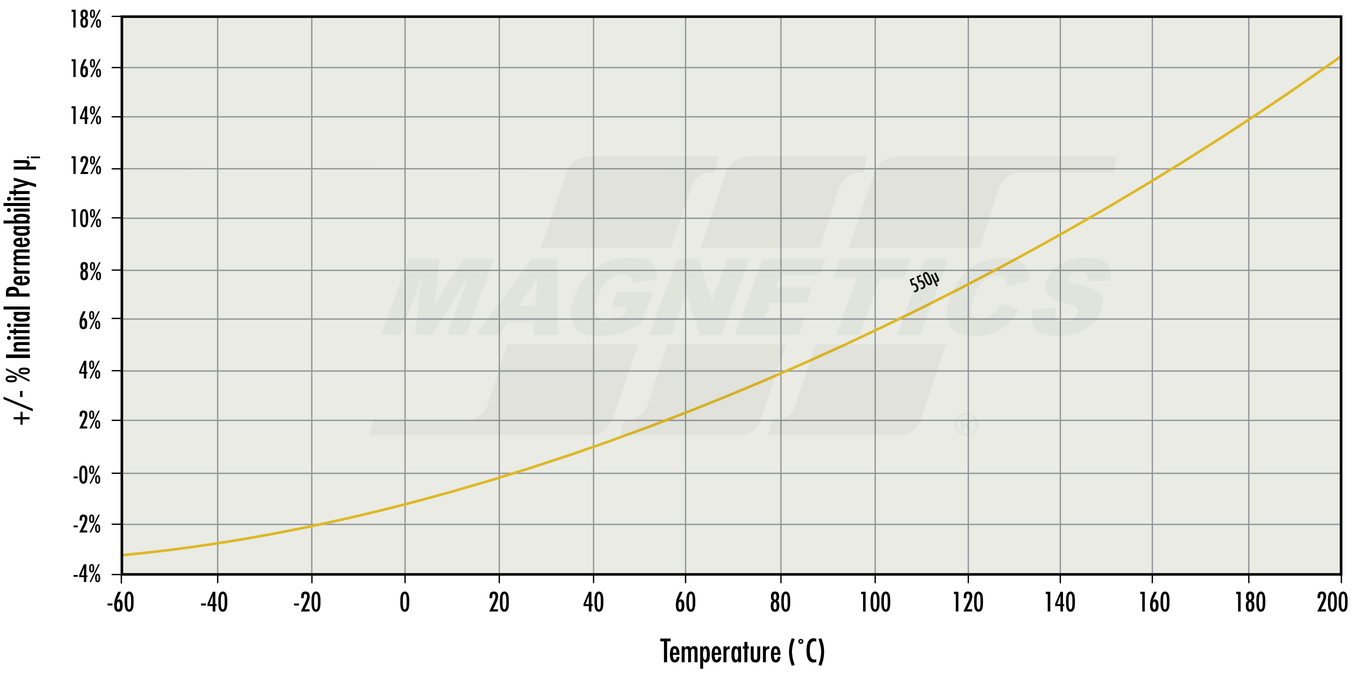
	μ	a	b	c	d	e	x
MPP	14μ	-7.507E+00	6.573E+00	4.619E-01	7.777E+01	4.987E-01	2
	26μ	6.679E-02	1.105E-02	-1.136E-05	1.112E-02	-1.233E-05	2
	60μ	8.146E-02	2.345E-02	6.032E-05	2.476E-02	7.185E-05	2
	125μ	6.420E-04	-6.271E-04	3.253E-04	9.901E-03	5.366E-04	0.5
	147μ	6.530E-04	-7.301E-04	4.516E-04	1.583E-02	7.185E-04	0.5
	160μ	4.470E-04	-5.579E-04	5.211E-04	1.002E-02	8.164E-04	0.5
	173μ	5.450E-04	-7.716E-04	6.506E-04	6.875E-03	1.019E-03	0.5
	200μ	1.001E-03	-1.450E-03	9.127E-04	6.057E-03	1.428E-03	0.5
	300μ	9.400E-04	-1.543E-03	1.990E-03	2.400E-02	3.073E-03	0.5
	550μ	7.300E-04	-1.509E-03	6.482E-03	6.371E-02	9.933E-03	0.5
High Flux	14μ	-5.945E-02	8.703E-03	3.623E-04	5.290E-02	3.474E-04	2
	26μ	-4.067E-02	1.637E-02	3.742E-04	5.316E-02	3.413E-04	2
	60μ	-1.695E-01	1.215E-01	1.213E-02	6.938E-01	1.016E-02	2
	125μ	5.320E-04	-6.811E-04	3.506E-04	1.052E-02	1.694E-04	0.5
	147μ	2.670E-04	-7.829E-04	5.290E-04	2.215E-03	2.606E-04	0.5
	160μ	2.670E-04	-7.829E-04	5.290E-04	2.215E-03	2.606E-04	0.5
Kool Mμ®	26μ	5.868E-05	9.362E-05	9.011E-06	-3.682E-04	8.747E-06	0.5
	40μ	8.870E-05	5.592E-05	2.700E-05	2.928E-04	2.574E-05	0.5
	60μ	1.658E-04	2.301E-05	7.297E-05	5.906E-03	6.053E-05	0.5
	75μ	1.433E-05	9.724E-05	1.323E-04	7.255E-03	1.131E-04	0.5
	90μ	5.660E-04	-1.216E-04	1.974E-04	7.278E-03	1.698E-04	0.5
	125μ	7.808E-05	5.088E-04	2.595E-04	3.922E-03	2.285E-04	0.5
XFlux®	26μ	4.445E-02	2.547E-02	5.153E-04	9.162E-02	3.510E-04	2
	60μ	2.455E-02	8.789E-02	6.444E-03	4.188E-01	4.668E-03	2

Permeability versus Temperature Curves

MPP (14µ-300µ)

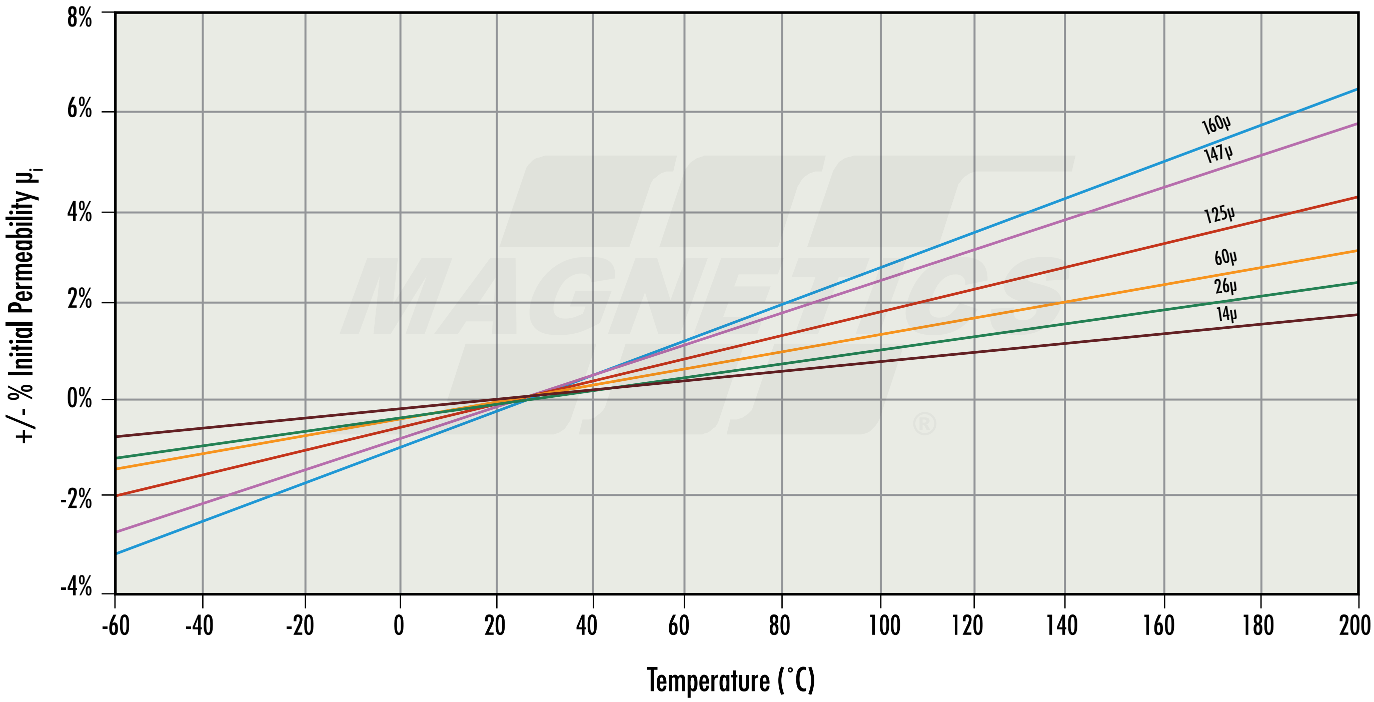


MPP (550µ)

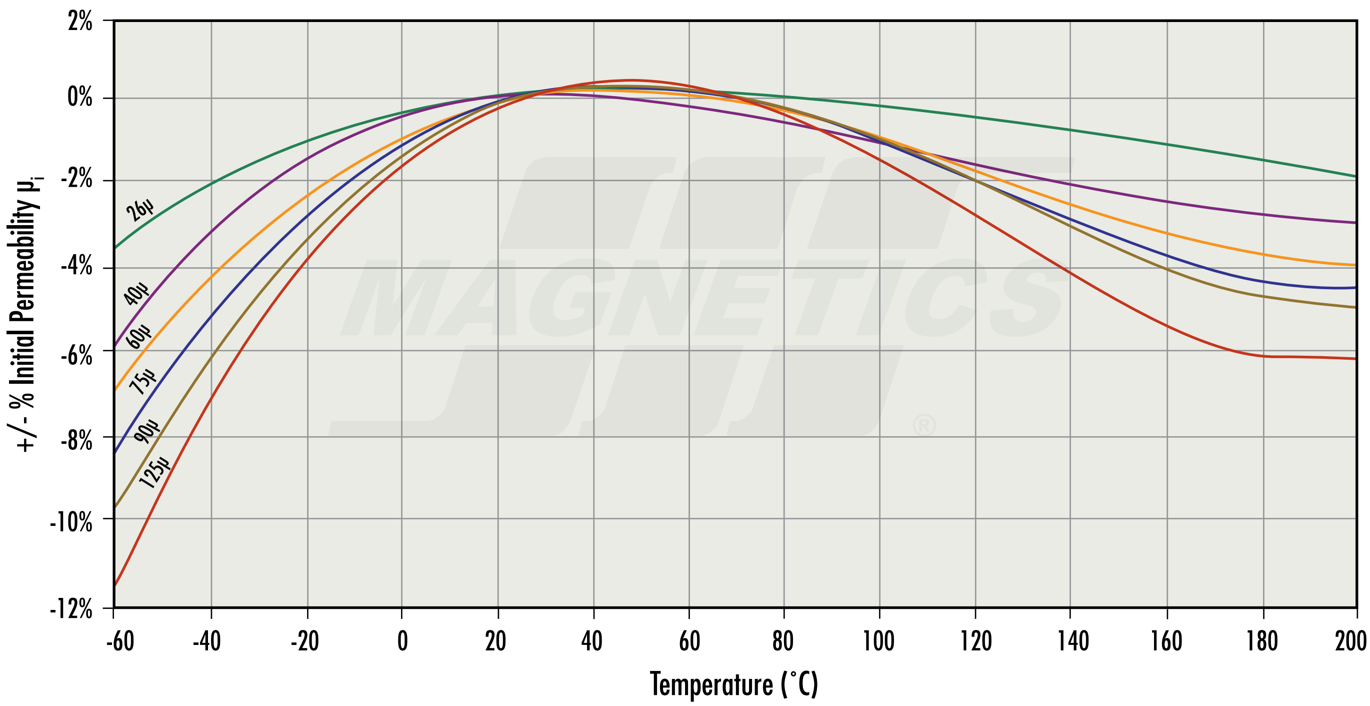


Permeability versus Temperature Curves

High Flux

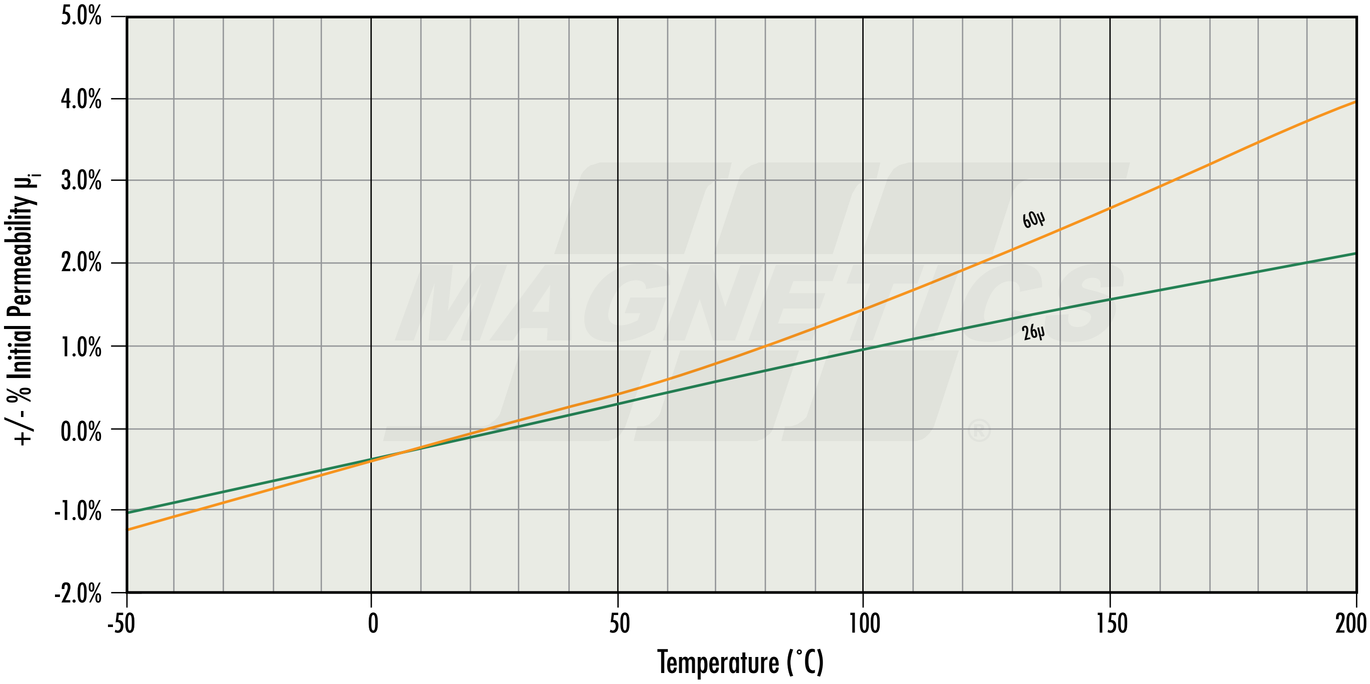


Kool Mμ®



Permeability versus Temperature Curves

XFLUX®



Permeability versus Temperature Curves

Fit Formula

Change compared with $\mu_{25°C} = \frac{\mu_T - \mu_{25°C}}{\mu_{25°C}} = a + bT + cT^2$

where:

	μ	a	b	c
MPP	14μ	-1.300E-03	4.750E-05	1.300E-07
	26μ	-1.431E-03	5.265E-05	1.837E-07
	60μ	-1.604E-03	5.945E-05	1.875E-07
	125μ	-1.939E-03	7.013E-05	2.967E-07
	147μ	-2.308E-03	8.497E-05	2.943E-07
	160	-2.308E-03	8.497E-05	2.943E-07
	173μ	-2.308E-03	8.497E-05	2.943E-07
	200μ	-2.528E-03	9.211E-05	3.601E-07
	300μ	-2.528E-03	9.211E-05	3.601E-07
	550μ	-1.309E-02	4.716E-04	2.086E-06
High Flux	14μ	-2.500E-03	9.670E-05	5.560E-08
	26μ	-3.300E-03	1.290E-04	3.800E-08
	60μ	-4.400E-03	1.740E-04	4.090E-08
	125μ	-6.000E-03	2.400E-04	3.220E-08
	147μ	-7.900E-03	3.140E-04	7.310E-08
	160μ	-9.200E-03	3.670E-04	1.750E-08

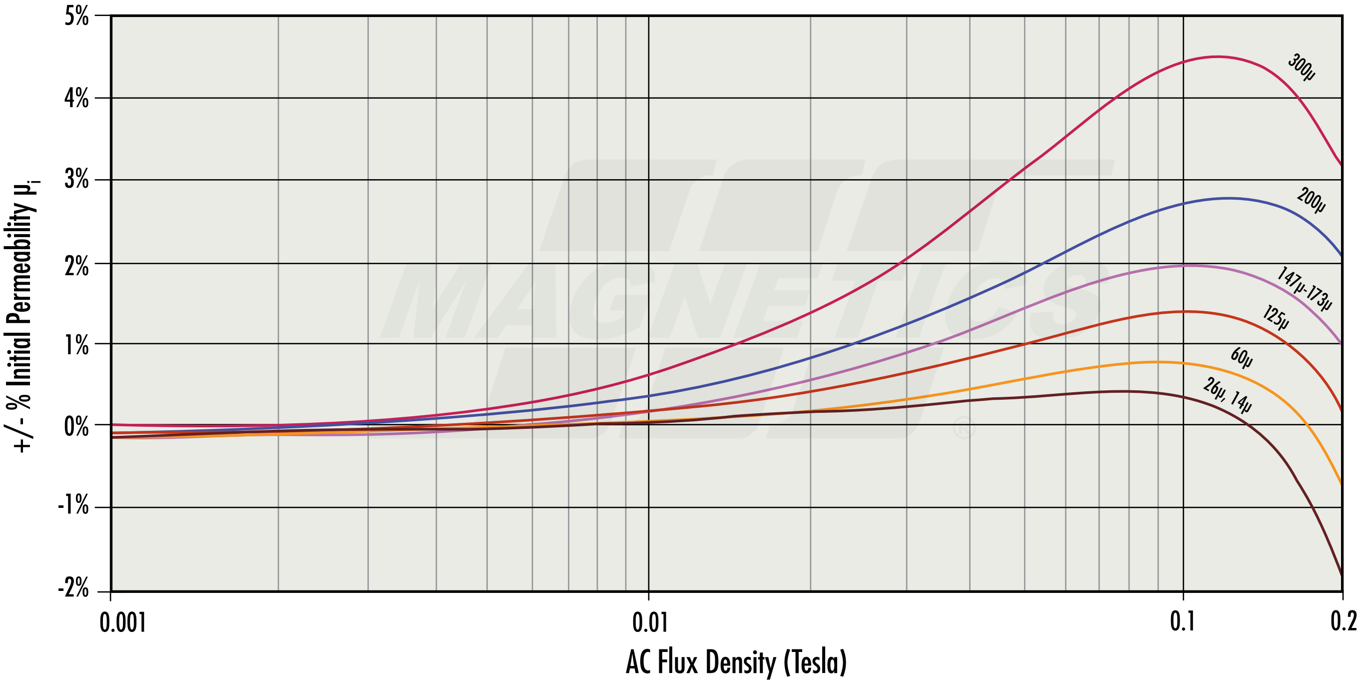
Change compared with $\mu_{25°C} = \frac{\mu_T - \mu_{25°C}}{\mu_{25°C}} = a + bT + cT^2 + dT^3 + eT^4$

where:

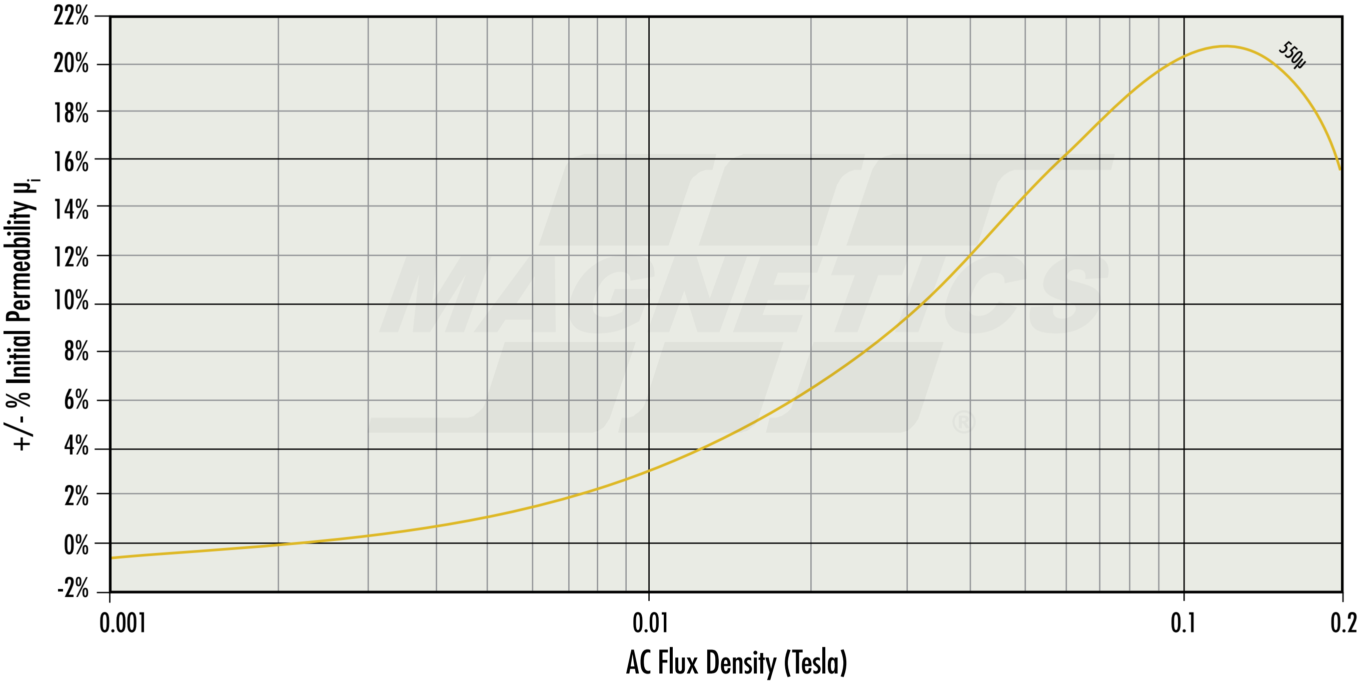
	μ	a	b	c	d	e
Kool Mμ®	26μ	-4.289E-03	2.521E-04	-3.557E-06	1.384E-08	-2.066E-11
	40μ	-5.034E-03	3.521E-04	-6.797E-06	3.193E-08	-4.916E-11
	60μ	-8.841E-03	5.197E-04	-7.064E-06	1.667E-08	8.820E-12
	75μ	-1.174E-02	6.653E-04	-8.195E-06	1.411E-08	3.032E-11
	90μ	-1.369E-02	7.705E-04	-9.385E-06	1.812E-08	2.524E-11
	125μ	-1.647E-02	9.306E-04	-1.132E-05	1.623E-08	5.722E-11
XFlux®	26μ	-3.879E-03	1.356E-04	1.228E-07	-1.739E-09	4.35E-12
	60μ	-4.010E-03	1.553E-04	-1.875E-08	3.907E-09	-1.213E-11

Permeability versus AC Flux Curves

MPP (14µ - 300µ)

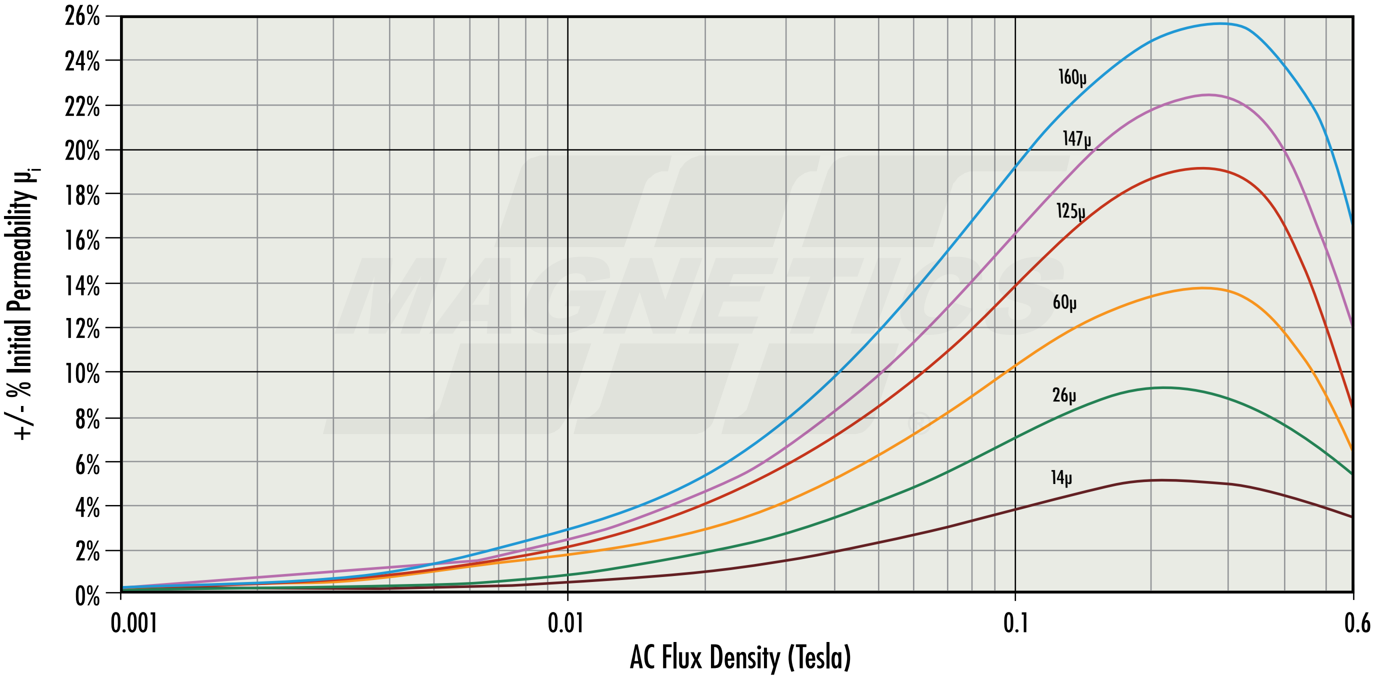


MPP (550µ)

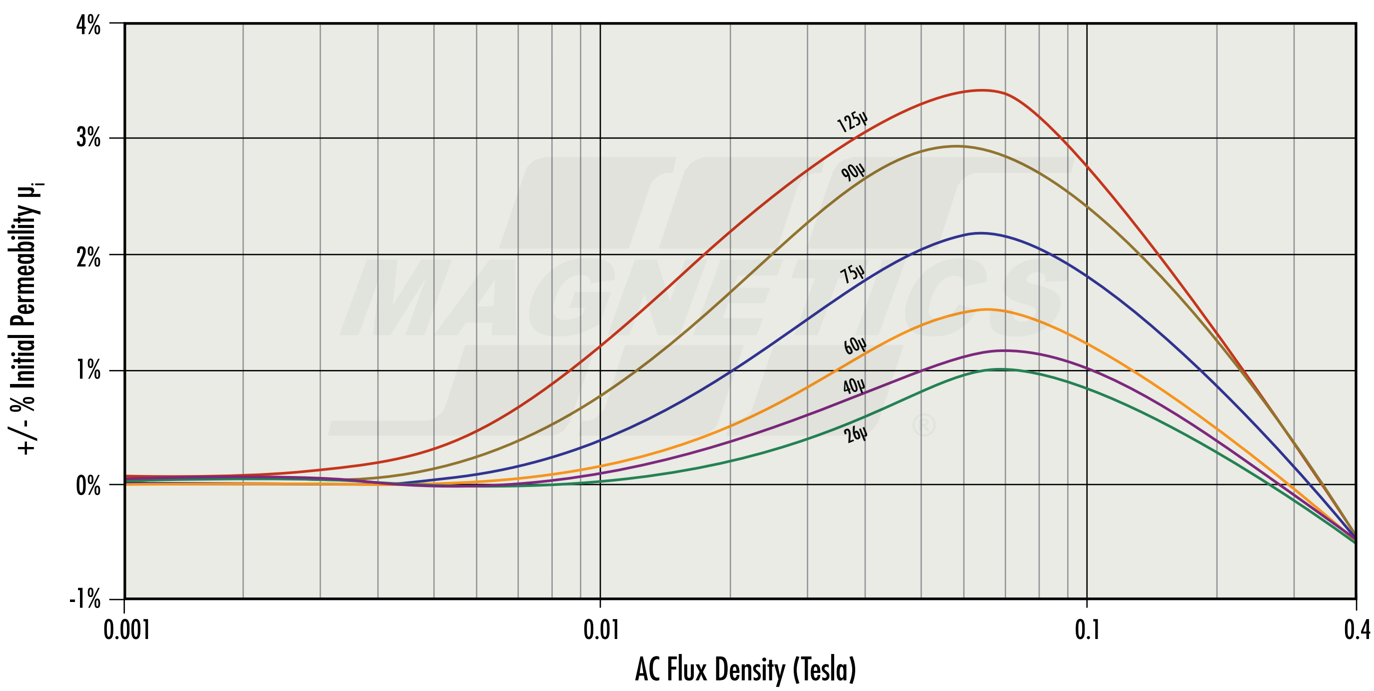


Permeability versus AC Flux Curves

High Flux

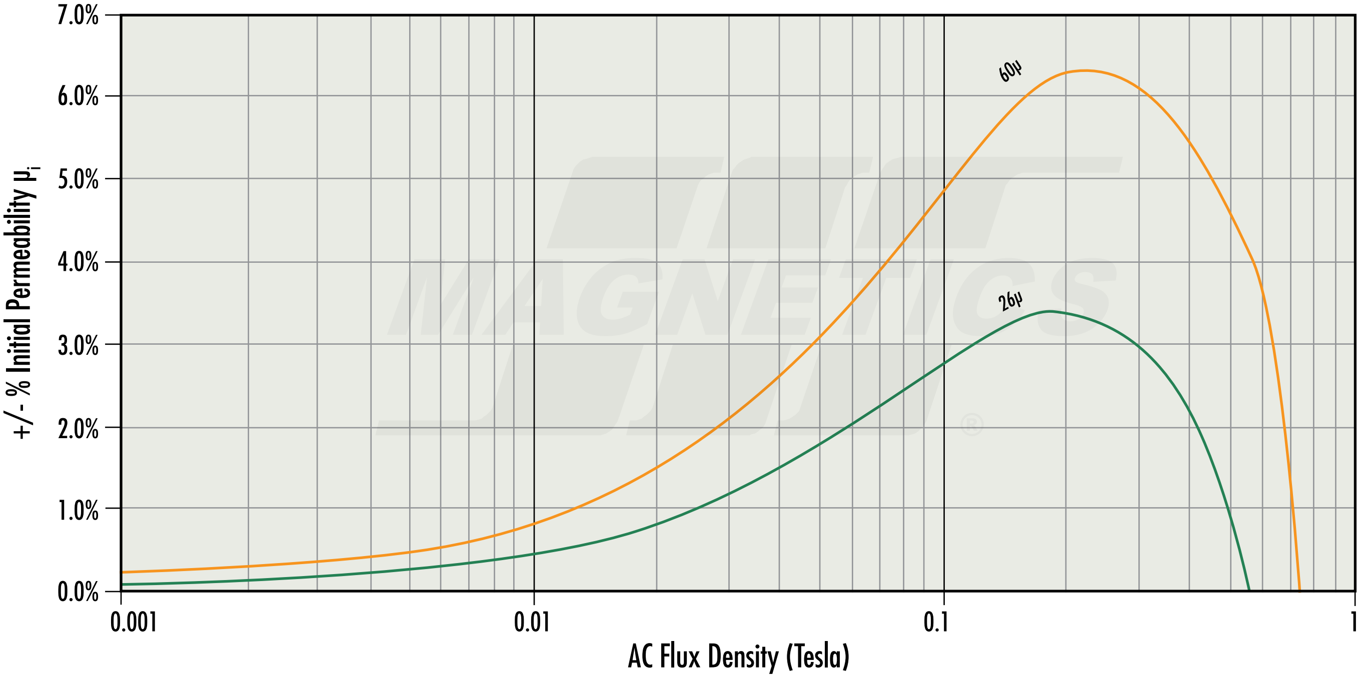


Kool Mμ®



Permeability versus AC Flux Curves

XFLUX®



Permeability versus AC Flux Curves

Fit Formula

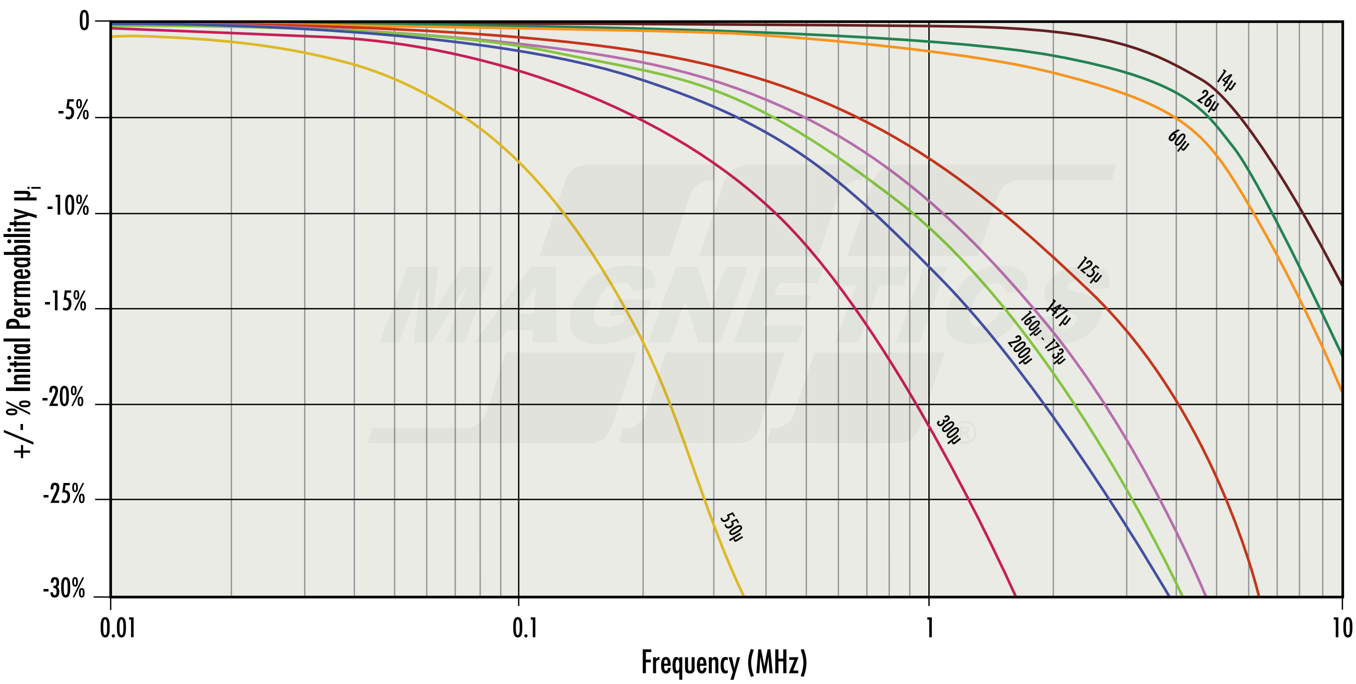
$\pm \mu_i = (a + bB + cB^2 + dB^3 + eB^4)$ Units: B in Tesla

where:

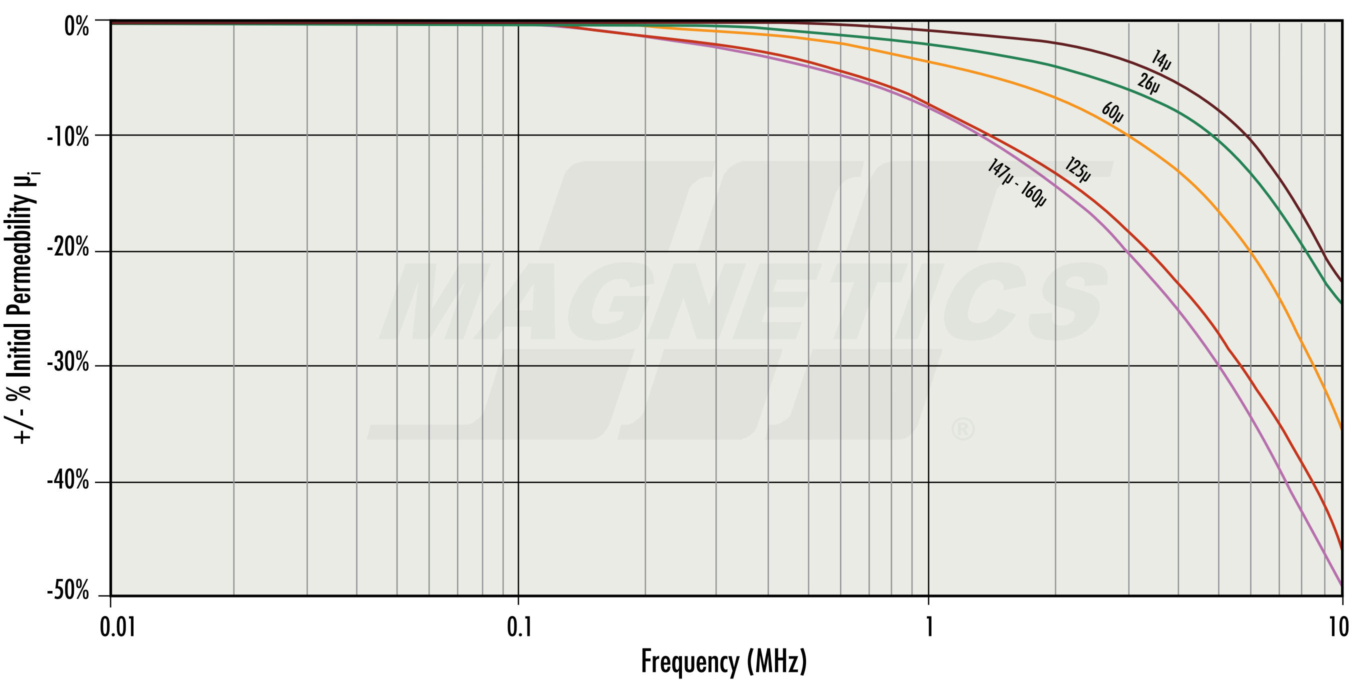
	μ	a	b	c	d	e
MPP	14μ	-5.000E-04	1.186E-01	-5.096E-01	-2.727E+00	0
	26μ	-5.000E-04	1.186E-01	-5.096E-01	-2.727E+00	0
	60μ	-1.000E-03	1.708E-01	-6.675E-01	-1.792E+00	0
	125μ	-1.000E-03	2.960E-01	-1.561E+00	8.254E-01	0
	147μ	-2.000E-03	4.393E-01	-2.591E+00	3.446E+00	0
	160μ	-2.000E-03	4.393E-01	-2.591E+00	3.446E+00	0
	173μ	-2.000E-03	4.393E-01	-2.591E+00	3.446E+00	0
	200μ	-1.000E-03	5.145E-01	-2.688E+00	3.308E+00	0
	300μ	-2.000E-03	9.038E-01	-5.112E+00	7.055E+00	0
	550μ	-9.000E-03	4.042E+00	-2.240E+01	3.123E+01	0
High Flux	14μ	-1.000E-03	5.458E-01	-1.930E+00	2.598E+00	-1.228E+00
	26μ	-2.000E-03	1.020E+00	-3.696E+00	5.099E+00	-2.529E+00
	60μ	0	1.476E+00	-5.695E+00	9.395E+00	-6.182E+00
	125μ	0	1.934E+00	-6.792E+00	1.014E+01	-6.347E+00
	147μ	0	2.350E+00	-8.895E+00	1.465E+01	-9.716E+00
	160μ	-2.000E-03	2.910E+00	-1.224E+01	2.263E+01	-1.590E+01
Kool Mμ®	26μ	-1.300E-03	4.711E-01	-5.779E+00	2.102E+01	-2.121E+01
	40μ	-2.000E-03	5.866E-01	-7.404E+00	2.883E+01	-3.397E+01
	60μ	-1.900E-03	7.340E-01	-9.824E+00	4.486E+01	-7.157E+01
	75μ	-2.800E-03	1.024E+00	-1.333E+01	5.704E+01	-8.069E+01
	90μ	-2.800E-03	1.430E+00	-2.092E+01	1.115E+02	-2.135E+02
	125μ	-2.400E-03	1.740E+00	-2.662E+01	1.531E+02	-3.170E+02
XFlux®	26μ	-3.846E-04	4.288E-01	-1.853E+00	3.132E+00	-2.138E+00
	60μ	-1.584E-03	7.074E-01	-2.782E+00	4.403E+00	-2.621E+00

Permeability versus Frequency Curves

MPP

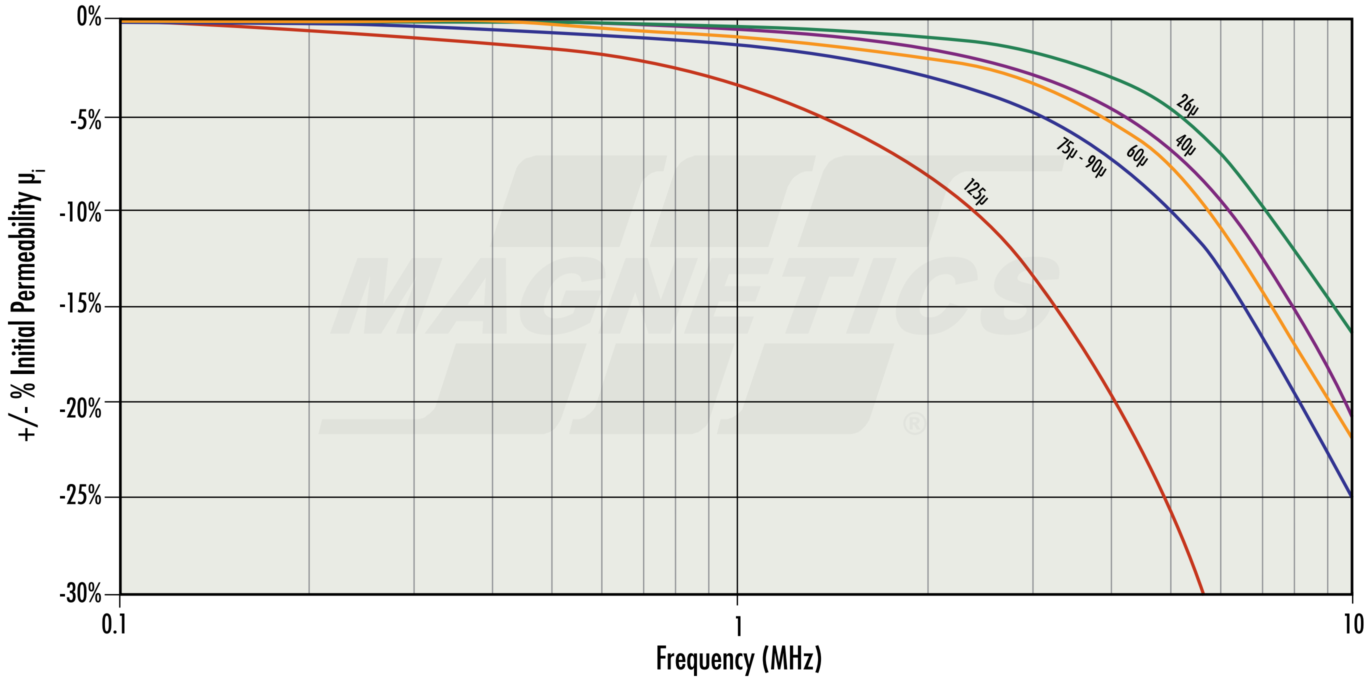


High Flux

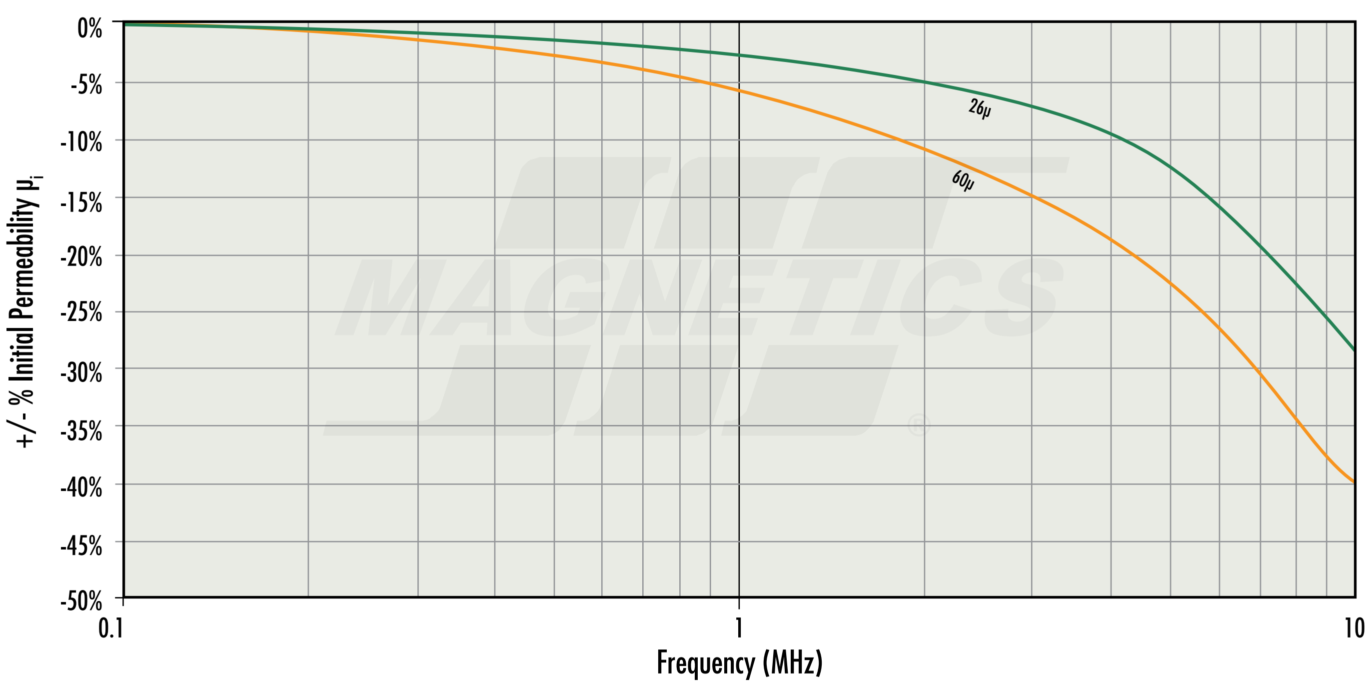


Permeability versus Frequency Curves

Kool Mμ®



XFlux®



Permeability versus Frequency Curves

Fit Formula

$\pm \mu_i = a + bf + cf^2 + df^3 + ef^4$ Units: f in MHz

where:

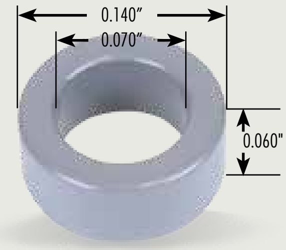
	µ	a	b	c	d	e
MPP	14µ	0	-2.320E-03	7.630E-04	-5.070E-04	3.170E-05
	26µ	0	-1.560E-02	5.190E-03	-1.160E-03	6.230E-05
	60µ	0	-1.820E-02	4.320E-03	-9.780E-04	5.360E-05
	125µ	0	-8.430E-02	1.590E-02	-2.270E-03	1.080E-04
	147µ	0	-1.110E-01	2.040E-02	-2.810E-03	1.300E-04
	160µ	0	-1.290E-01	2.390E-02	-3.080E-03	1.410E-04
	173µ	0	-1.290E-01	2.390E-02	-3.080E-03	1.410E-04
	200µ	0	-1.610E-01	3.820E-02	-5.170E-03	2.160E-04
	300µ	0	-2.590E-01	5.570E-02	-6.530E-03	2.780E-04
	550µ	0	–4.590E-01	-3.3E+00	8.14E+00	-5.73E+00
High Flux	14µ	0	-1.070E-02	5.960E-04	-4.920E-04	3.070E-05
	26µ	0	-2.560E-02	3.430E-03	-7.340E-04	3.990E-05
	60µ	0	-3.870E-02	3.050E-03	-5.490E-04	2.690E-05
	125µ	0	-8.600E-02	1.140E-02	-1.370E-03	6.050E-05
	147µ	0	-8.170E-02	7.330E-03	-6.400E-04	2.390E-05
	160µ	0	-8.590E-02	7.220E-03	-5.530E-04	1.880E-05
Kool Mµ®	26µ	0	-5.500E-03	1.400E-03	-6.200E-04	3.700E-05
	40µ	0	-7.300E-03	8.400E-04	-5.900E-04	3.700E-05
	60µ	0	-1.100E-02	1.600E-03	-7.100E-04	4.400E-05
	75µ	0	-2.000E-02	3.500E-03	-9.500E-04	5.500E-05
	90µ	0	-1.500E-02	6.900E-04	-4.800E-04	3.100E-05
	125µ	0	-3.000E-02	-5.500E-03	2.400E-04	4.500E-06
XFlux®	26µ	3.000E-04	-3.132E-02	4.902E-03	-1.015E-03	5.543E-05
	60µ	6.805E-03	-7.575E-02	1.206E-02	-1.607E-03	7.524E-05

MAGNETICS®

Notes

3.56 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	3.56 mm/0.140 in	1.78 mm/0.070 in	1.52 mm/0.060 in
After Finish (limits)	4.20 mm/0.165 in	1.27 mm/0.050 in	2.16 mm/0.085 in



Permeability (μ)	A_L ± 8% Kool Mμ A_L ± 15%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
60	13	-	-	77141	-
75	16	-	-	77445	-
90	19	-	-	77444	-
125	26	55140	-	77140	-
147	31	55139	-	-	-
160	33	55138	-	-	-
173	36	55134	-	-	-
200	42	55137	-	-	-
300	62	55135	-	-	-

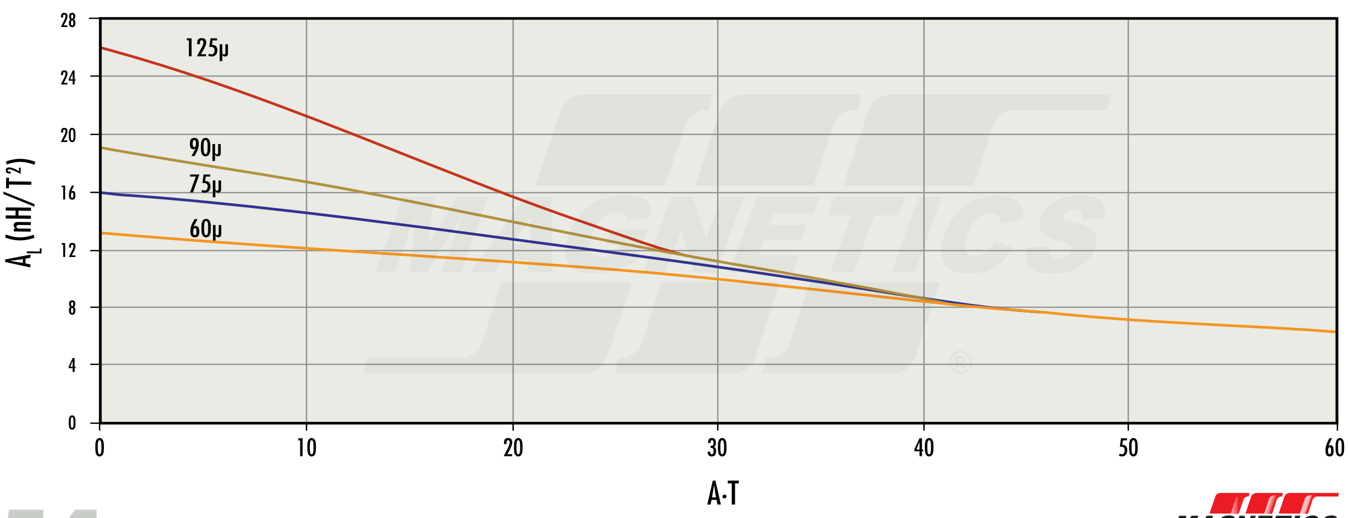
Physical Characteristics	
Window Area	1.27 mm^2
Cross Section	1.30 mm^2
Path Length	8.06 mm
Volume	10.5 mm^3
Weight- MPP	0.094 g
Weight- High Flux	-
Weight- Kool Mμ	0.065 g
Weight - XFlux	-
Area Product	1.65 mm^4

Winding Turn Length * *Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	7.24
20%	7.56
25%	7.65
30%	7.70
35%	7.81
40%	7.89
45%	7.98
50%	8.08
60%	8.27
70%	8.48

Wound Coil Dimensions		
40% Winding Factor	OD	4.30 mm
	HT	2.56 mm
Completely Full Window	Max OD	4.95 mm
	Max HT	2.74 mm

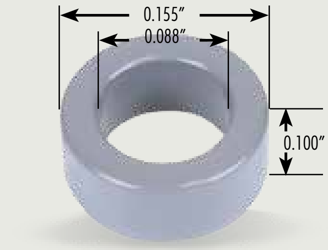
Surface Area	
Unwound Core	60 mm^2
40% Winding Factor	70 mm^2

Kool Mμ A_L vs. DC Bias



3.94 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	3.94 mm/0.155 in	2.24 mm/0.088 in	2.54 mm/0.100 in
After Finish (limits)	4.58 mm/0.180 in	1.72 mm/0.068 in	3.18 mm/0.125 in



Permeability (μ)	A_L ± 8% Kool Mμ A_L ± 15%	Part Number			
		MPP	High Flux	Kool Mμ®	XFLUX®
60	17	-	-	77151	-
75	21	-	-	77155	-
90	25	-	-	77154	-
125	35	55150	-	77150	-
147	41	55149	-	-	-
160	45	55148	-	-	-
173	48	55144	-	-	-
200	56	55147	-	-	-
300	84	55145	-	-	-

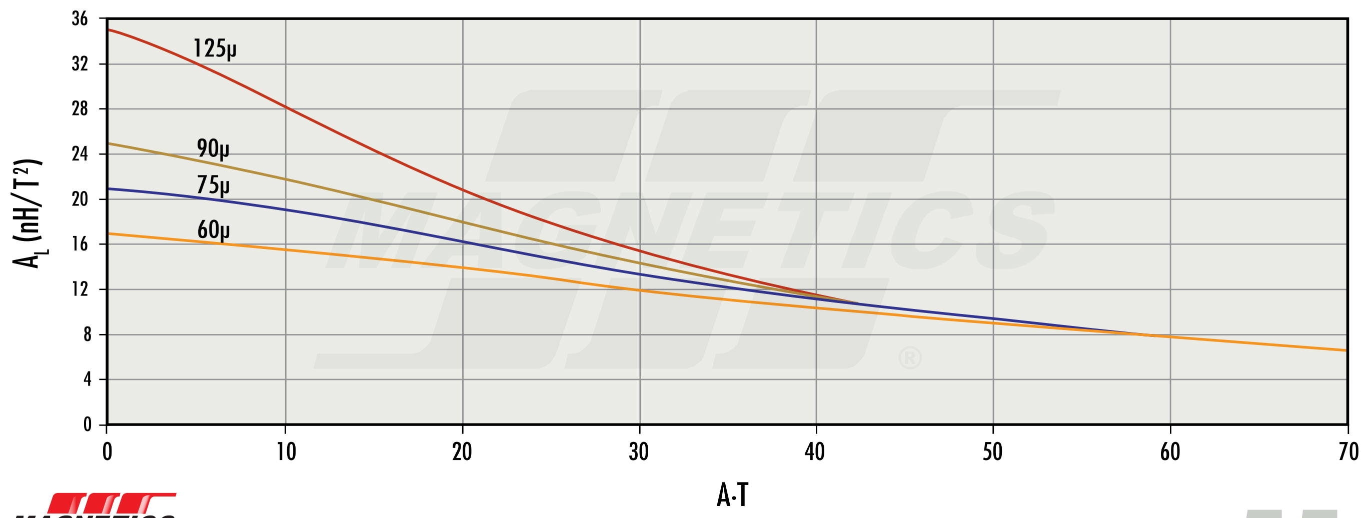
Physical Characteristics	
Window Area	2.32 mm²
Cross Section	2.11 mm²
Path Length	9.42 mm
Volume	19.9 mm³
Weight- MPP	0.17 g
Weight- High Flux	-
Weight- Kool Mμ	0.12 g
Weight - XFLUX	-
Area Product	4.90 mm⁴

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	9.20
20%	9.64
25%	9.76
30%	9.84
35%	9.98
40%	10.1
45%	10.2
50%	10.3
60%	10.6
70%	10.9

Wound Coil Dimensions		
40% Winding Factor	OD	4.85 mm
	HT	3.73 mm
Completely Full Window	Max OD	5.77 mm
	Max HT	4.75 mm

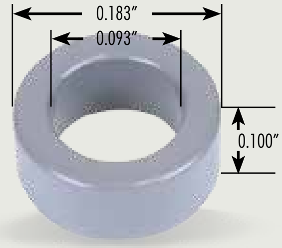
Surface Area	
Unwound Core	90 mm²
40% Winding Factor	110 mm²

Kool Mμ A_L vs. DC Bias



4.65 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	4.65 mm/0.183 in	2.36 mm/0.093 in	2.54 mm/0.100 in
After Finish (limits)	5.29 mm/0.208 in	1.85 mm/0.073 in	3.18 mm/0.125 in



Permeability (μ)	A_L ± 8% Kool Mμ A_L ± 15%	Part Number			
		MPP	High Flux	Kool Mμ®	XFLUX®
60	20	55181	-	77181	-
75	25	-	-	77185	-
90	30	-	-	77184	-
125	42	55180	-	77180	-
147	49	55179	-	-	-
160	53	55178	-	-	-
173	57	55174	-	-	-
200	67	55177	-	-	-
300	99	55175	-	-	-

Physical Characteristics	
Window Area	2.69 mm^2
Cross Section	2.85 mm^2
Path Length	10.6 mm
Volume	30.3 mm^3
Weight- MPP	0.25 g
Weight- High Flux	-
Weight- Kool Mμ	0.18 g
Weight - XFLUX	-
Area Product	7.66 mm^4

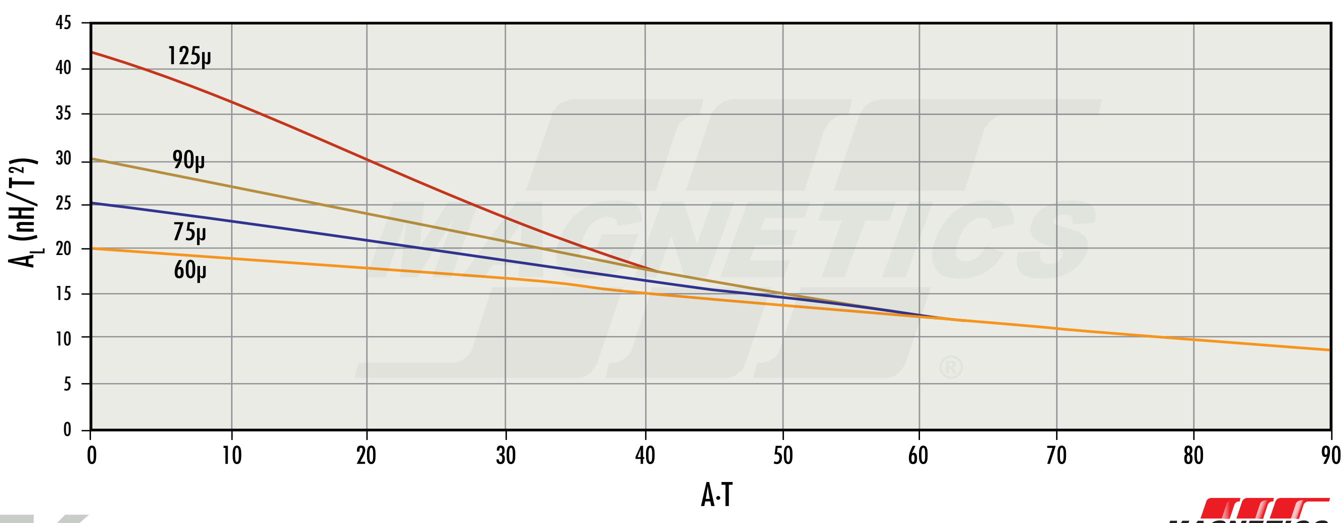
Winding Turn Length ** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	9.79
20%	10.3
25%	10.4
30%	10.5
35%	10.6
40%	10.7
45%	10.9
50%	11.0
60%	11.3
70%	11.6

Wound Coil Dimensions		
40% Winding Factor	OD	5.56 mm
	HT	3.73 mm
Completely Full Window	Max OD	6.65 mm
	Max HT	4.94 mm

Surface Area	
Unwound Core	110 mm^2
40% Winding Factor	130 mm^2

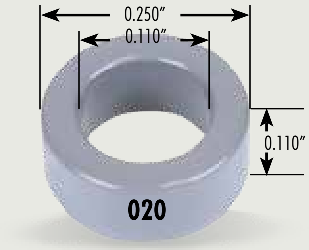
Kool Mμ A_L vs. DC Bias



MAGNETICS®

6.35 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	6.35 mm/0.250 in	2.79 mm/0.110 in	2.79 mm/0.110 in
After Finish (limits)	6.99 mm/0.275 in	2.28 mm/0.090 in	3.43 mm/0.135 in



Permeability (μ)	A_L ± 8% Kool Mμ A_L ± 12%	Part Number			
		MPP	High Flux	Kool Mμ®	XFLUX®
14	6	55023	58023	-	-
26	10	55022	58022	-	-
60	24	55021	58021	77021	-
75	30	-	-	77825	-
90	36	-	-	77824	-
125	50	55020	58020	77020	-
147	59	55019	58019	-	-
160	64	55018	58018	-	-
173	69	55014	-	-	-
200	80	55017	-	-	-
300	120	55015	-	-	-
550	220	55016	-	-	-

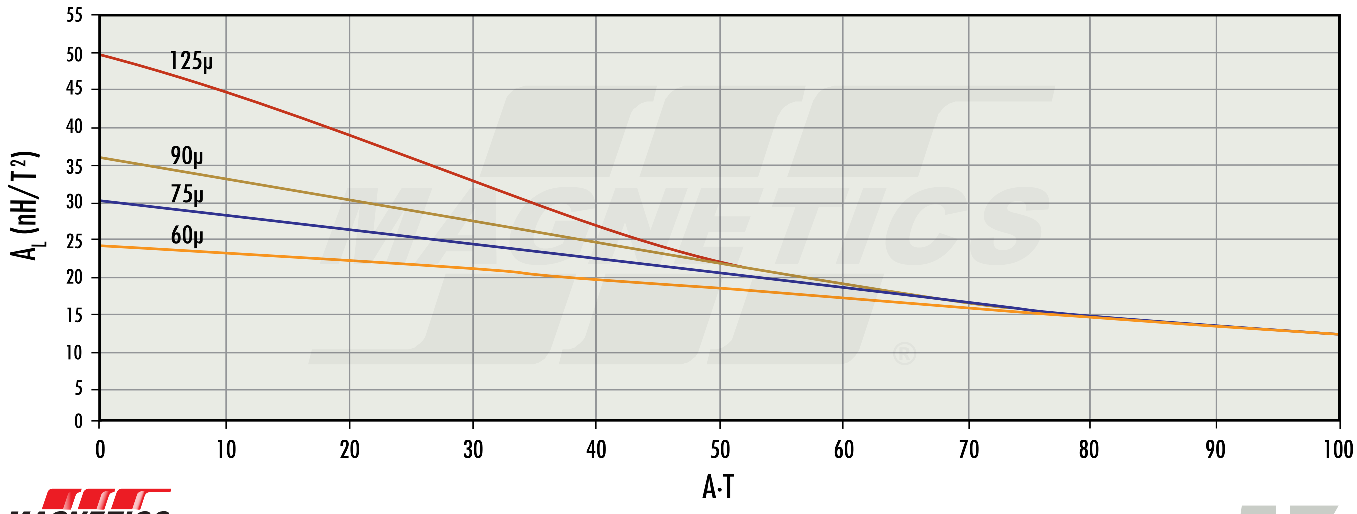
Physical Characteristics	
Window Area	4.08 mm^2
Cross Section	4.70 mm^2
Path Length	13.6 mm
Volume	64.0 mm^3
Weight- MPP	0.59 g
Weight- High Flux	0.55 g
Weight- Kool Mμ	0.39 g
Weight - XFLUX	-
Area Product	19.2 mm^4

Wound Coil Dimensions		
40% Winding Factor	OD	7.34 mm
	HT	4.12 mm
Completely Full Window	Max OD	8.81 mm
	Max HT	5.38 mm

Winding Turn Length * Reference General Winding Data pages	
Winding Factor	Length/Turn (mm)
0%	11.6
20%	12.2
25%	12.3
30%	12.4
35%	12.6
40%	12.8
45%	12.9
50%	13.1
60%	13.4
70%	13.9

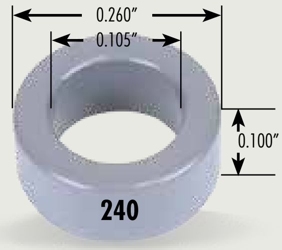
Surface Area	
Unwound Core	170 mm^2
40% Winding Factor	200 mm^2

Kool Mμ A_L vs. DC Bias



6.60 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	6.60 mm/0.260 in	2.67 mm/0.105 in	2.54 mm/0.100 in
After Finish (limits)	7.24 mm/0.285 in	2.15 mm/0.085 in	3.18 mm/0.125 in



Permeability (µ)	A_L ± 8% Kool Mµ A_L ± 12%	Part Number			
		MPP	High Flux	Kool Mµ®	XFlux®
14	6	55243	58243	-	-
26	11	55242	58242	-	-
60	26	55241	58241	77241	-
75	32	-	-	77245	-
90	39	-	-	77244	-
125	54	55240	58240	77240	-
147	64	55239	58239	-	-
160	69	55238	58238	-	-
173	75	55234	-	-	-
200	86	55237	-	-	-
300	130	55235	-	-	-
550	242	55236	-	-	-

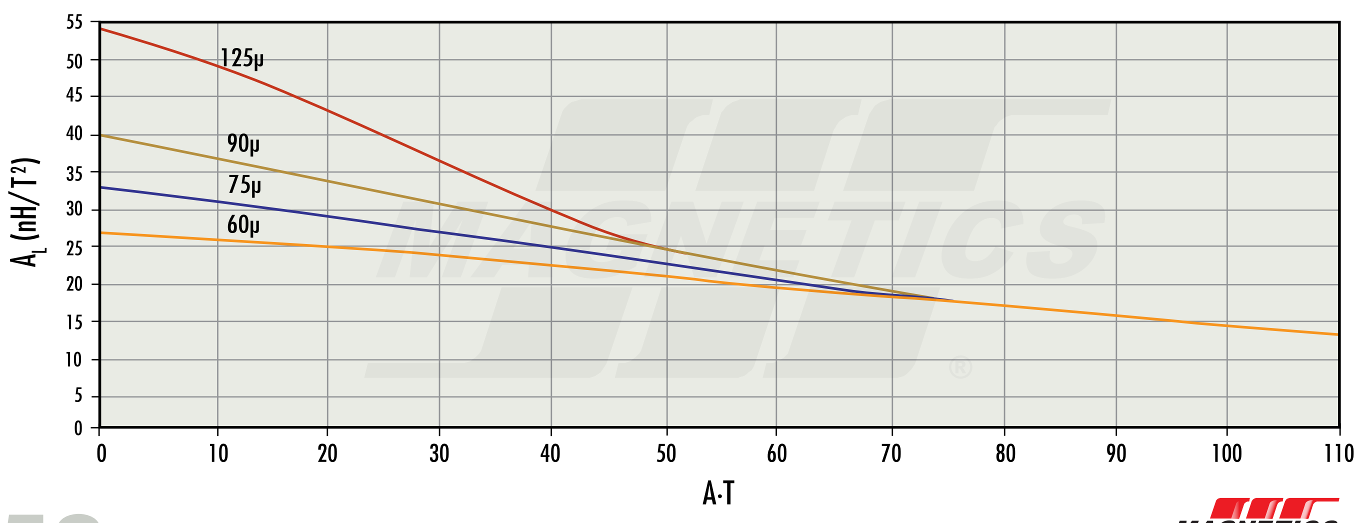
Physical Characteristics	
Window Area	3.63 mm²
Cross Section	4.76 mm²
Path Length	13.6 mm
Volume	64.9 mm³
Weight- MPP	0.58 g
Weight- High Flux	0.55 g
Weight- Kool Mµ	0.40 g
Weight - XFlux	-
Area Product	17.3 mm⁴

Wound Coil Dimensions		
40% Winding Factor	OD	7.41 mm
	HT	3.87 mm
Completely Full Window	Max OD	9.12 mm
	Max HT	5.13 mm

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	11.4
20%	12.0
25%	12.2
30%	12.3
35%	12.4
40%	12.6
45%	12.7
50%	12.9
60%	13.2
70%	13.6

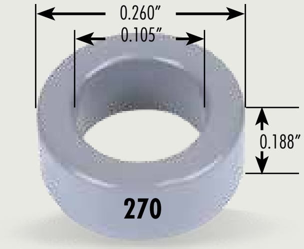
Surface Area	
Unwound Core	170 mm²
40% Winding Factor	190 mm²

Kool Mµ A_L vs. DC Bias



6.60 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	6.60 mm/0.260 in	2.67 mm/0.105 in	4.78 mm/0.188 in
After Finish (limits)	7.24 mm/0.285 in	2.15 mm/0.085 in	5.42 mm/0.213 in



Permeability (µ)	A_L ± 8% Kool Mµ A_L ± 12%	Part Number			
		MPP	High Flux	Kool Mµ®	XFLUX®
14	12	55273	58273	-	-
26	21	55272	58272	-	-
60	50	55271	58271	77271	-
75	62	-	-	77875	-
90	74	-	-	77874	-
125	103	55270	58270	77270	-
147	122	55269	58269	-	-
160	132	55268	58268	-	-
173	144	55264	-	-	-
200	165	55267	-	-	-
300	247	55265	-	-	-
550	466	55266	-	-	-

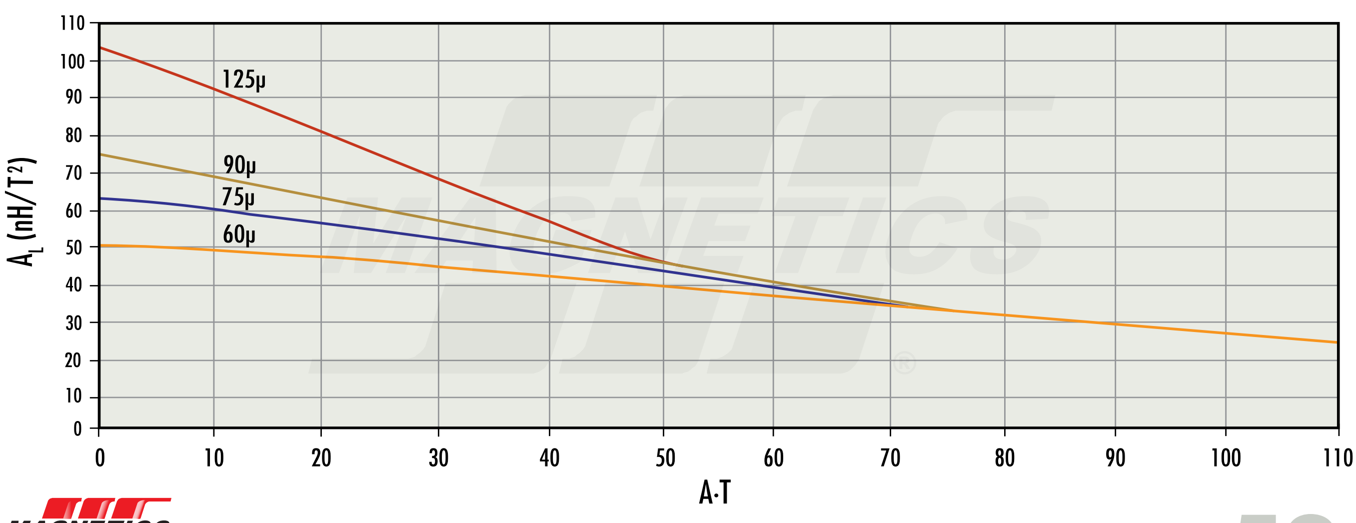
Physical Characteristics	
Window Area	3.63 mm²
Cross Section	9.20 mm²
Path Length	13.6 mm
Volume	125 mm³
Weight- MPP	1.1 g
Weight- High Flux	1.0 g
Weight- Kool Mµ	0.77 g
Weight - XFLUX	-
Area Product	33.4 mm⁴

Winding Turn Length * Reference General Winding Data pages	
Winding Factor	Length/Turn (mm)
0%	16.2
20%	16.7
25%	16.9
30%	17.0
35%	17.1
40%	17.3
45%	17.4
50%	17.6
60%	17.9
70%	18.3

Wound Coil Dimensions		
40% Winding Factor	OD	7.41 mm
	HT	6.11 mm
Completely Full Window	Max OD	9.17 mm
	Max HT	7.42 mm

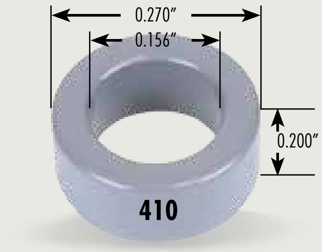
Surface Area	
Unwound Core	230 mm²
40% Winding Factor	260 mm²

Kool Mµ A_L vs. DC Bias



6.86 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	6.86 mm/0.270 in	3.96 mm/0.156 in	5.08 mm/0.200 in
After Finish (limits)	7.50 mm/0.295 in	3.45 mm/0.136 in	5.72 mm/0.225 in



Permeability (μ)	A_L ± 8% Kool Mμ A_L ± 12%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	8	55413	58413	-	-
26	14	55412	58412	-	-
60	33	55411	58411	77411	-
75	42	-	-	77415	-
90	50	-	-	77414	-
125	70	55410	58410	77410	-
147	81	55409	58409	-	-
160	89	55408	58408	-	-
173	95	55404	-	-	-
200	112	55407	-	-	-
300	166	55405	-	-	-

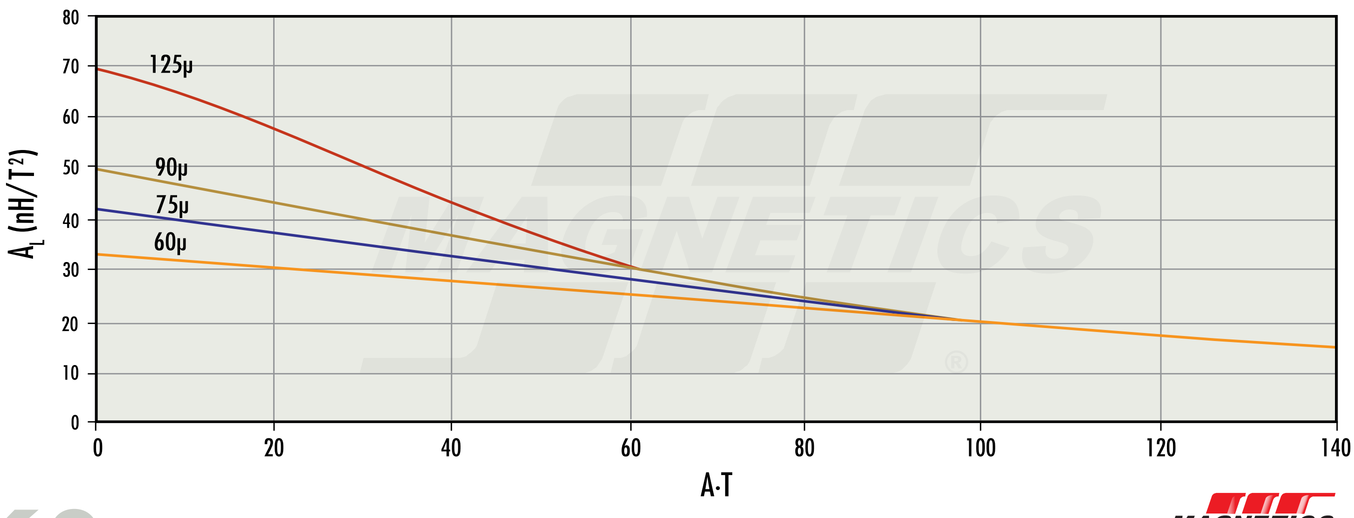
Physical Characteristics	
Window Area	9.35 mm²
Cross Section	7.25 mm²
Path Length	16.5 mm
Volume	120 mm³
Weight- MPP	1.0 g
Weight- High Flux	0.94 g
Weight- Kool Mμ	0.74 g
Weight - XFlux	-
Area Product	67.8 mm⁴

Wound Coil Dimensions		
40% Winding Factor	OD	8.06 mm
	HT	6.84 mm
Completely Full Window	Max OD	9.60 mm
	Max HT	10.0 mm

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	15.5
20%	16.4
25%	16.6
30%	16.8
35%	17.0
40%	17.3
45%	17.5
50%	17.8
60%	18.3
70%	18.9

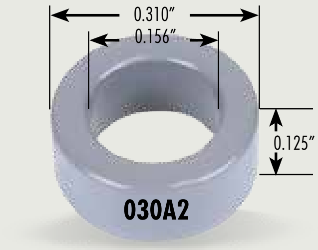
Surface Area	
Unwound Core	260 mm²
40% Winding Factor	330 mm²

Kool Mμ A_L vs. DC Bias



7.87 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	7.87 mm/0.310 in	3.96 mm/0.156 in	3.18 mm/0.125 in
After Finish (limits)	8.51 mm/0.335 in	3.45 mm/0.136 in	3.81 mm/0.150 in



Permeability (μ)	A_L ± 8% Kool Mμ A_L ± 12%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	6	55033	58033	-	-
26	11	55032	58032	-	-
60	25	55031	58031	77031	-
75	31	-	-	77835	-
90	37	-	-	77834	-
125	52	55030	58030	77030	-
147	62	55029	58029	-	-
160	66	55028	58028	-	-
173	73	55024	-	-	-
200	83	55027	-	-	-
300	124	55025	-	-	-
550	229	55026	-	-	-

Physical Characteristics	
Window Area	9.35 mm²
Cross Section	5.99 mm²
Path Length	17.9 mm
Volume	107 mm³
Weight- MPP	0.92 g
Weight- High Flux	0.87 g
Weight- Kool Mμ	0.68 g
Weight - XFlux	-
Area Product	56.0 mm⁴

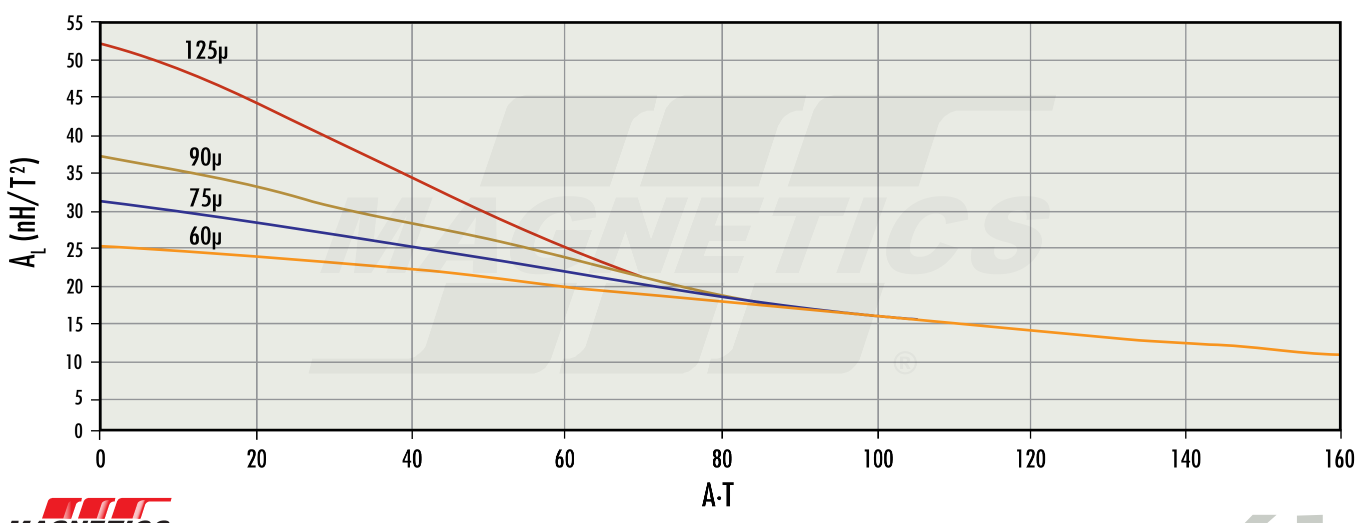
Wound Coil Dimensions		
40% Winding Factor	OD	9.07 mm
	HT	4.93 mm
Completely Full Window	Max OD	11.0 mm
	Max HT	6.73 mm

Winding Turn Length ** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	12.7
20%	13.6
25%	13.8
30%	14.0
35%	14.3
40%	14.5
45%	14.7
50%	15.0
60%	15.5
70%	16.1

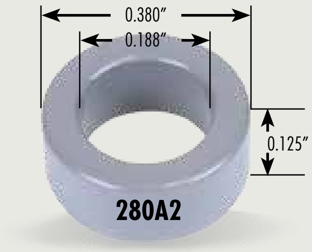
Surface Area	
Unwound Core	240 mm²
40% Winding Factor	310 mm²

Kool Mμ A_L vs. DC Bias



9.65 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	9.65 mm/0.380 in	4.78 mm/0.188 in	3.18 mm/0.125 in
After Finish (limits)	10.3 mm/0.405 in	4.26 mm/0.168 in	3.81 mm/0.150 in



Permeability (μ)	A_L ± 8% Kool Mμ A_L ± 12%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	6	55283	58283	-	-
26	11	55282	58282	-	-
60	25	55281	58281	77281	-
75	32	-	-	77885	-
90	38	-	-	77884	-
125	53	55280	58280	77280	-
147	63	55279	58279	-	-
160	68	55278	58278	-	-
173	74	55274	-	-	-
200	84	55277	-	-	-
300	128	55275	-	-	-
550	232	55276	-	-	-

Physical Characteristics

Window Area	14.3 mm^2
Cross Section	7.52 mm^2
Path Length	21.8 mm
Volume	164 mm^3
Weight- MPP	1.4 g
Weight- High Flux	1.3 g
Weight- Kool Mμ	1.0 g
Weight - XFlux	-
Area Product	107 mm^4

Wound Coil Dimensions

40% Winding Factor	OD	11.0 mm
	HT	5.17 mm
Completely Full Window	Max OD	13.4 mm
	Max HT	7.44 mm

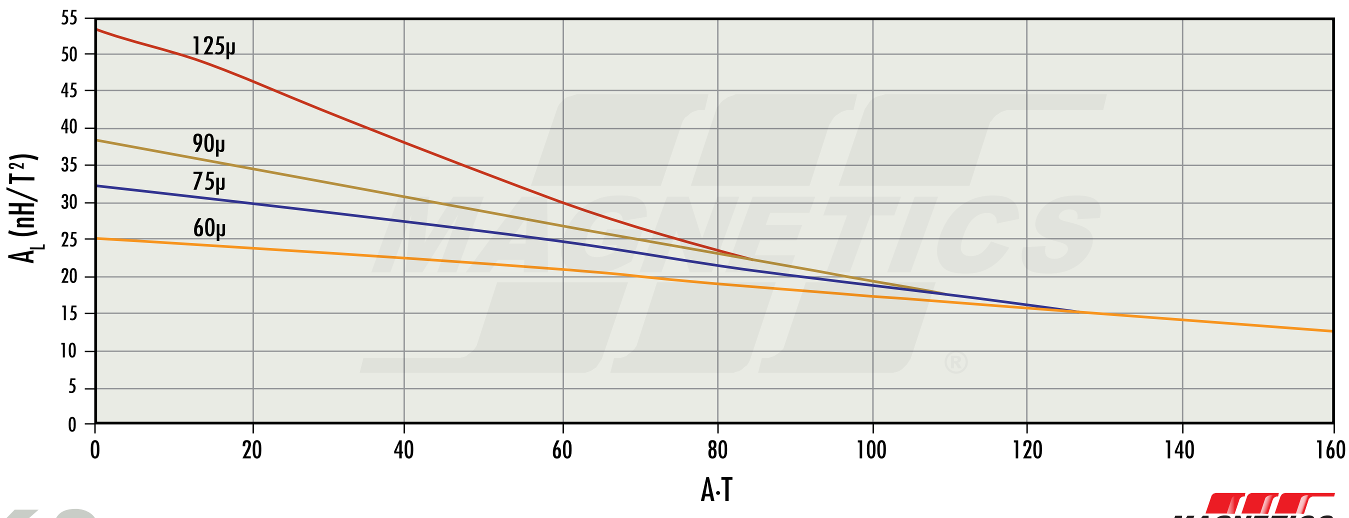
Winding Turn Length
** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	13.6
20%	14.7
25%	15.0
30%	15.3
35%	15.6
40%	15.9
45%	16.2
50%	16.5
60%	17.2
70%	17.9

Surface Area

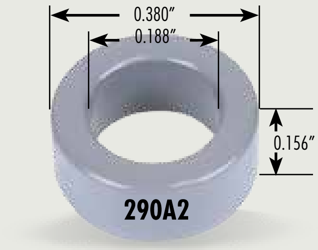
Unwound Core	310 mm^2
40% Winding Factor	410 mm^2

Kool Mμ A_L vs. DC Bias



9.65 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	9.65 mm/0.380 in	4.78 mm/0.188 in	3.96 mm/0.156 in
After Finish (limits)	10.3 mm/0.405 in	4.26 mm/0.168 in	4.60 mm/0.181 in



Permeability (μ)	A_L ± 8% Kool Mμ A_L ± 12%	Part Number			
		MPP	High Flux	Kool Mμ®	XFLUX®
14	7	55293	58293	-	-
26	14	55292	58292	-	-
60	32	55291	58291	77291	-
75	40	-	-	77295	-
90	48	-	-	77294	-
125	66	55290	58290	77290	-
147	78	55289	58289	-	-
160	84	55288	58288	-	-
173	92	55284	-	-	-
200	105	55287	-	-	-
300	159	55285	-	-	-
550	290	55286	-	-	-

Physical Characteristics	
Window Area	14.3 mm²
Cross Section	9.45 mm²
Path Length	21.8 mm
Volume	206 mm³
Weight- MPP	1.8 g
Weight- High Flux	1.7 g
Weight- Kool Mμ	1.4 g
Weight - XFLUX	-
Area Product	135 mm⁴

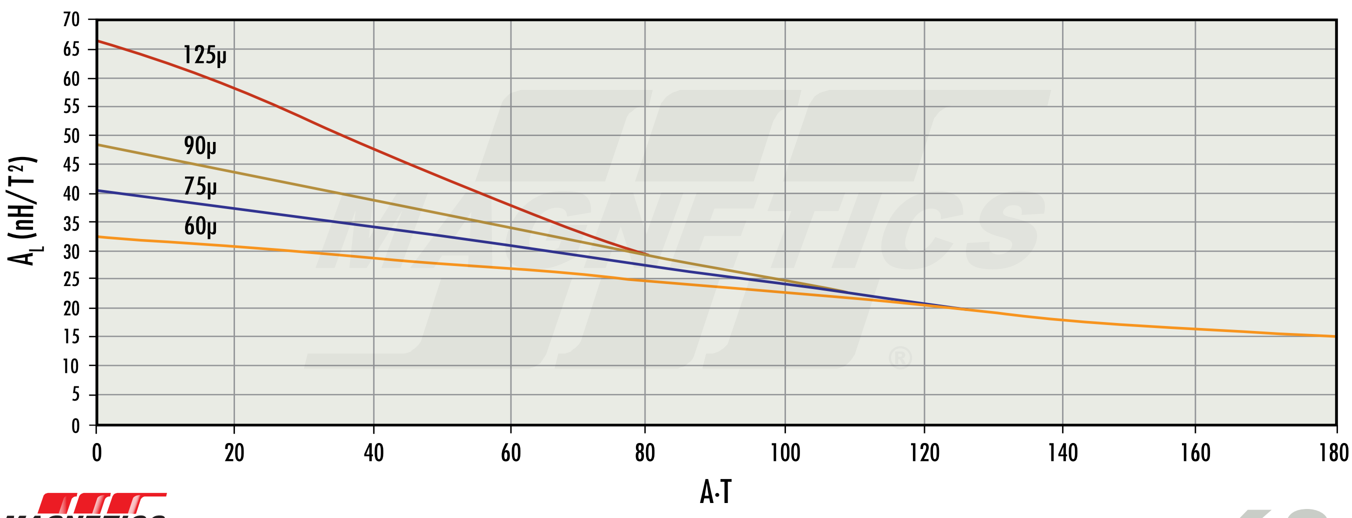
Wound Coil Dimensions		
40% Winding Factor	OD	11.0 mm
	HT	5.96 mm
Completely Full Window	Max OD	13.4 mm
	Max HT	8.20 mm

Winding Turn Length ** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	15.2
20%	16.4
25%	16.6
30%	16.9
35%	17.2
40%	17.4
45%	17.8
50%	18.1
60%	18.7
70%	19.5

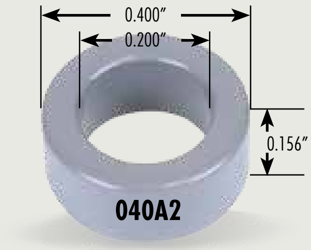
Surface Area	
Unwound Core	350 mm²
40% Winding Factor	450 mm²

Kool Mμ A_L vs. DC Bias



10.2 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	10.2 mm/0.400 in	5.08 mm/0.200 in	3.96 mm/0.156 in
After Finish (limits)	10.8 mm/0.425 in	4.57 mm/0.180 in	4.60 mm/0.181 in



Permeability (μ)	A_L ± 8% Kool Mμ A_L ± 12%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	7	55043	58043	-	-
26	14	55042	58042	-	-
60	32	55041	58041	77041	-
75	40	-	-	77845	-
90	48	-	-	77844	-
125	66	55040	58040	77040	-
147	78	55039	58039	-	-
160	84	55038	58038	-	-
173	92	55034	-	-	-
200	105	55037	-	-	-
300	159	55035	-	-	-
550	290	55036	-	-	-

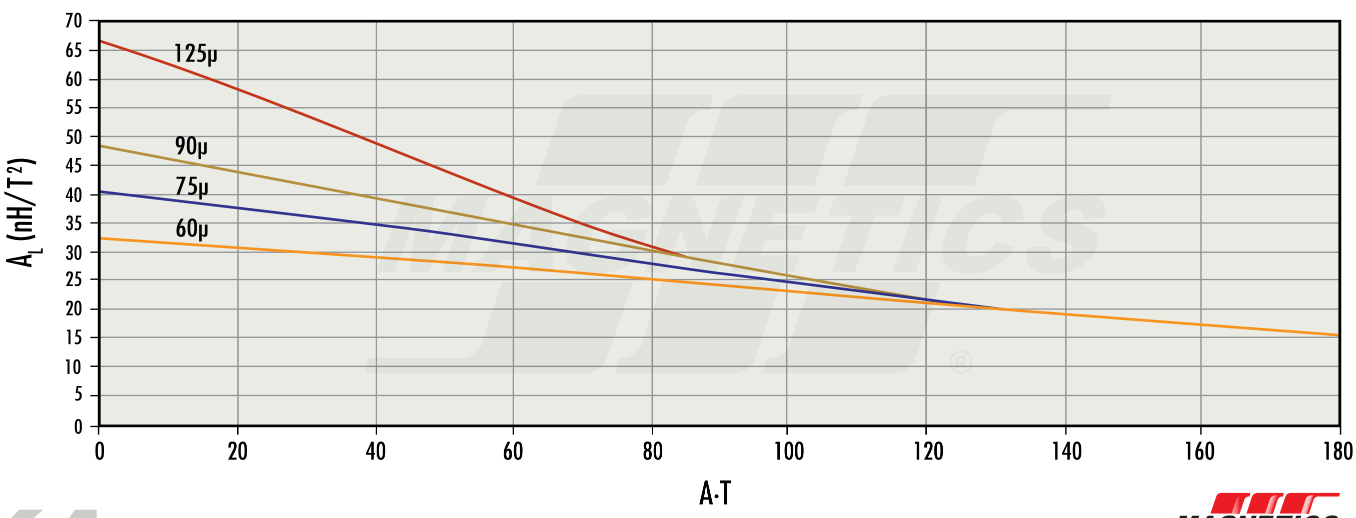
Physical Characteristics	
Window Area	16.4 mm²
Cross Section	9.57 mm²
Path Length	23.0 mm
Volume	220 mm³
Weight- MPP	1.9 g
Weight- High Flux	1.8 g
Weight- Kool Mμ	1.5 g
Weight - XFlux	-
Area Product	156 mm⁴

Wound Coil Dimensions		
40% Winding Factor	OD	11.5 mm
	HT	5.96 mm
Completely Full Window	Max OD	14.1 mm
	Max HT	8.46 mm

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	15.4
20%	16.6
25%	16.9
30%	17.1
35%	17.5
40%	17.8
45%	18.1
50%	18.4
60%	19.2
70%	20.0

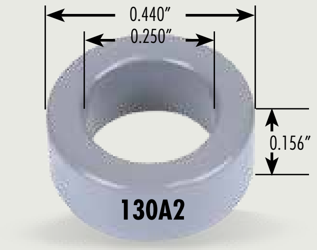
Surface Area	
Unwound Core	370 mm²
40% Winding Factor	480 mm²

Kool Mμ A_L vs. DC Bias



11.2 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	11.2 mm/0.440 in	6.35 mm/0.250 in	3.96 mm/0.156 in
After Finish (limits)	11.9 mm/0.465 in	5.84 mm/0.230 in	4.60 mm/0.181 in



Permeability (μ)	A_L ± 8% Kool Mμ A_L ± 12%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	6	55133	58133	-	-
26	11	55132	58132	-	-
60	26	55131	58131	77131	-
75	32	-	-	77335	-
90	38	-	-	77334	-
125	53	55130	58130	77130	-
147	63	55129	58129	-	-
160	68	55128	58128	-	-
173	74	55124	-	-	-
200	85	55127	-	-	-
300	127	55125	-	-	-

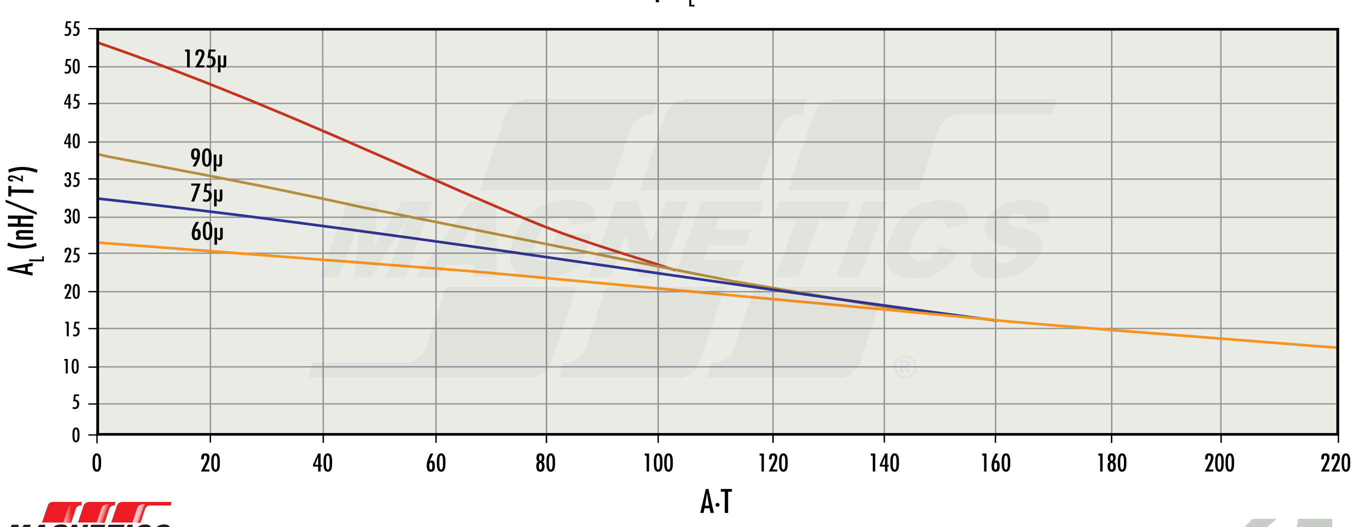
Physical Characteristics	
Window Area	26.8 mm²
Cross Section	9.06 mm²
Path Length	26.9 mm
Volume	244 mm³
Weight- MPP	2.1 g
Weight- High Flux	2.0 g
Weight- Kool Mμ	1.5 g
Weight - XFlux	-
Area Product	243 mm⁴

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	15.2
20%	16.7
25%	17.0
30%	17.4
35%	17.8
40%	18.1
45%	18.6
50%	19.0
60%	19.9
70%	20.9

Wound Coil Dimensions		
40% Winding Factor	OD	12.9 mm
	HT	6.53 mm
Completely Full Window	Max OD	15.7 mm
	Max HT	8.97 mm

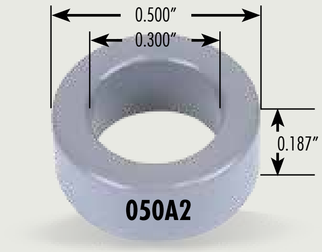
Surface Area	
Unwound Core	420 mm²
40% Winding Factor	600 mm²

Kool Mμ A_L vs. DC Bias



12.7 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	12.7 mm/0.500 in	7.62 mm/0.300 in	4.75 mm/0.187 in
After Finish (limits)	13.5 mm/0.530 in	6.98 mm/0.275 in	5.52 mm/0.217 in



Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	6.4	55053	58053	-	-
26	12	55052	58052	77052	78052
60	27	55051	58051	77051	78051
75	34	-	-	77055	-
90	40	-	-	77054	-
125	56	55050	58050	77050	-
147	67	55049	58049	-	-
160	72	55048	58048	-	-
173	79	55044	-	-	-
200	90	55047	-	-	-
300	134	55045	-	-	-
550	255	55046	-	-	-

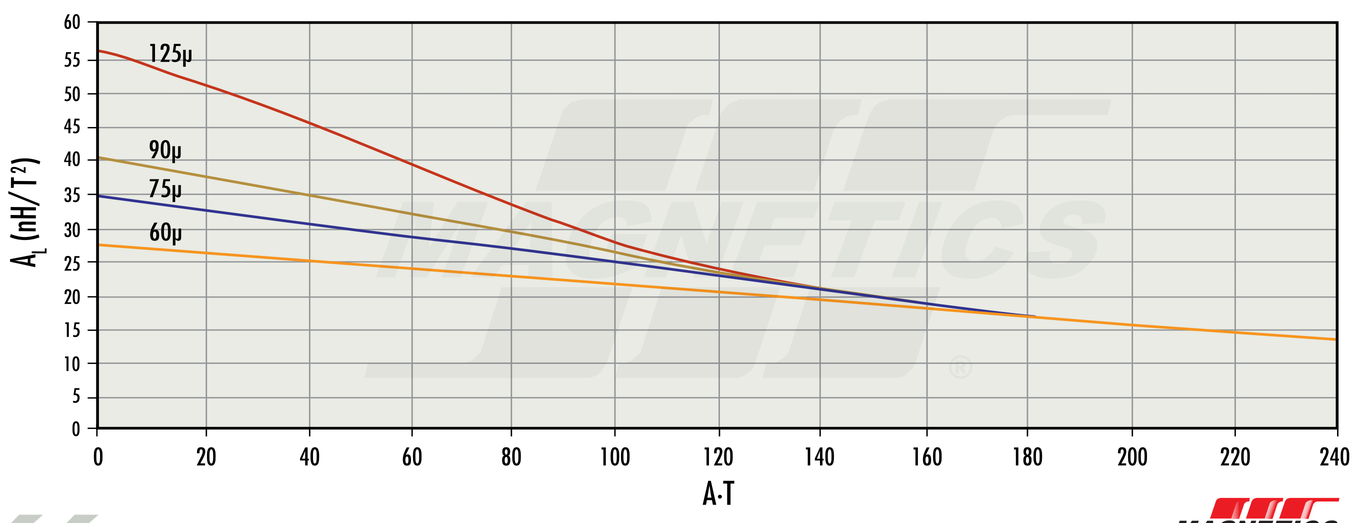
Physical Characteristics	
Window Area	38.3 mm²
Cross Section	10.9 mm²
Path Length	31.2 mm
Volume	340 mm³
Weight- MPP	3.1 g
Weight- High Flux	2.9 g
Weight- Kool Mμ	2.2 g
Weight - XFlux	2.5 g
Area Product	417 mm⁴

Wound Coil Dimensions		
40% Winding Factor	OD	14.6 mm
	HT	7.66 mm
Completely Full Window	Max OD	18.2 mm
	Max HT	11.5 mm

Winding Turn Length * Reference General Winding Data pages	
Winding Factor	Length/Turn (mm)
0%	17.5
20%	19.3
25%	19.8
30%	20.1
35%	20.7
40%	21.1
45%	21.7
50%	22.1
60%	23.2
70%	24.5

Surface Area	
Unwound Core	560 mm²
40% Winding Factor	800 mm²

Kool Mμ A_L vs. DC Bias



16.6 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	16.6 mm/0.653 in	10.2 mm/0.400 in	6.35 mm/0.250 in
After Finish (limits)	17.3 mm/0.680 in	9.52 mm/0.375 in	7.12 mm/0.280 in

Permeability (µ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mµ®	XFLUX®
14	8	55123	58123	-	-
26	15	55122	58122	-	78122
60	35	55121	58121	77121	78121
75	43	-	-	77225	-
90	52	-	-	77224	-
125	72	55120	58120	77120	-
147	88	55119	58119	-	-
160	92	55118	58118	-	-
173	104	55114	-	-	-
200	115	55117	-	-	-
300	173	55115	-	-	-
550	317	55116	-	-	-

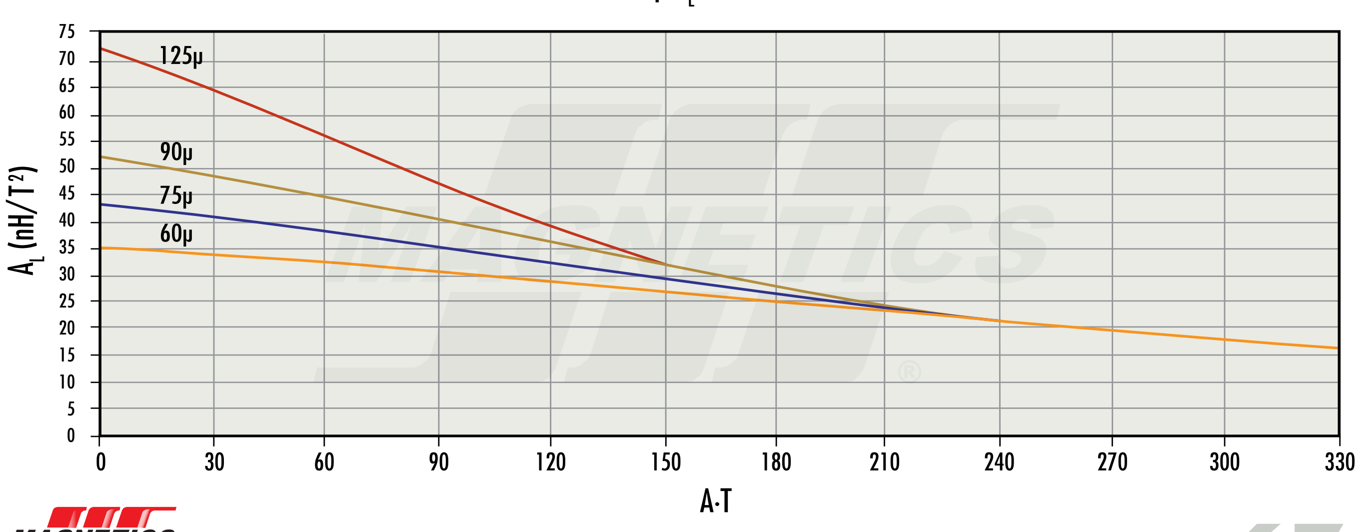
Physical Characteristics	
Window Area	71.2 mm²
Cross Section	19.2 mm²
Path Length	41.2 mm
Volume	791 mm³
Weight- MPP	6.8 g
Weight- High Flux	6.3 g
Weight- Kool Mµ	5.0 g
Weight - XFLUX	5.6 g
Area Product	1,370 mm⁴

Wound Coil Dimensions		
40% Winding Factor	OD	18.8 mm
	HT	10.1 mm
Completely Full Window	Max OD	23.7 mm
	Max HT	15.2 mm

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	22.1
20%	24.6
25%	25.2
30%	25.6
35%	26.4
40%	27.0
45%	27.7
50%	28.4
60%	29.8
70%	31.5

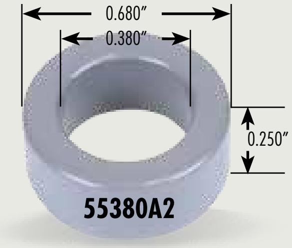
Surface Area	
Unwound Core	920 mm²
40% Winding Factor	1,300 mm²

Kool Mµ A_L vs. DC Bias



17.3 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	17.3 mm/0.680 in	9.65 mm/0.380 in	6.35 mm/0.250 in
After Finish (limits)	18.1 mm/0.710 in	9.01 mm/0.355 in	7.12 mm/0.280 in



Permeability (µ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mµ®	XFlux®
14	10	55383	58383	-	-
26	19	55382	58382	-	78382
60	43	55381	58381	77381	78381
75	53	-	-	77385	-
90	64	-	-	77384	-
125	89	55380	58380	77380	-
147	105	55379	58379	-	-
160	114	55378	58378	-	-
173	123	55374	-	-	-
200	142	55377	-	-	-
300	214	55375	-	-	-

Physical Characteristics	
Window Area	63.8 mm²
Cross Section	23.2 mm²
Path Length	41.4 mm
Volume	960 mm³
Weight- MPP	8.2 g
Weight- High Flux	7.7 g
Weight- Kool Mµ	5.9 g
Weight - XFlux	7.2 g
Area Product	1,480 mm⁴

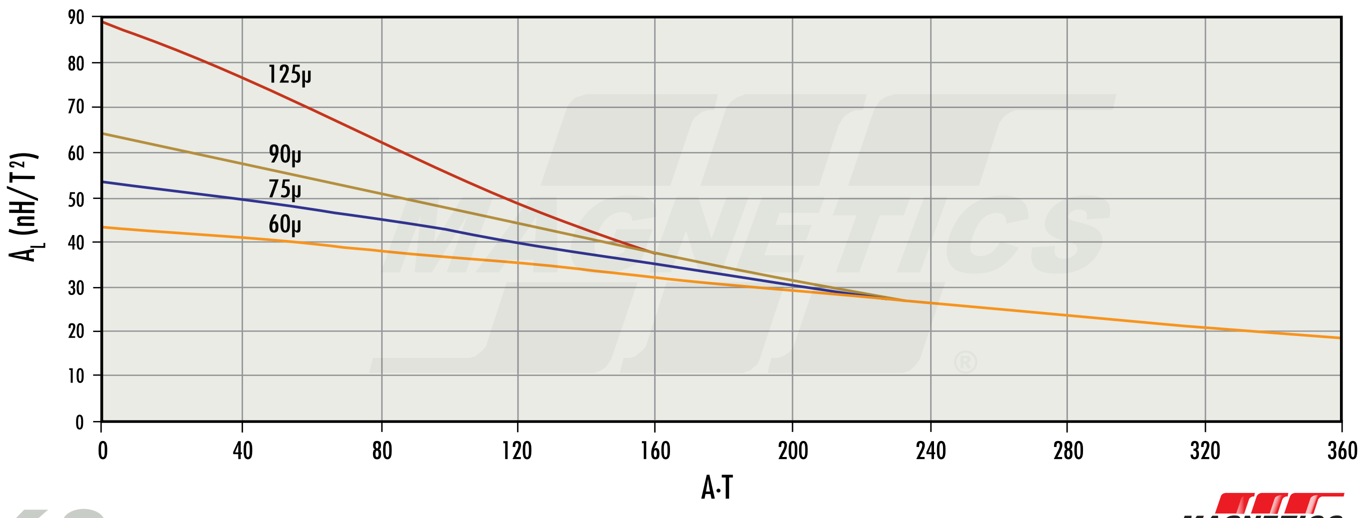
Wound Coil Dimensions		
40% Winding Factor	OD	19.6 mm
	HT	10.1 mm
Completely Full Window	Max OD	24.9 mm
	Max HT	16.3 mm

Winding Turn Length ** Reference General Winding Data pages*

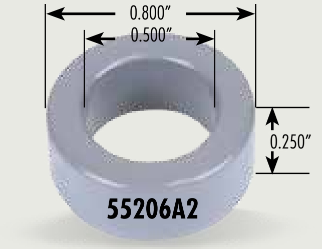
Winding Factor	Length/Turn (mm)
0%	23.2
20%	25.6
25%	26.2
30%	26.6
35%	27.4
40%	28.0
45%	28.6
50%	29.3
60%	30.8
70%	32.4

Surface Area	
Unwound Core	990 mm²
40% Winding Factor	1,400 mm²

Kool Mµ A_L vs. DC Bias



20.3 mm OD



Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	20.3 mm/0.800 in	12.7 mm/0.500 in	6.35mm/0.250 in
After Finish (limits)	21.1 mm/0.830 in	12.0 mm/0.475 in	7.12 mm/0.280 in

Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFLUX®
14	7.8	55209	58209	-	-
26	14	55208	58208	-	78208
40	21	-	-	77847	-
60	32	55848	58848	77848	78848
75	41	-	-	77211	-
90	49	-	-	77210	-
125	68	55206	58206	77206	-
147	81	55205	58205	-	-
160	87	55204	58204	-	-
173	96	55200	-	-	-
200	109	55203	-	-	-
300	163	55201	-		
550	320	55202	-		

Physical Characteristics	
Window Area	114 mm^2
Cross Section	22.1 mm^2
Path Length	50.9 mm
Volume	1,120 mm^3
Weight- MPP	9.4 g
Weight- High Flux	8.9 g
Weight- Kool Mμ	7.1 g
Weight - XFLUX	7.9 g
Area Product	2,520 mm^4

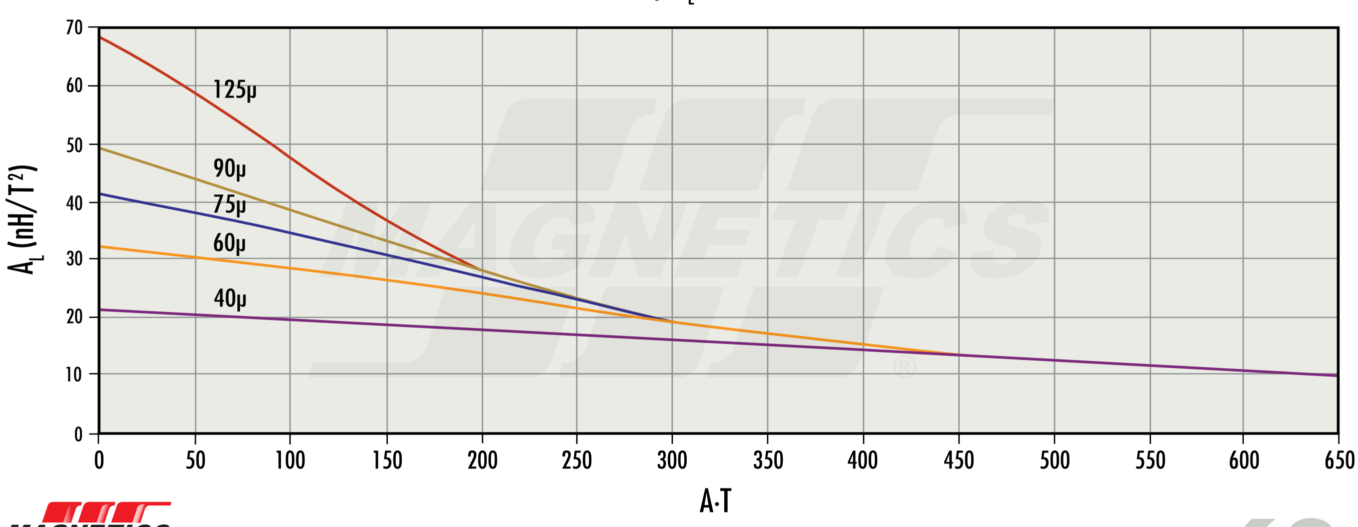
Wound Coil Dimensions		
40% Winding Factor	OD	22.9 mm
	HT	10.7 mm
Completely Full Window	Max OD	29.2 mm
	Max HT	17.4 mm

Winding Turn Length ** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	23.3
20%	26.4
25%	27.2
30%	27.8
35%	28.8
40%	29.5
45%	30.5
50%	31.3
60%	33.2
70%	35.4

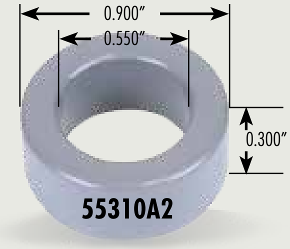
Surface Area	
Unwound Core	1,200 mm^2
40% Winding Factor	1,900 mm^2

Kool Mμ A_L vs. DC Bias



22.9 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	22.9 mm/0.900 in	14.0 mm/0.550 in	7.62 mm/0.300 in
After Finish (limits)	23.7 mm/0.930 in	13.3 mm/0.525 in	8.39 mm/0.330 in



Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	9.9	55313	58313	-	-
26	19	55312	58312	77312	78312
40	29	-	-	77316	-
60	43	55059	58059	77059	78059
75	54	-	-	77315	-
90	65	-	-	77314	-
125	90	55310	58310	77310	-
147	106	55309	58309	-	-
160	115	55308	58308	-	-
173	124	55304	-	-	-
200	144	55307	-	-	-
300	216	55305	-	-	-
550	396	55306	-	-	-

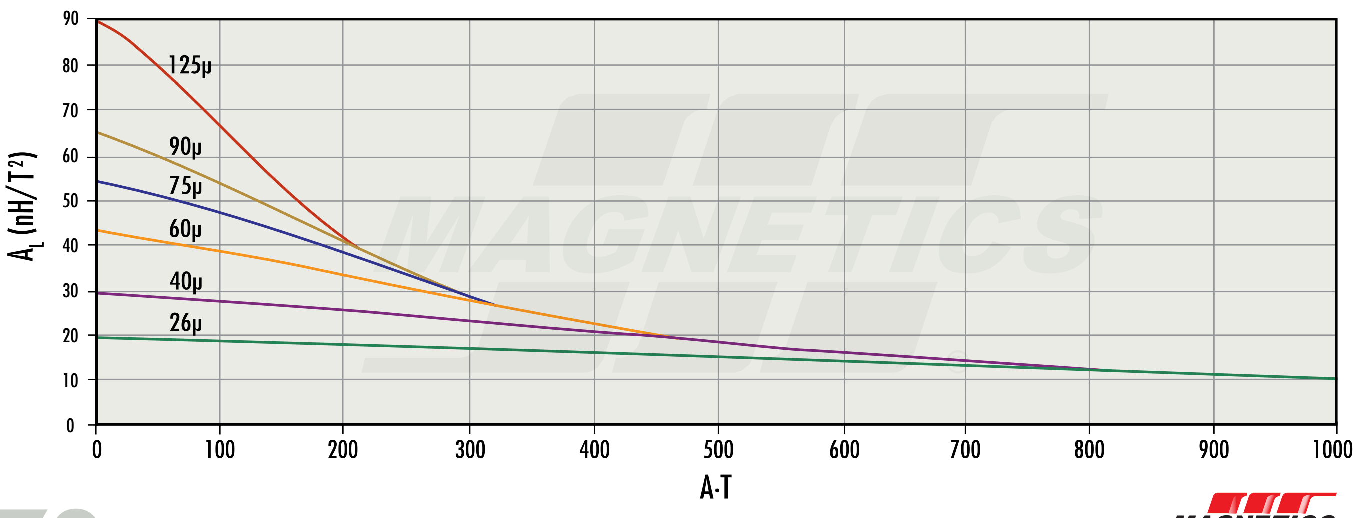
Physical Characteristics	
Window Area	139 mm^2
Cross Section	31.7 mm^2
Path Length	56.7 mm
Volume	1,800 mm^3
Weight- MPP	16 g
Weight- High Flux	15 g
Weight- Kool Mμ	12 g
Weight - XFlux	13 g
Area Product	4,430 mm^4

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	27.0
20%	30.5
25%	31.3
30%	32.0
35%	33.1
40%	33.9
45%	34.9
50%	35.9
60%	38.0
70%	40.4

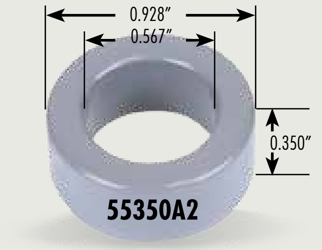
Wound Coil Dimensions		
40% Winding Factor	OD	25.7 mm
	HT	12.4 mm
Completely Full Window	Max OD	32.6 mm
	Max HT	19.8 mm

Surface Area	
Unwound Core	1,600 mm^2
40% Winding Factor	2,400 mm^2

Kool Mμ A_L vs. DC Bias



23.6 mm OD



Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	23.6 mm/0.928 in	14.4 mm/0.567 in	8.89 mm/0.350 in
After Finish (limits)	24.4 mm/0.958 in	13.7 mm/0.542 in	9.66 mm/0.380 in

Permeability (µ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mµ®	XFLUX®
14	12	55353	58353	-	-
26	22	55352	58352	77352	78352
40	34	-	-	77356	-
60	51	55351	58351	77351	78351
75	62	-	-	77355	-
90	76	-	-	77354	-
125	105	55350	58350	77350	-
147	124	55349	58349	-	-
160	135	55348	58348	-	-
173	146	55344	-	-	-
200	169	55347	-	-	-
300	253	55345	-	-	-

Physical Characteristics	
Window Area	149 mm²
Cross Section	38.8 mm²
Path Length	58.8 mm
Volume	2,280 mm³
Weight- MPP	20 g
Weight- High Flux	19 g
Weight- Kool Mµ	14 g
Weight - XFLUX	16 g
Area Product	5,770 mm⁴

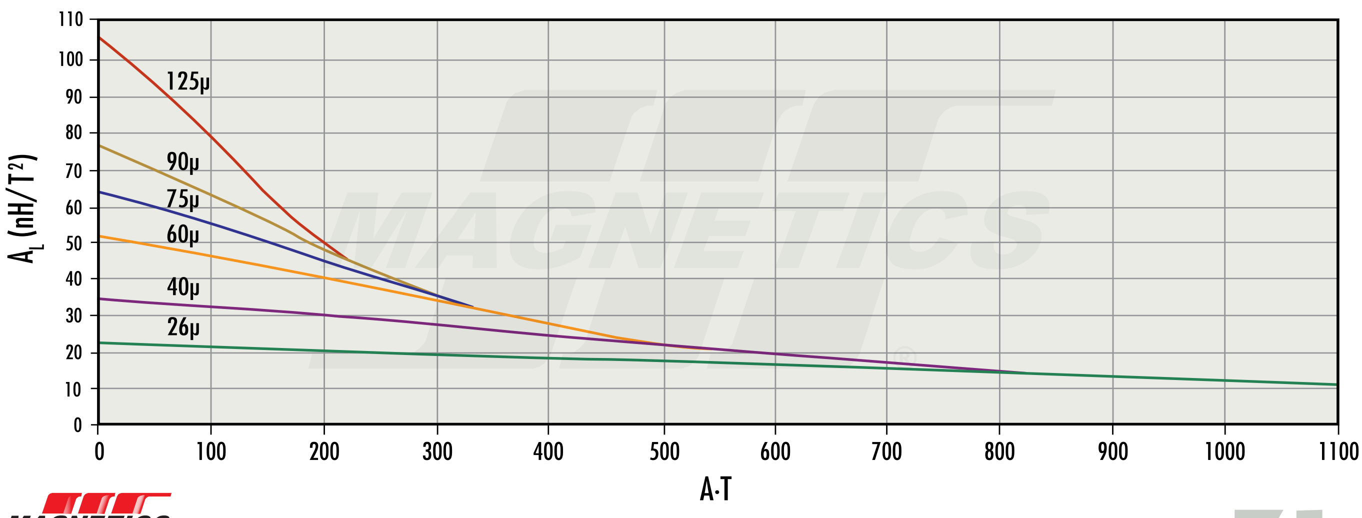
Wound Coil Dimensions		
40% Winding Factor	OD	26.7 mm
	HT	14.2 mm
Completely Full Window	Max OD	33.5 mm
	Max HT	21.4 mm

Winding Turn Length ** Reference General Winding Data pages*

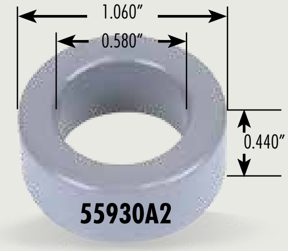
Winding Factor	Length/Turn (mm)
0%	29.8
20%	33.4
25%	34.2
30%	35.0
35%	36.1
40%	36.9
45%	38.0
50%	38.9
60%	41.1
70%	43.6

Surface Area	
Unwound Core	1,800 mm²
40% Winding Factor	2,700 mm²

Kool Mµ A_L vs. DC Bias



26.9 mm OD



Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	26.90 mm/1.060 in	14.7 mm/0.580 in	11.2 mm/0.440 in
After Finish (limits)	27.69 mm/1.090 in	14.1 mm/0.555 in	12.0 mm/0.470 in

Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFLUX®
14	18	55933	58933	-	-
26	32	55932	58932	77932	78932
40	50	-	-	77936	-
60	75	55894	58894	77894	78894
75	94	-	-	77935	-
90	113	-	-	77934	-
125	157	55930	58930	77930	-
147	185	55929	58929	-	-
160	201	55928	58928	-	-
173	217	55924	-	-	-
200	251	55927	-	-	-
300	377	55925	-	-	-
550	740	55926	-	-	-

Physical Characteristics	
Window Area	156 mm^2
Cross Section	65.4 mm^2
Path Length	63.5 mm
Volume	4,150 mm^3
Weight- MPP	36 g
Weight- High Flux	34 g
Weight- Kool Mμ	26 g
Weight - XFLUX	29 g
Area Product	10,200 mm^4

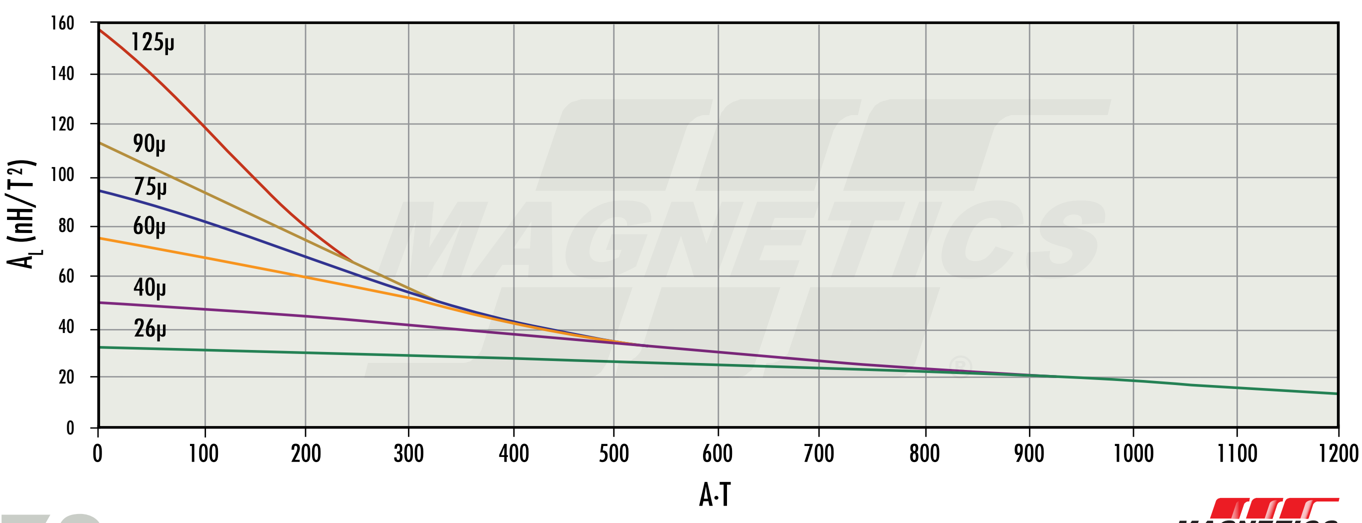
Wound Coil Dimensions		
40% Winding Factor	OD	30.0 mm
	HT	16.5 mm
Completely Full Window	Max OD	37.3 mm
	Max HT	24.0 mm

Winding Turn Length ** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	37.5
20%	41.1
25%	41.9
30%	42.8
35%	43.8
40%	44.6
45%	45.7
50%	46.6
60%	48.8
70%	51.3

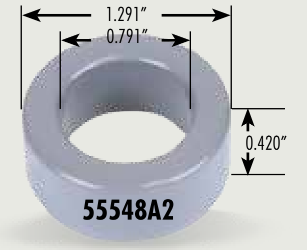
Surface Area	
Unwound Core	2,400 mm^2
40% Winding Factor	3,500 mm^2

Kool Mμ A_L vs. DC Bias



32.8 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	32.8 mm/1.291 in	20.1 mm/0.791 in	10.7 mm/0.420 in
After Finish (limits)	33.66 mm/1.325 in	19.4 mm/0.766 in	11.5 mm/0.450 in



Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFLUX®
14	14	55551	58551	-	-
26	28	55550	58550	77550	78550
40	41	-	-	77555	-
60	61	55071	58071	77071	78071
75	76	-	-	77553	-
90	91	-	-	77552	-
125	127	55548	58548	77548	-
147	150	55547	58547	-	-
160	163	55546	58546	-	-
173	176	55542	-	-	-
200	203	55545	-	-	-
300	305	55543	-	-	-
550	559	55544	-	-	-

Physical Characteristics	
Window Area	297 mm²
Cross Section	65.6 mm²
Path Length	81.4 mm
Volume	5,340 mm³
Weight- MPP	47 g
Weight- High Flux	44 g
Weight- Kool Mμ	34 g
Weight - XFLUX	38 g
Area Product	19,500 mm⁴

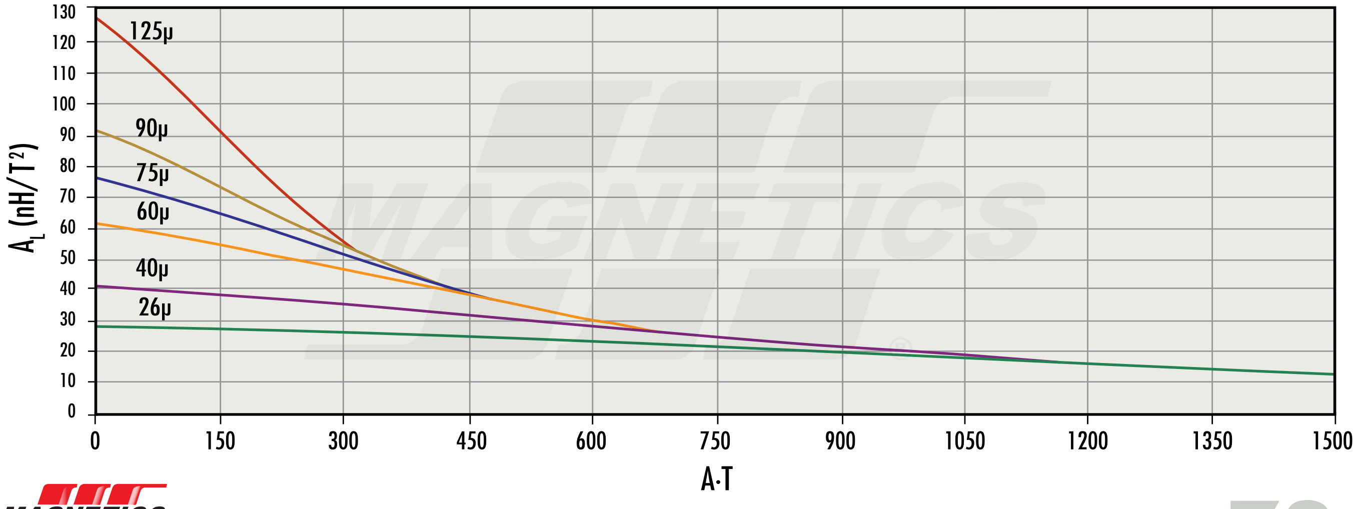
Wound Coil Dimensions		
40% Winding Factor	OD	36.8 mm
	HT	17.8 mm
Completely Full Window	Max OD	46.7 mm
	Max HT	28.0 mm

Winding Turn Length ** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	37.4
20%	42.4
25%	43.5
30%	44.7
35%	46.1
40%	47.2
45%	48.8
50%	50.1
60%	53.2
70%	56.7

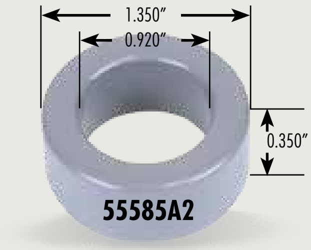
Surface Area	
Unwound Core	3,100 mm²
40% Winding Factor	4,900 mm²

Kool Mμ A_L vs. DC Bias



34.3 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	34.30 mm/1.350 in	23.4 mm/0.920 in	8.89 mm/0.350 in
After Finish (limits)	35.18 mm/1.385 in	22.5 mm/0.888 in	9.78 mm/0.385 in



Permeability (µ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mµ®	XFlux®
14	9	55588	58588	-	-
26	16	55587	58587	77587	78587
40	25	-	-	77591	-
60	38	55586	58586	77586	78586
75	47	-	-	77590	-
90	57	-	-	77589	-
125	79	55585	58585	77585	-
147	93	55584	58584	-	-
160	101	55583	58583	-	-
173	109	55579	-	-	-
200	126	55582	-	-	-
300	190	55580	-	-	-
550	348	55581	-	-	-

Physical Characteristics	
Window Area	399 mm^2
Cross Section	46.4 mm^2
Path Length	89.5 mm
Volume	4,150 mm^3
Weight- MPP	35 g
Weight- High Flux	33 g
Weight- Kool Mµ	25 g
Weight - XFlux	29 g
Area Product	18,500 mm^4

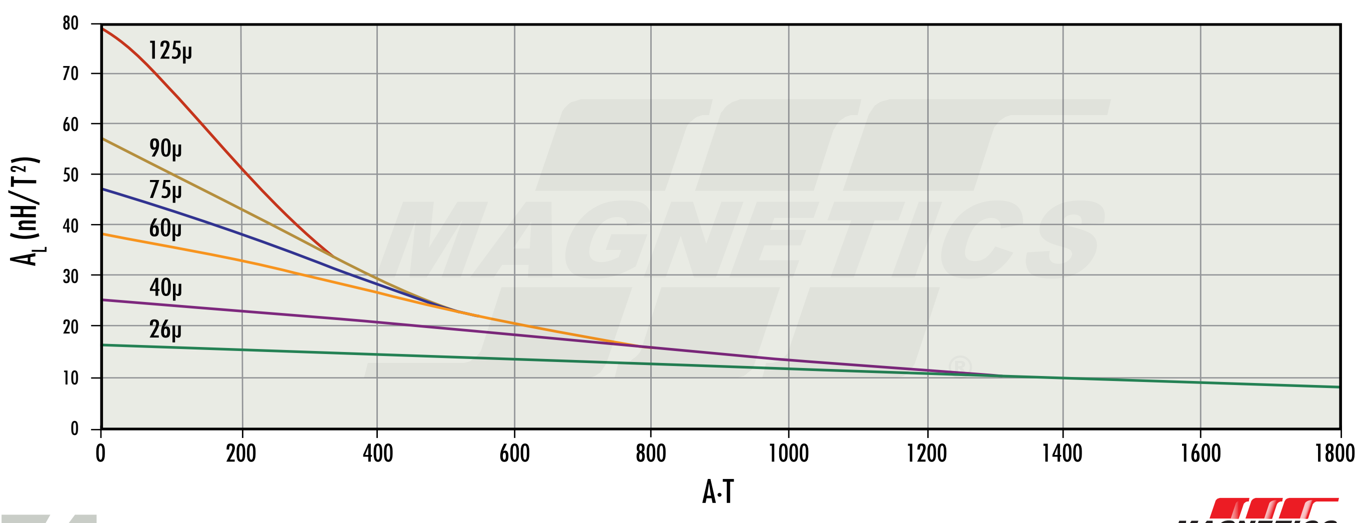
Wound Coil Dimensions		
40% Winding Factor	OD	40.5 mm
	HT	16.8 mm
Completely Full Window	Max OD	50.1 mm
	Max HT	29.0 mm

Winding Turn Length ** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	32.2
20%	38.1
25%	39.6
30%	40.6
35%	42.5
40%	44.0
45%	45.6
50%	47.3
60%	50.8
70%	54.9

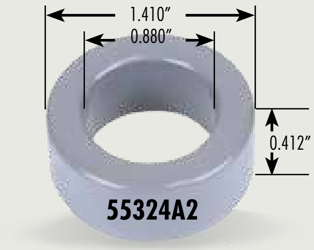
Surface Area	
Unwound Core	2,900 mm^2
40% Winding Factor	5,500 mm^2

Kool Mµ A_L vs. DC Bias



MAGNETICS

35.8 mm OD



Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	35.80 mm/1.410 in	22.4 mm/0.880 in	10.5 mm/0.412 in
After Finish (limits)	36.71 mm/1.445 in	21.5 mm/0.848 in	11.4 mm/0.447 in

Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	13	55327	58327	-	-
26	24	55326	58326	77326	78326
40	37	-	-	77330	-
60	56	55076	58076	77076	78076
75	70	-	-	77329	-
90	84	-	-	77328	-
125	117	55324	58324	77324	-
147	138	55323	58323	-	-
160	150	55322	58322	-	-
173	162	55318	-	-	-
200	187	55321	-	-	-
300	281	55319	-	-	-
550	515	55320	-	-	-

Physical Characteristics	
Window Area	364 mm^2
Cross Section	67.8 mm^2
Path Length	89.8 mm
Volume	6,090 mm^3
Weight- MPP	52 g
Weight- High Flux	49 g
Weight- Kool Mμ	37 g
Weight - XFlux	43 g
Area Product	24,700 mm^4

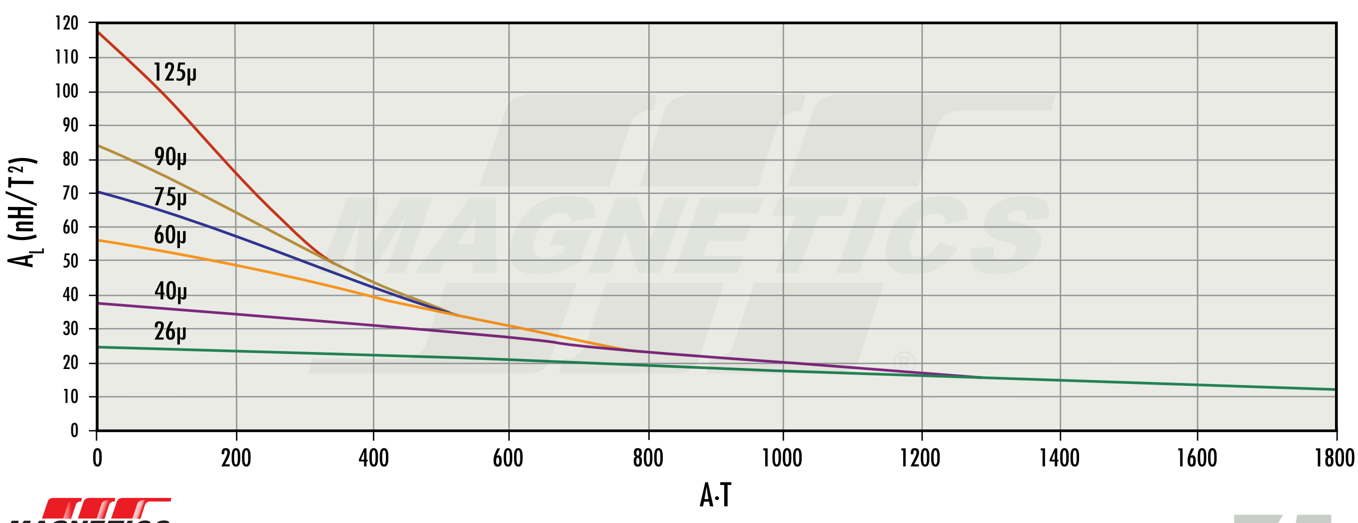
Wound Coil Dimensions		
40% Winding Factor	OD	40.2 mm
	HT	18.4 mm
Completely Full Window	Max OD	51.1 mm
	Max HT	29.6 mm

Winding Turn Length ** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	37.9
20%	43.5
25%	44.8
30%	46.0
35%	47.6
40%	48.9
45%	50.6
50%	52.0
60%	55.5
70%	59.3

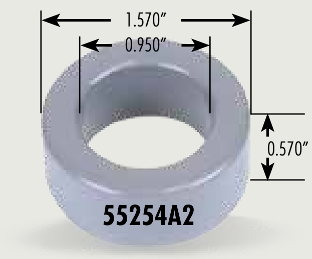
Surface Area	
Unwound Core	3,400 mm^2
40% Winding Factor	5,700 mm^2

Kool Mμ A_L vs. DC Bias



39.9 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	39.90 mm/1.570 in	24.1 mm/0.950 in	14.5 mm/0.570 in
After Finish (limits)	40.77 mm/1.605 in	23.3 mm/0.918 in	15.4 mm/0.605 in



Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	19	55257	58257	-	-
26	35	55256	58256	77256	78256
40	54	-	-	77260	-
60	81	55083	58083	77083	78083
75	101	-	-	77259	-
90	121	-	-	77258	-
125	168	55254	58254	77254	-
147	198	55253	58253	-	-
160	215	55252	58252	-	-
173	233	55248	-	-	-
200	269	55251	-	-	-
300	403	55249	-	-	-
550	740	55250	-	-	-

Physical Characteristics	
Window Area	427 mm^2
Cross Section	107 mm^2
Path Length	98.4 mm
Volume	10,600 mm^3
Weight- MPP	92 g
Weight- High Flux	87 g
Weight- Kool Mμ	65 g
Weight - XFlux	78 g
Area Product	45,800 mm^4

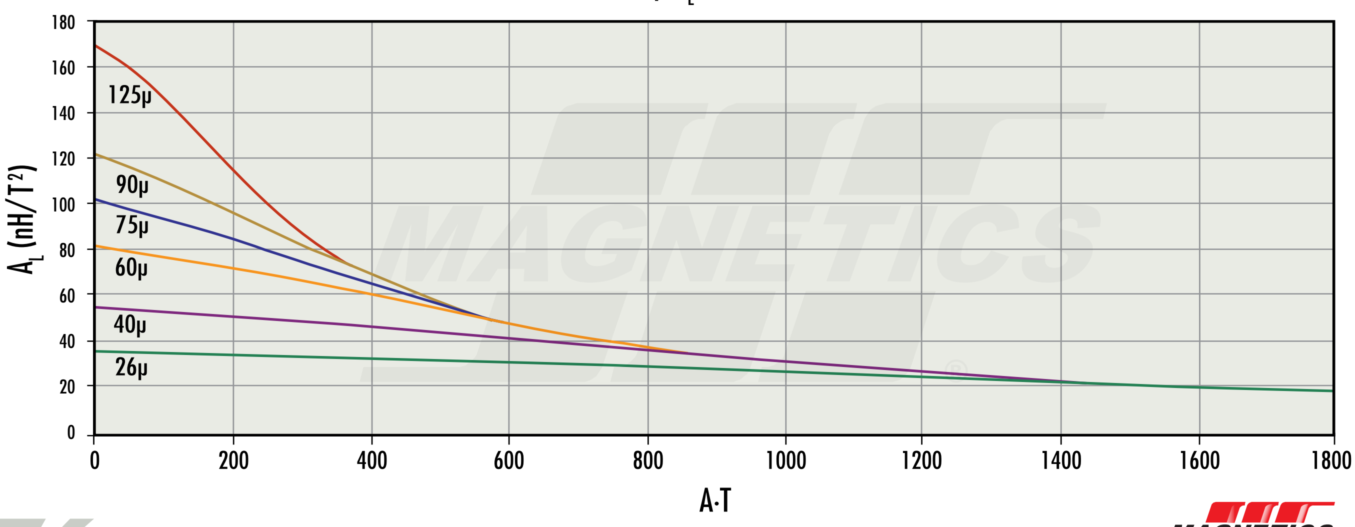
Wound Coil Dimensions		
40% Winding Factor	OD	44.3 mm
	HT	22.4 mm
Completely Full Window	Max OD	56.4 mm
	Max HT	35.2 mm

Winding Turn Length ** Reference General Winding Data pages*

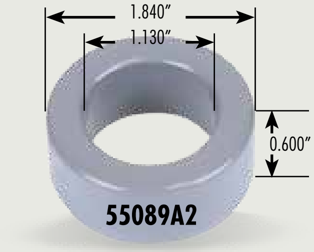
Winding Factor	Length/Turn (mm)
0%	48.2
20%	54.3
25%	55.8
30%	57.0
35%	58.8
40%	60.2
45%	62.1
50%	63.7
60%	67.3
70%	71.5

Surface Area	
Unwound Core	4,800 mm^2
40% Winding Factor	7,300 mm^2

Kool Mμ A_L vs. DC Bias



46.7 mm OD



Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	46.70 mm/1.840 in	28.70 mm/1.130 in	15.2 mm/0.600 in
After Finish (limits)	47.63 mm/1.875 in	27.88 mm/1.098 in	16.2 mm/0.635 in

Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	20	55092	58092	-	-
26	37	55091	58091	77091	78091
40	57	-	-	77095	-
60	86	55090	58090	77090	78090
75	107	-	-	77094	-
90	128	-	-	77093	-
125	178	55089	58089	77089	-
147	210	55088	-	-	-
160	228	55087	-	-	-
173	246	55082	-	-	-
200	285	55086	-	-	-
300	427	55084	-	-	-

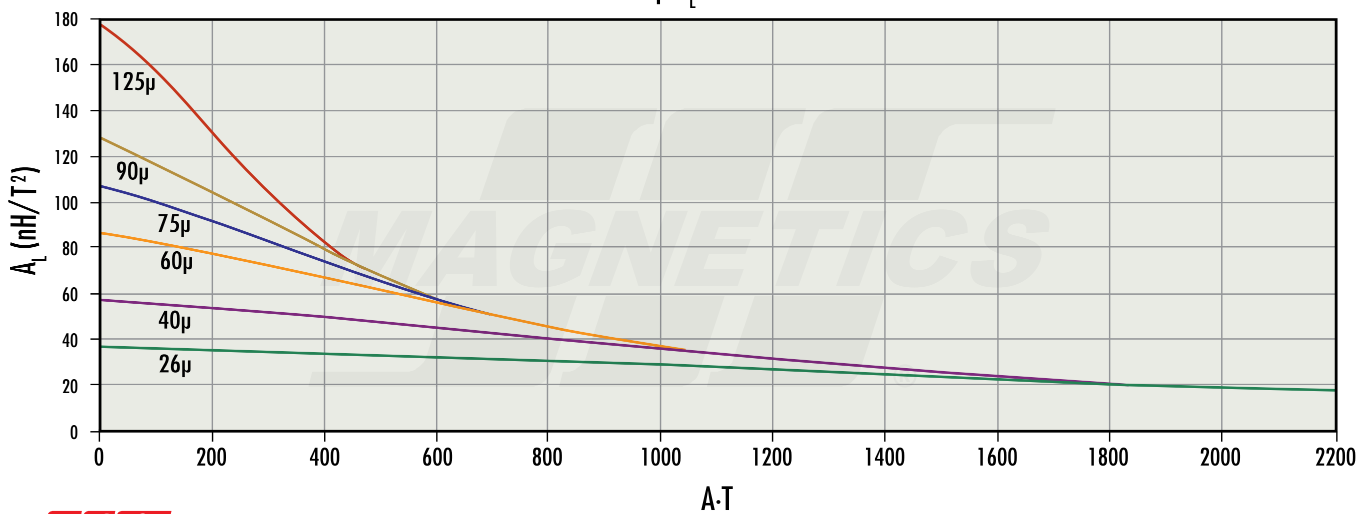
Physical Characteristics	
Window Area	610 mm^2
Cross Section	134 mm^2
Path Length	116 mm
Volume	15,600 mm^3
Weight- MPP	130 g
Weight- High Flux	120 g
Weight- Kool Mμ	96 g
Weight - XFlux	110 g
Area Product	81,800 mm^4

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	52.0
20%	59.1
25%	61.0
30%	62.2
35%	64.5
40%	66.4
45%	68.2
50%	70.4
60%	74.7
70%	79.5

Wound Coil Dimensions		
40% Winding Factor	OD	52.0 mm
	HT	24.9 mm
Completely Full Window	Max OD	66.3 mm
	Max HT	39.8 mm

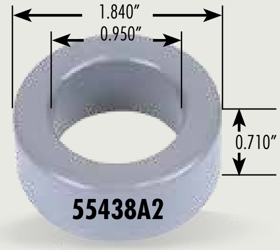
Surface Area	
Unwound Core	6,100 mm^2
40% Winding Factor	9,800 mm^2

Kool Mμ A_L vs. DC Bias



46.7 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	46.70 mm/1.840 in	24.1 mm/0.950 in	18.0 mm/0.710 in
After Finish (limits)	47.63 mm/1.875 in	23.3 mm/0.918 in	19.0 mm/0.745 in



Permeability (µ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mµ®	XFlux®
14	32	55441	58441	-	-
26	59	55440	58440	77440	78440
40	90	-	-	77431	-
60	135	55439	58439	77439	78439
75	169	-	-	77443	-
90	202	-	-	77442	-
125	281	55438	58438	77438	-
147	330	55437	58437	-	-
160	360	55436	-	-	-
173	390	55432	-	-	-
200	450	55435	-	-	-
300	674	55433	-	-	-

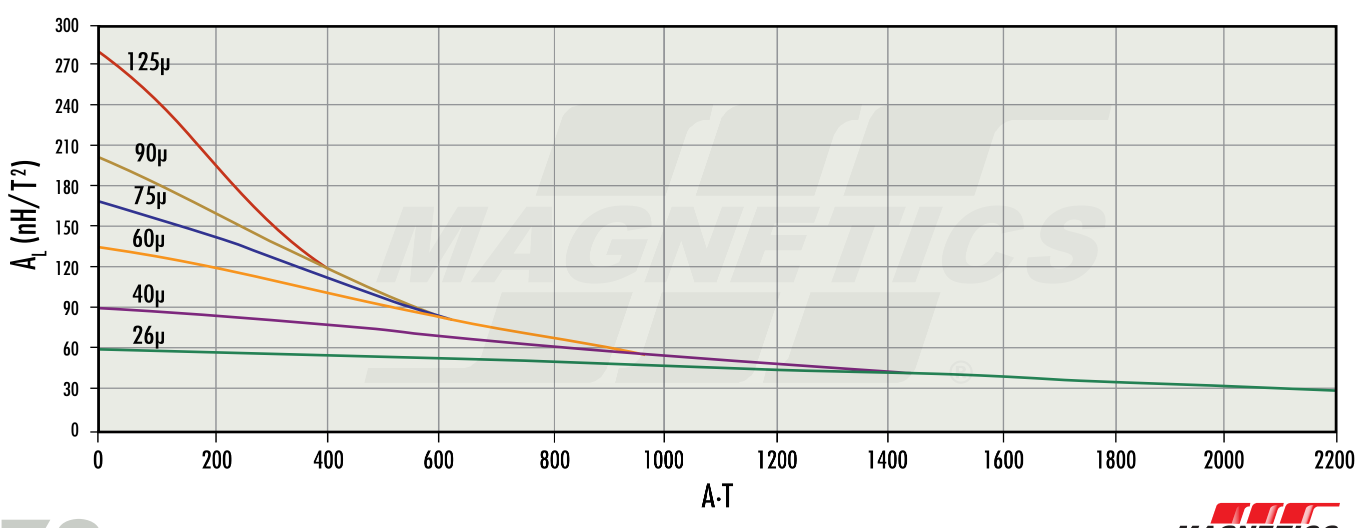
Physical Characteristics	
Window Area	427 mm^2
Cross Section	199 mm^2
Path Length	107 mm
Volume	21,300 mm^3
Weight- MPP	180 g
Weight- High Flux	170 g
Weight- Kool Mµ	130 g
Weight - XFlux	150 g
Area Product	85,900 mm^4

Wound Coil Dimensions		
40% Winding Factor	OD	51.2 mm
	HT	26.0 mm
Completely Full Window	Max OD	63.8 mm
	Max HT	38.7 mm

Winding Turn Length * Reference General Winding Data pages	
Winding Factor	Length/Turn (mm)
0%	62.1
20%	68.2
25%	69.7
30%	70.9
35%	72.7
40%	74.1
45%	76.0
50%	77.6
60%	81.2
70%	85.4

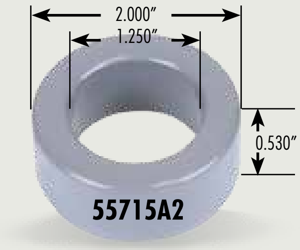
Surface Area	
Unwound Core	6,900 mm^2
40% Winding Factor	9,600 mm^2

Kool Mµ A_L vs. DC Bias



50.8 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	50.80 mm/2.000 in	31.80 mm/1.250 in	13.5 mm/0.530 in
After Finish (limits)	51.69 mm/2.035 in	30.93 mm/1.218 in	14.4 mm/0.565 in



Permeability (µ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mµ®	XFlux®
14	17	55718	58718	-	-
26	32	55717	58717	77717	78717
40	49	-	-	77721	-
60	73	55716	58716	77716	78716
75	91	-	-	77720	-
90	109	-	-	77719	-
125	152	55715	58715	77715	-
147	179	55714	58714	-	-
160	195	55713	-	-	-
173	210	55709	-	-	-
200	243	55712	-	-	-
300	365	55710	-	-	-

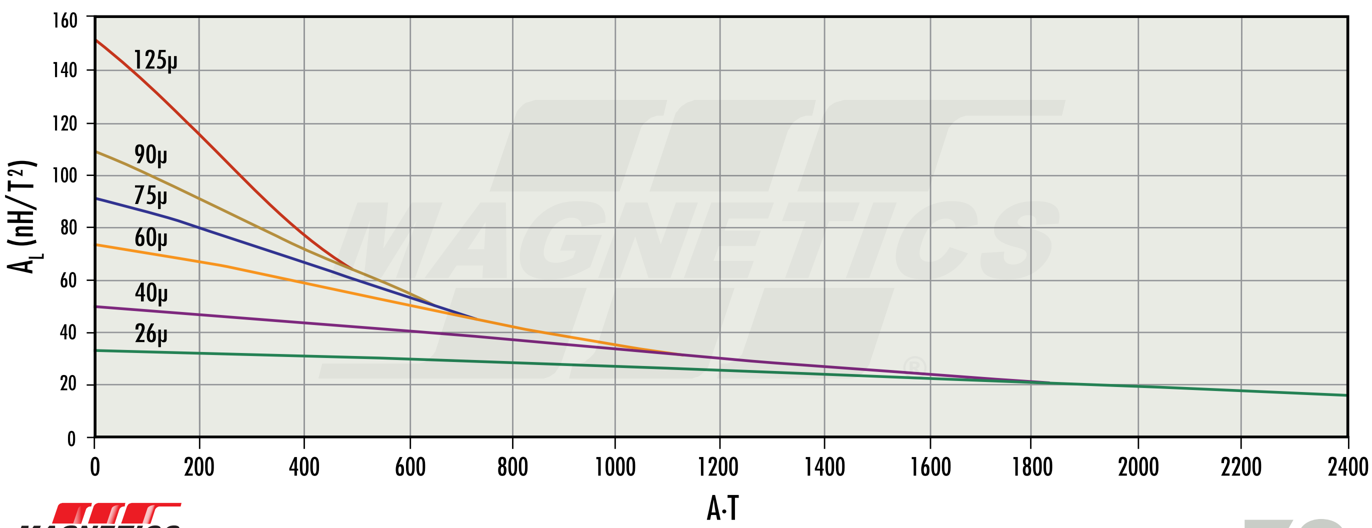
Physical Characteristics	
Window Area	751 mm^2
Cross Section	125 mm^2
Path Length	127 mm
Volume	15,900 mm^3
Weight- MPP	140 g
Weight- High Flux	130 g
Weight- Kool Mµ	98 g
Weight - XFlux	110 g
Area Product	94,000 mm^4

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	49.5
20%	57.4
25%	59.6
30%	61.0
35%	63.5
40%	65.5
45%	67.7
50%	70.1
60%	74.9
70%	80.3

Wound Coil Dimensions		
40% Winding Factor	OD	56.6 mm
	HT	24.2 mm
Completely Full Window	Max OD	72.4 mm
	Max HT	40.6 mm

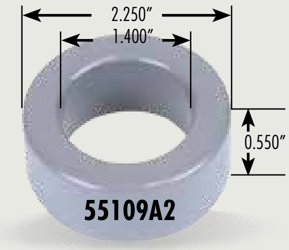
Surface Area	
Unwound Core	6,400 mm^2
40% Winding Factor	11,000 mm^2

Kool Mµ A_L vs. DC Bias



57.2 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	57.20 mm/2.250 in	35.60 mm/1.400 in	14.0 mm/0.550 in
After Finish (limits)	58.04 mm/2.285 in	34.74 mm/1.368 in	14.9 mm/0.585 in



Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	18	55112	58112	-	-
26	33	55111	58111	77111	78111
40	50	-	-	77212	-
60	75	55110	58110	77110	78110
75	94	-	-	77214	-
90	112	-	-	77213	-
125	156	55109	58109	77109	-
147	185	55108	-	-	-
160	200	55107	-	-	-
173	218	55103	-	-	-
200	250	55106	-	-	-
300	374	55104	-	-	-

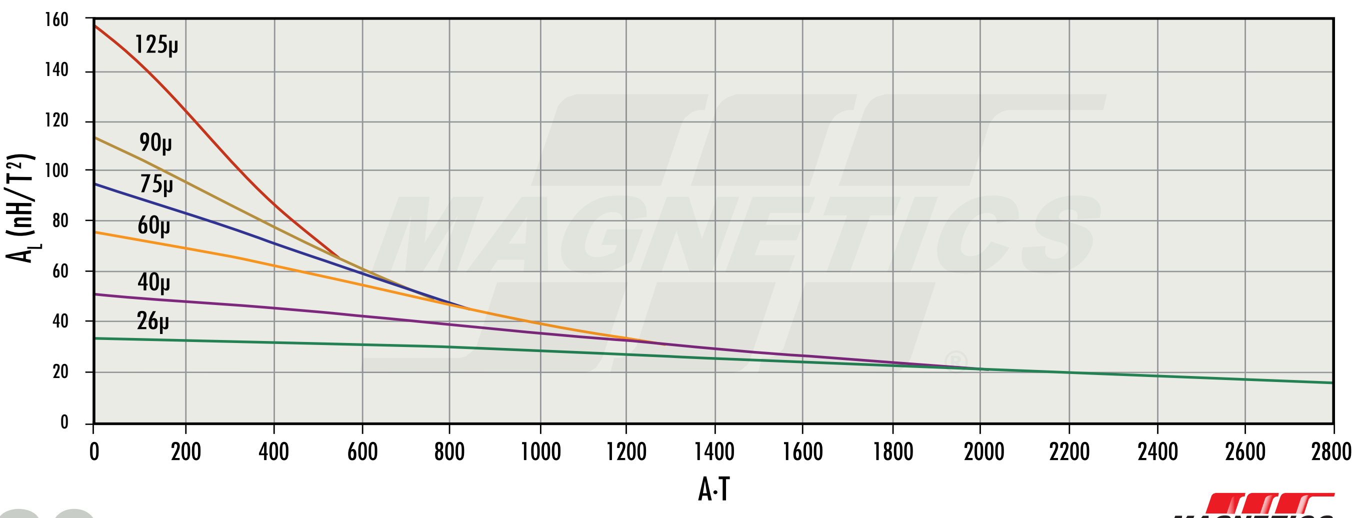
Physical Characteristics	
Window Area	948 mm²
Cross Section	144 mm²
Path Length	143 mm
Volume	20,700 mm³
Weight- MPP	180 g
Weight- High Flux	170 g
Weight- Kool Mμ	130 g
Weight - XFlux	150 g
Area Product	137,000 mm⁴

Wound Coil Dimensions		
40% Winding Factor	OD	63.5 mm
	HT	25.9 mm
Completely Full Window	Max OD	81.3 mm
	Max HT	44.4 mm

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	53.0
20%	61.9
25%	64.3
30%	65.8
35%	68.7
40%	71.0
45%	73.2
50%	76.0
60%	81.3
70%	87.1

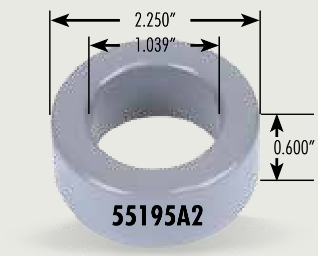
Surface Area	
Unwound Core	7,700 mm²
40% Winding Factor	13,000 mm²

Kool Mμ A_L vs. DC Bias



57.2 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	57.20 mm/2.250 in	26.40 mm/1.039 in	15.2 mm/0.600 in
After Finish (limits)	58.04 mm/2.285 in	25.57 mm/1.007 in	16.2 mm/0.635 in



Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFLUX®
14	32	55190	58190	-	-
26	60	55191	58191	77191	78191
40	92	-	-	77189	-
60	138	55192	58192	77192	78192
75	172	-	-	77193	-
90	207	-	-	77194	-
125	287	55195	58195	77195	-
147	306	55196	-	-	-
160	333	55197	-	-	-
173	360	55198	-	-	-
200	417	55199	-	-	-

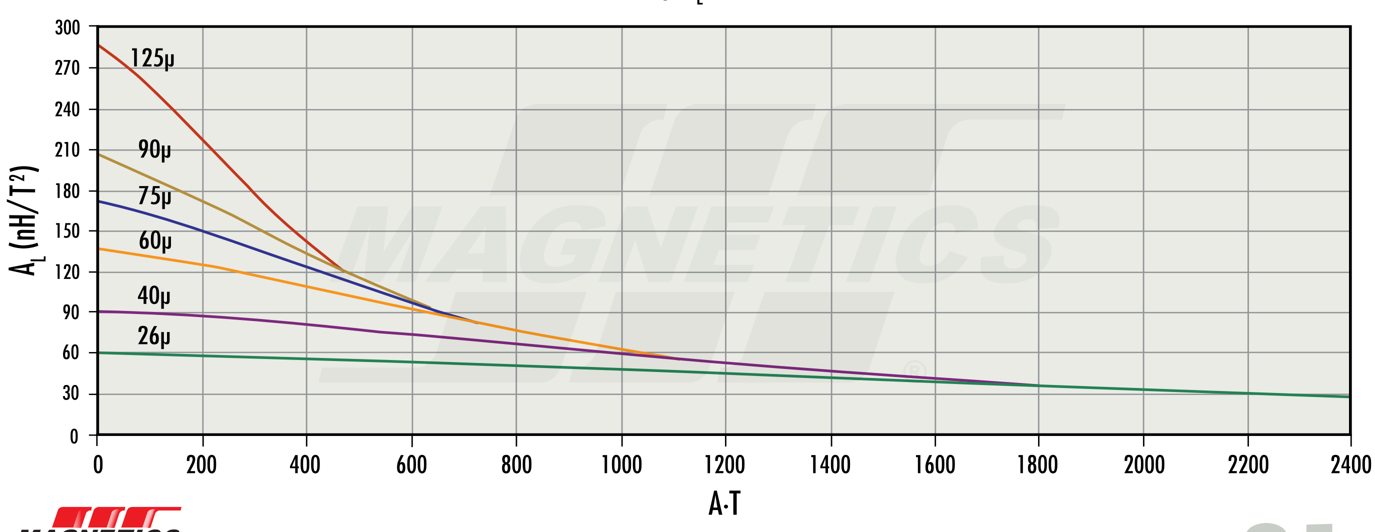
Physical Characteristics	
Window Area	514 mm^2
Cross Section	229 mm^2
Path Length	125 mm
Volume	28,600 mm^3
Weight- MPP	240 g
Weight- High Flux	230 g
Weight- Kool Mμ	180 g
Weight - XFLUX	200 g
Area Product	118,000 mm^4

Winding Turn Length * Reference General Winding Data pages	
Winding Factor	Length/Turn (mm)
0%	64.6
20%	71.2
25%	72.9
30%	74.1
35%	76.3
40%	77.8
45%	79.8
50%	81.6
60%	85.6
70%	90.1

Wound Coil Dimensions		
40% Winding Factor	OD	62.0 mm
	HT	24.0 mm
Completely Full Window	Max OD	75.7 mm
	Max HT	34.0 mm

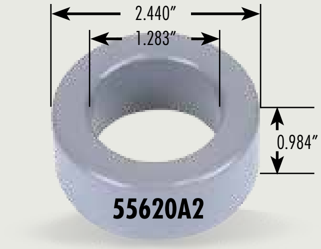
Surface Area	
Unwound Core	8,500 mm^2
40% Winding Factor	12,000 mm^2

Kool Mμ A_L vs. DC Bias



62.0 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	62.00 mm/2.440 in	32.60 mm/1.283 in	25.0 mm/0.984 in
After Finish (limits)	62.91 mm/2.477 in	31.69 mm/1.248 in	25.91 mm/1.020 in



Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	44	55614	58614	-	-
26	82	55615	58615	77615	-
40	126	-	-	77616	-
60	189	55617	58617	77617	-
75	237	-	-	77618	-
90	284	-	-	77619	-
125	394	55620	58620	77620	-

Physical Characteristics	
Window Area	789 mm²
Cross Section	360 mm²
Path Length	144 mm
Volume	51,800 mm³
Weight- MPP	460 g
Weight- High Flux	440 g
Weight- Kool Mμ	340 g
Weight - XFlux	-
Area Product	284,000 mm⁴

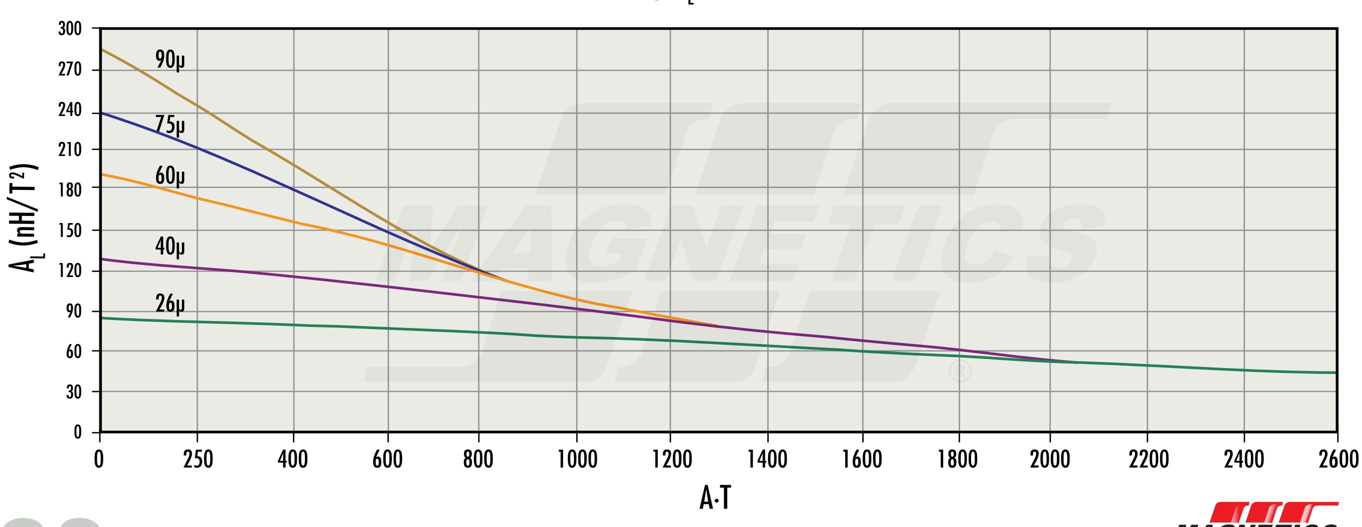
Winding Turn Length ** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	83.0
20%	91.3
25%	93.4
30%	94.9
35%	97.5
40%	99.5
45%	102
50%	104
60%	109
70%	115

Wound Coil Dimensions		
40% Winding Factor	OD	75.3 mm
	HT	39.7 mm
Completely Full Window	Max OD	81.4 mm
	Max HT	47.4 mm

Surface Area	
Unwound Core	12,000 mm²
40% Winding Factor	21,000 mm²

Kool Mμ A_L vs. DC Bias



74.1 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	74.10 mm/2.917 in	45.30 mm/1.783 in	35.00 mm/1.378 in
After Finish (limits)	75.01 mm/2.953 in	44.39 mm/1.748 in	35.92 mm/1.414 in

Permeability (µ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mµ®	XFlux®
14	48	55734	58734	-	-
26	88	55735	58735	77735	-
40	136	-	-	77736	-
60	204	55737	58737	77737	-
75	255	-	-	77738	-
90	306	-	-	77739	-
125	425	55740	58740	77740	-

Physical Characteristics	
Window Area	1,550 mm^2
Cross Section	497 mm^2
Path Length	184 mm
Volume	91,400 mm^3
Weight- MPP	790 g
Weight- High Flux	750 g
Weight- Kool Mµ	570 g
Weight - XFlux	-
Area Product	769,000 mm^4

Winding Turn Length ** Reference General Winding Data pages*

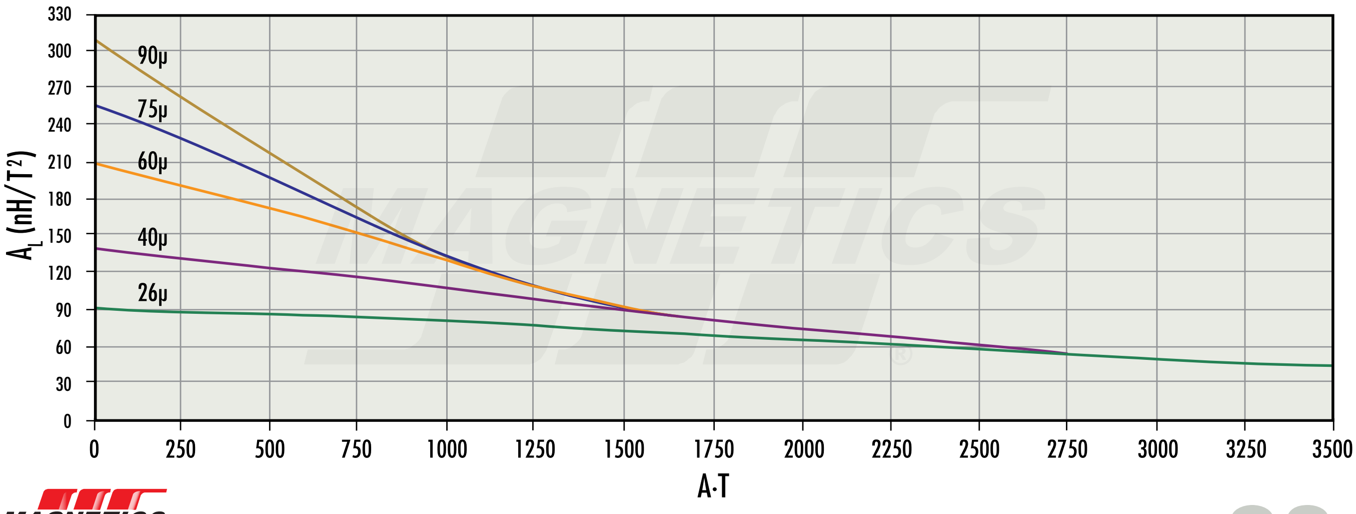
Winding Factor	Length/Turn (mm)
0%	102
20%	114
25%	117
30%	119
35%	122
40%	125
45%	129
50%	132
60%	139
70%	147

Wound Coil Dimensions

40% Winding Factor	OD	91.0 mm
	HT	55.2 mm
Completely Full Window	Max OD	102 mm
	Max HT	65.7 mm

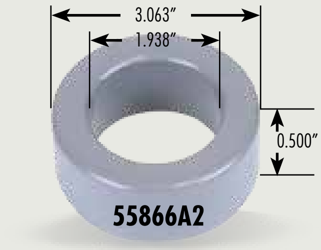
Surface Area	
Unwound Core	19,000 mm^2
40% Winding Factor	33,000 mm^2

Kool Mµ A_L vs. DC Bias



77.8 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	77.80 mm/3.063 in	49.20 mm/1.938 in	12.7 mm/0.500 in
After Finish (limits)	78.95 mm/3.108 in	48.20 mm/1.898 in	13.9 mm/0.545 in



Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFLUX®
14	16	55869	58869	-	-
26	30	55868	58868	77868	-
40	45	-	-	77872	-
60	68	55867	58867	77867	78867
125	142	55866	58866	77866	-

Physical Characteristics	
Window Area	1,820 mm²
Cross Section	176 mm²
Path Length	196 mm
Volume	34,500 mm³
Weight- MPP	290 g
Weight- High Flux	270 g
Weight- Kool Mμ	210 g
Weight - XFLUX	240 g
Area Product	321,000 mm⁴

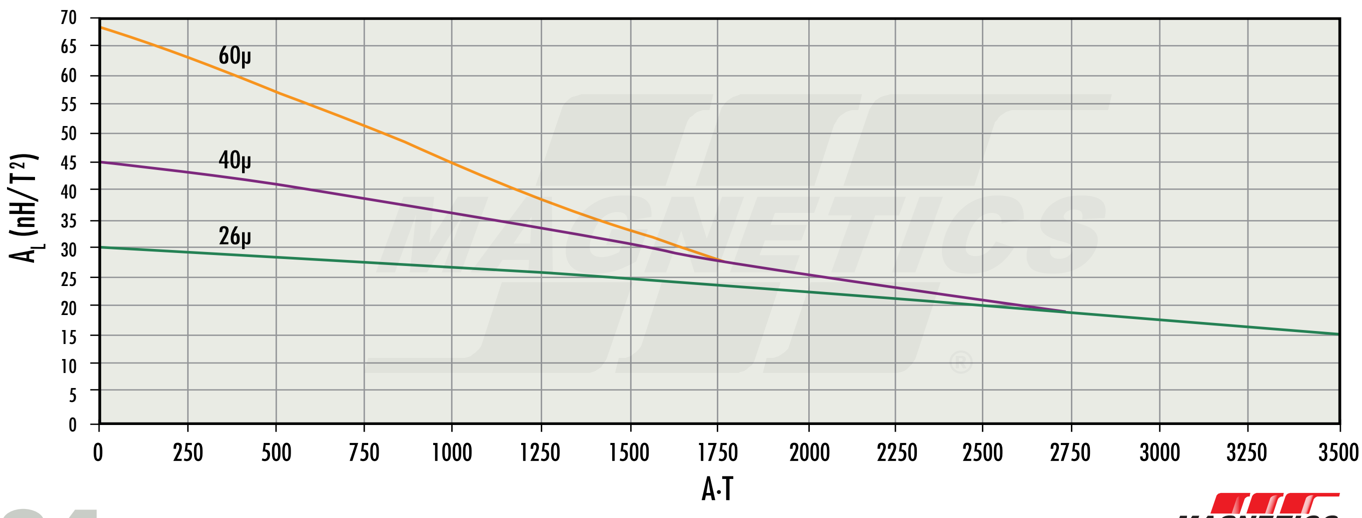
Winding Turn Length ** Reference General Winding Data pages*

Winding Factor	Length/Turn (mm)
0%	58.4
20%	70.9
25%	74.1
30%	76.3
35%	80.4
40%	83.5
45%	86.7
50%	90.4
60%	98.1
70%	107

Wound Coil Dimensions		
40% Winding Factor	OD	86.6 mm
	HT	29.1 mm
Completely Full Window	Max OD	112 mm
	Max HT	54.3 mm

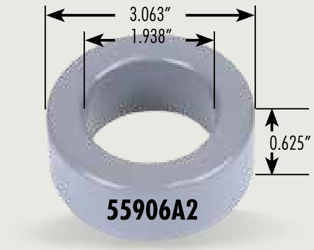
Surface Area	
Unwound Core	11,000 mm²
40% Winding Factor	23,000 mm²

Kool Mμ A_L vs. DC Bias



77.8 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	77.80 mm/3.063 in	49.20 mm/1.938 in	15.9 mm/0.625 in
After Finish (limits)	78.95 mm/3.108 in	48.20 mm/1.898 in	17.1 mm/0.670 in



Permeability (µ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mµ®	XFlux®
14	20	55909	58909	-	-
26	37	55908	58908	77908	-
40	57	-	-	77912	-
60	85	55907	58907	77907	78907
125	177	55906	58906	77906	-

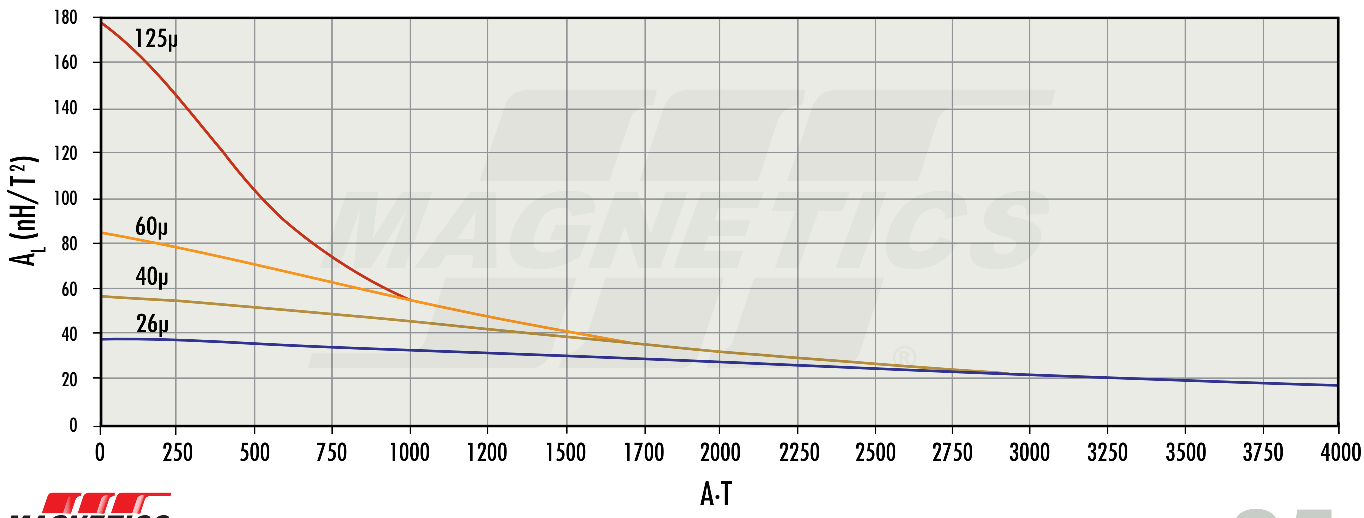
Physical Characteristics	
Window Area	1,820 mm²
Cross Section	221 mm²
Path Length	196 mm
Volume	43,400 mm³
Weight- MPP	380 g
Weight- High Flux	360 g
Weight- Kool Mµ	280 g
Weight - XFlux	320 g
Area Product	403,000 mm⁴

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	64.7
20%	77.2
25%	80.5
30%	82.7
35%	86.8
40%	89.9
45%	93.1
50%	96.8
60%	104
70%	113

Wound Coil Dimensions		
40% Winding Factor	OD	86.6 mm
	HT	32.3 mm
Completely Full Window	Max OD	113 mm
	Max HT	57.7 mm

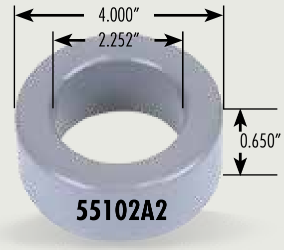
Surface Area	
Unwound Core	13,000 mm²
40% Winding Factor	24,000 mm²

Kool Mµ A_L vs. DC Bias



101.6 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	101.6 mm/4.000 in	57.20 mm/2.252 in	16.5 mm/0.650 in
After Finish (limits)	103.0 mm/4.055 in	55.75 mm/2.195 in	17.9 mm/0.705 in



Permeability (µ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mµ®	XFlux®
14	26	55101	58101	-	-
26	48	55102	58102	77102	-
40	74	-	-	77100	-
60	111	55099	58099	77099	-
125	232	55098	58098	77098	-

Physical Characteristics	
Window Area	2,470 mm²
Cross Section	358 mm²
Path Length	243 mm
Volume	86,900 mm³
Weight- MPP*	650 g
Weight- High Flux*	610 g
Weight- Kool Mµ*	470 g
Weight - XFlux	-
Area Product	885,000 mm⁴

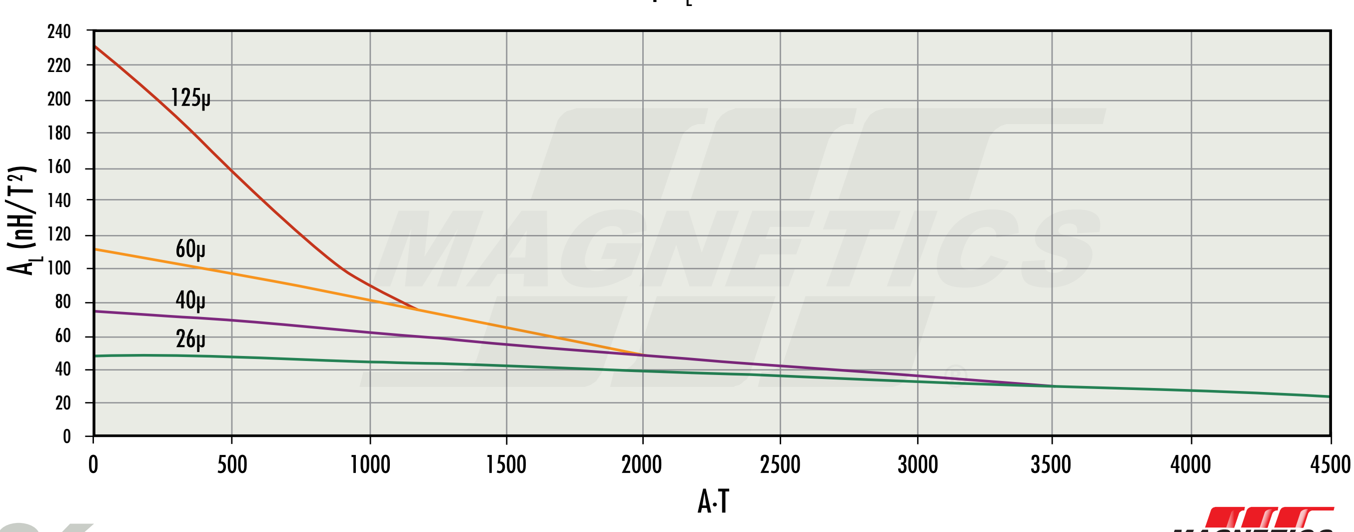
*26µ, see page 25

Winding Turn Length *Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	82.2
20%	96.8
25%	100
30%	103
35%	108
40%	111
45%	116
50%	120
60%	128
70%	139

Wound Coil Dimensions		
40% Winding Factor	OD	112 mm
	HT	34.9 mm
Completely Full Window	Max OD	136 mm
	Max HT	55.1 mm

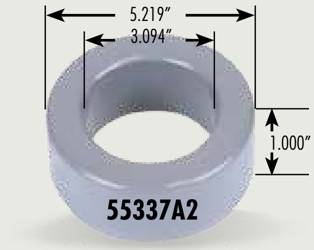
Surface Area	
Unwound Core	20,000 mm²
40% Winding Factor	36,000 mm²

Kool Mµ A_L vs. DC Bias



132.6 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	132.6 mm/5.219 in	78.60 mm/3.094 in	25.4 mm/1.000 in
After Finish (limits)	134.0 mm/5.274 in	77.19 mm/3.039 in	26.8 mm/1.055 in



Permeability (µ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mµ®	XFLUX®
14	37	55336	58336	-	-
26	68	55337	58337	77337	-
40	105	-	-	77338	-
60	158	55339	58339	77339	-
125	329	55340	58340	-	-

Physical Characteristics	
Window Area	4,710 mm^2
Cross Section	678 mm^2
Path Length	324 mm
Volume	220,000 mm^3
Weight- MPP*	1,700 g
Weight- High Flux*	1,500 g
Weight- Kool Mµ*	1,200 g
Weight - XFLUX	-
Area Product	3,190,000 mm^4

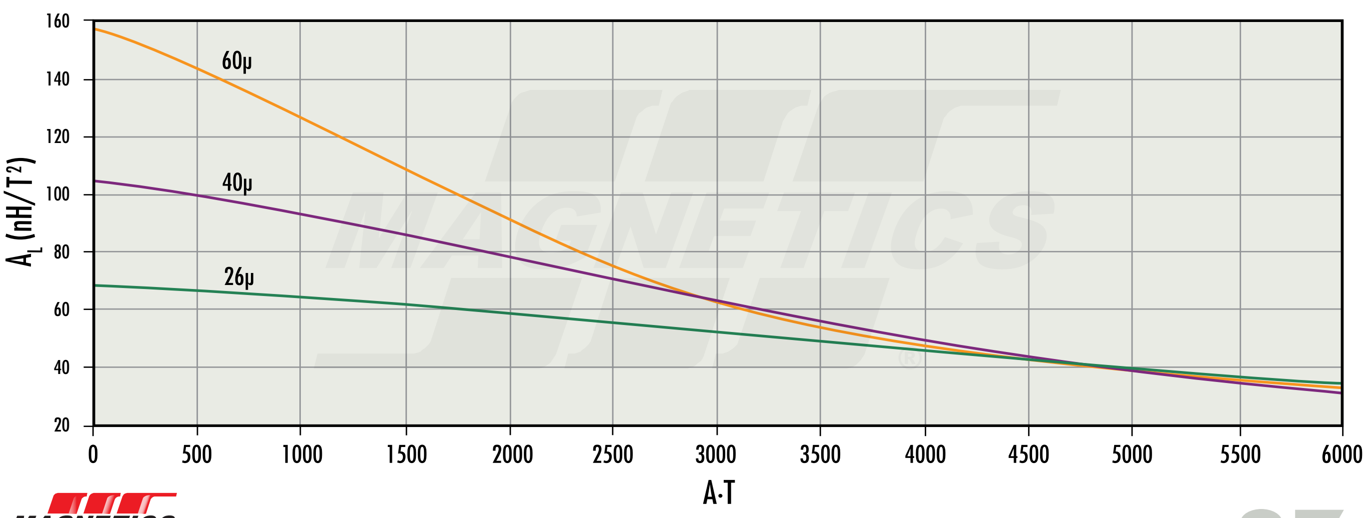
*26µ, see page 25

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	110
20%	130
25%	135
30%	139
35%	145
40%	150
45%	156
50%	162
60%	173
70%	187

Wound Coil Dimensions		
40% Winding Factor	OD	146 mm
	HT	50.7 mm
Completely Full Window	Max OD	179 mm
	Max HT	78.8 mm

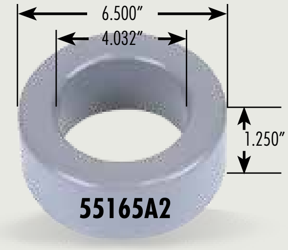
Surface Area	
Unwound Core	36,000 mm^2
40% Winding Factor	65,000 mm^2

Kool Mµ A_L vs. DC Bias



165.1 mm OD

Core Dimensions	OD(max)	ID(min)	HT(max)
Before Finish (nominal)	165.1 mm/6.500 in	102.4 mm/4.032 in	31.75 mm/1.250 in
After Finish (limits)	166.5 mm/6.555 in	101.0 mm/3.977 in	33.15 mm/1.305 in



Permeability (μ)	A_L ± 8%	Part Number			
		MPP	High Flux	Kool Mμ®	XFlux®
14	42	55164	58164	-	-
26	78	55165	58165	77165	-
40	120	-	-	-	-
60	180	55167	58167	-	-

Physical Characteristics	
Window Area	8,030 mm²
Cross Section	987 mm²
Path Length	412 mm
Volume	407,000 mm³
Weight- MPP*	3,000 g
Weight- High Flux*	2,800 g
Weight- Kool Mμ*	2,200 g
Weight - XFlux	-
Area Product	7,920,000 mm⁴

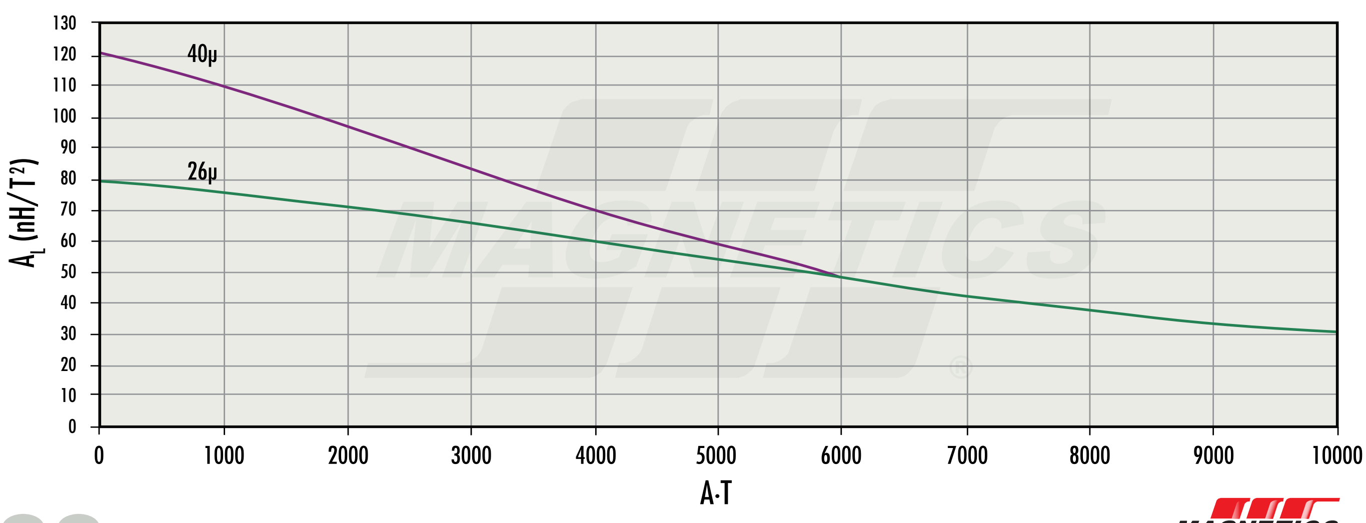
*26μ, see page 25

Winding Turn Length ** Reference General Winding Data pages*	
Winding Factor	Length/Turn (mm)
0%	132
20%	158
25%	164
30%	170
35%	178
40%	184
45%	192
50%	199
60%	215
70%	233

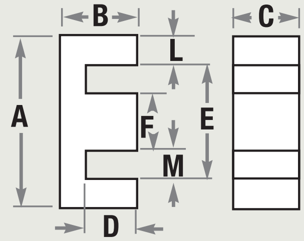
Wound Coil Dimensions		
40% Winding Factor	OD	182 mm
	HT	63.2 mm
Completely Full Window	Max OD	228 mm
	Max HT	103 mm

Surface Area	
Unwound Core	55,000 mm²
40% Winding Factor	102,000 mm²

Kool Mμ A_L vs. DC Bias



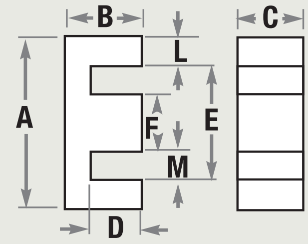
E Core Data



PART NO		A	B	C	D(min)	E(min)	F	L(nom)	M(min)
00K1808E*** (EI-187)	mm in	19.3±0.305 0.760±0.012	8.10±0.178 0.319±0.007	4.78±0.152 0.188±0.006	5.53 0.218	13.9 0.548	4.78±0.127 0.188±0.005	2.39 0.094	4.64 0.183
00K2510E*** (E-2425)	mm in	25.4±0.381 1.000±0.015	9.53±0.178 0.375±0.007	6.35±0.102 0.250±0.004	6.22 0.245	18.7 0.740	6.35±0.127 0.250±0.005	3.18 0.125	6.24 0.246
00K3007E*** (DIN 30/7)	mm in	30.10±0.457 1.185±0.018	15.0±0.229 0.591±0.009	7.06±0.152 0.278±0.006	9.55 0.376	19.8 0.782	6.96±0.203 0.274±0.008	5.11 0.201	6.32 0.249
00K3515E*** (EI-375)	mm in	34.54±0.508 1.360±0.020	14.2±0.229 0.557±0.009	9.35±0.178 0.368±0.007	9.60 0.378	25.2 0.995	9.32±0.203 0.367±0.008	4.45 0.175	7.87 0.310
00K4017E*** (EE 42/11)	mm in	42.85±0.635 1.687±0.025	21.1±0.305 0.830±0.012	10.8±0.254 0.424±0.010	14.9 0.587	30.30 1.195	11.9±0.254 0.468±0.010	5.94 0.234	9.27 0.365
00K4020E*** (DIN 42/15)	mm in	42.85±0.635 1.687±0.025	21.1±0.330 0.830±0.013	15.4±0.254 0.608±0.010	14.9 0.587	30.35 1.195	11.9±0.254 0.468±0.010	5.94 0.234	9.27 0.365
00K4022E*** (DIN 42/20)	mm in	42.85±0.635 1.687±0.025	21.1±0.330 0.830±0.013	20.0±0.254 0.788±0.010	14.9 0.587	30.35 1.195	11.9±0.254 0.468±0.010	5.94 0.234	9.27 0.365
00K4317E*** (EI-21)	mm in	40.87±0.610 1.609±0.024	16.5±0.279 0.650±0.011	12.5±0.178 0.493±0.007	10.3 0.409	28.32 1.115	12.5±0.203 0.493±0.008	6.05 0.238	7.87 0.310
00K5528E*** (DIN 55/21)	mm in	54.86±0.813 2.160±0.032	27.56±0.406 1.085±0.016	20.6±0.381 0.812±0.015	18.5 0.729	37.49 1.476	16.8±0.381 0.660±0.015	8.38 0.330	10.2 0.405
00K5530E*** (DIN 55/25)	mm in	54.86±0.813 2.160±0.032	27.56±0.406 1.085±0.016	24.6±0.381 0.969±0.015	18.5 0.729	37.49 1.476	16.8±0.381 0.660±0.015	8.38 0.330	10.2 0.405
00K6527E*** (Metric E65)	mm in	65.15±1.27 2.565±0.050	32.51±0.381 1.280±0.015	27.00±0.406 1.063±0.016	22.1 0.874	44.19 1.740	19.7±0.356 0.774±0.014	10.0 0.394	12.0 0.476
00K7228E*** (F11)	mm in	72.39±1.09 2.85±0.043	27.94±0.508 1.100±0.020	19.1±0.381 0.750±0.015	17.7 0.699	52.62 2.072	19.1±0.381 0.750±0.015	9.53 0.375	16.8 0.665
00K8020E*** (Metric E80)	mm in	80.01±1.19 3.150±0.047	38.10±0.635 1.500±0.025	19.8±0.381 0.780±0.015	28.01 1.103	59.28 2.334	19.8±0.381 0.780±0.015	9.91 0.390	19.8 0.780
00K8024E***	mm in	80.01±1.19 3.150±0.047	24.05±0.635 0.950±0.025	29.72±0.381 1.170±0.015	14.02 0.552	59.28 2.334	19.8±0.381 0.780±0.015	9.91 0.390	19.8 0.780
00K8044E***	mm in	80.01±1.19 3.150±0.047	44.58±0.635 1.755±0.025	19.8±0.381 0.780±0.015	34.36 1.353	59.28 2.334	19.8±0.381 0.780±0.015	9.91 0.390	19.8 0.780
00K114LE***	mm in	114.3±0.762 4.500±0.030	46.18±0.381 1.818±0.015	34.93±0.381 1.375±0.015	28.60 1.126	79.50 3.13	35.10±0.381 1.382±0.015	17.2 0.676	22.1 0.874
00K130LE***	mm in	130.3±3.81 5.130±0.150	32.51±0.305 1.280±0.012	53.85±1.27 2.120±0.050	22.1 0.874	108.4 4.270	20.0±0.762 0.788±0.030	10.0 0.394	44.22 1.741
00K160LE***	mm in	160.0±2.54 6.300±0.100	38.10±0.635 1.500±0.025	39.62±1.27 1.560±0.050	28.14 1.108	138.2 5.440	19.8±0.762 0.780±0.030	9.91 0.390	59.28 2.334

*Add permeability code*** to part number, e.g. for 26μ Kool Mμ the complete part number is 00K4022E026.*

E Core Data



PART NO	A_L nH/TURNS²± 8%				Path Length l_e (mm)	Cross Section A_e (mm²)	Volume V_e (mm³)
	26µ	40µ	60µ	90µ			
00K1808E***	26	35	48	69	40.1	22.8	914
00K2510E***	39	52	70	100	48.5	38.5	1,870
00K3007E***	33	46	71	92	65.6	60.1	3,940
00K3515E***	56	75	102	146	69.4	84.0	5,830
00K4017E***	56	76	105	151	98.4	128	12,600
00K4020E***	80	108	150	217	98.4	183	18,000
00K4022E***	104	140	194	281	98.4	237	23,300
00K4317E***	88	119	163	234	77.5	152	11,800
00K5528E***	116	157	219	-	123	350	43,100
00K5530E***	138	187	261	-	123	417	51,300
00K6527E***	162	230	300	-	147	540	79,400
00K7228E***	130	173	235	-	137	368	50,400
00K8020E***	103	145	190	-	185	389	72,000
00K8024E***	-	-	370	-	131.4	600	78,840
00K8044E***	91	-	-	-	208	389	80,900
00K114LE***	235	-	445	-	215	1,220	262,000
00K130LE***	254	-	-	-	219	1,080	237,000
00K160LE***	180	-	-	-	273	778	212,000

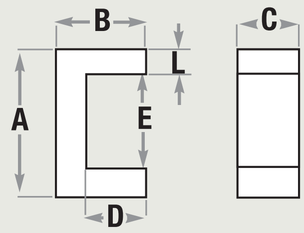
*Add permeability code*** to part number, e.g. for 26µ Kool Mµ the complete part number is 00K4022E026.*

Blocks

PART NO		A	B	C	Volume V_e(mm³)
00K4741B***	mm in	47.50±0.61 1.870±0.024	41.00±0.51 1.614±0.020	27.51±0.41 1.083±0.016	53,600
00K5528B***	mm in	54.86±0.64 2.160±0.025	27.56±0.41 1.085±0.016	20.6±0.39 0.812±0.015	31,200
00K5030B***	mm in	50.50±0.051 1.988±0.02	30.30±0.30 1.193±0.12	15.0±0.26 0.591±0.01	23,000
00K6030B***	mm in	60.00±0.25 2.362±0.01	30.00±0.25 1.181±0.01	15.0±0.25 0.591±0.01	27,000
00K7030B***	mm in	70.5±0.5 3.169±0.02	30.3±0.25 1.193±0.02	20.0±0.2 0.787±0.008	42,800
00K8030B***	mm in	80.49±0.51 3.169±0.020	30.30±0.51 1.193±0.020	20.00±0.21 0.787±0.008	48,800

*Add permeability code*** to part number, e.g. for 26µ Kool Mµ the complete part number is 00K6030B026.*
Standard blocks are available in 26µ. For other permeabilities, contact Magnetics.
Note: Inductance is tested in standard picture frame arrangements.

U Core Data

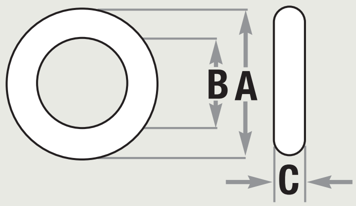


PART NO		A	B	C	D(min)	E(min)	L(nom)
00K3112U***	mm	31.24±0.51	11.2±0.26	12.1±0.39	2.54	14.2	8.26
	in	1.230±0.020	0.440±0.010	0.475±0.015	0.100	0.560	0.325
00K4110U***	mm	40.64±0.51	11.2±0.51	9.53±0.39	2.54	23.6	8.38
	in	1.600±0.020	0.440±0.020	0.375±0.015	0.100	0.930	0.330
00K4111U***	mm	40.64±0.51	11.2±0.26	12.1±0.39	2.54	23.6	8.38
	in	1.600±0.020	0.440±0.010	0.475±0.015	0.100	0.930	0.330
00K4119U***	mm	40.64±0.51	11.2±0.26	19.1±0.39	2.54	23.6	8.38
	in	1.600±0.020	0.440±0.010	0.750±0.015	0.100	0.930	0.330
00K5527U***	mm	54.86±0.64	27.56±0.51	16.3±0.39	16.7	33.78	10.5
	in	2.160±0.025	1.085±0.020	0.643±0.015	0.660	1.330	0.415
00K5529U***	mm	54.86±0.64	27.56±0.51	23.2±0.39	16.5	33.02	10.5
	in	2.160±0.025	1.085±0.020	0.912±0.015	0.650	1.300	0.415
00K6527U***	mm	65.15±1.4	32.51±0.31	27.00±0.41	22.1	44.22	10.0
	in	2.565±0.053	1.280±0.012	1.063±0.016	0.874	1.741	0.394
00K6533U***	mm	65.15±1.4	32.51±0.31	20.0±0.41	19.6	39.24	12.5
	in	2.565±0.053	1.280±0.012	0.788±0.016	0.772	1.545	0.493
00K7236U***	mm	72.39±0.89	35.56±0.64	20.9±0.39	21.3	43.68	13.9
	in	2.850±0.035	1.400±0.025	0.821±0.015	0.841	1.720	0.547
00K8020U***	mm	80.01±0.89	38.10±0.64	19.8±0.39	28.14	59.28	9.91
	in	3.150±0.035	1.500±0.025	0.780±0.015	1.108	2.334	0.390
00K8038U***	mm	80.01±0.89	38.10±0.64	23.0±0.39	22.4	49.27	15.4
	in	3.150±0.035	1.500±0.025	0.907±0.015	0.883	1.940	0.605

PART NO	A_L nH/TURN^2± 8%				Path Length l_e (mm)	Cross Section A_e (mm^2)	Volume V_e (mm^3)
	26µ	40µ	60µ	90µ			
00K3112U***	-	92	111	179	65.6	101	6,630
00K4110U***	-	56	78	109	85.2	80	6,820
00K4111U***	-	72	95	138	85.2	101	8,600
00K4119U***	-	110	151	218	85.2	159	13,600
00K5527U***	67	-	-	-	168	172	28,900
00K5529U***	85	-	-	-	168	244	41,000
00K6527U***	89	-	-	-	219	270	59,100
00K6533U***	82	-	-	-	199	250	49,800
00K7236U***	87	-	-	-	219	290	63,500
00K8020U***	64	-	-	-	273	195	53,200
00K8038U***	97	-	-	-	237	354	83,900

*Add permeability code*** to part number, e.g., for 26µ Kool Mµ, the complete part number is 00K6527U026.*

MPP THINZ® Core Data



THINZ are available in four permeabilities, 125µ, 160µ, 200µ, and 250µ, but the product is designed to be easily customized to any permeability up to 250. The most critical parameter of a power inductor material is its ability to provide inductance, or permeability, under DC bias. The distributed air gap of MPP results in a soft inductance versus DC bias curve.

This swinging inductance is often desirable since it maximizes power handling for a given package size; improves efficiency; accommodates a wide operating range; and provides automatic fault or overload protection.

Special core heights are available, consult Magnetics.

PART NO		A nom	B nom	C nom	A max	B min	C max
00M0301T***	mm in	3.05 0.120	1.78 0.070	0.81 0.032	3.18 0.125	1.70 0.067	0.89 0.035
00M0302T***	mm in	3.55 0.140	1.78 0.070	0.81 0.032	3.69 0.145	1.70 0.067	0.89 0.035
00M0402T***	mm in	3.94 0.155	2.23 0.088	0.81 0.032	4.07 0.160	2.13 0.084	0.89 0.035
00M0502T***	mm in	4.60 0.181	2.36 0.093	0.81 0.032	4.73 0.186	2.26 0.089	0.89 0.035
00M0603T***	mm in	6.35 0.250	2.79 0.110	0.81 0.032	6.48 0.255	2.67 0.105	0.89 0.035
00M0804T***	mm in	7.87 0.310	3.96 0.156	0.81 0.032	8.03 0.316	3.83 0.151	0.89 0.035

PART NO	A_L nH/TURN²± 15%				Path Length l_e (mm)	Cross Section A_e (mm²)	Volume V_e (mm³)
	125µ	160µ	200µ	250µ			
00M0301T***	8.4	10.8	13.5	16.9	7.04	0.40	2.8
00M0302T***	11.6	14.8	18.7	23.4	8.06	0.60	4.8
00M0402T***	9.6	12.3	15.4	19.3	9.44	0.58	5.5
00M0502T***	11.7	15.0	18.7	23.4	10.6	0.79	8.3
00M0603T***	14.9	19.1	24.0	30.0	13.6	1.30	17.7
00M0804T***	12.6	16.2	20.2	25.3	17.9	1.45	25.9

*Add permeability code*** to part number, e.g., for 125µ the complete part number is 00M0502T125*

E Core Hardware

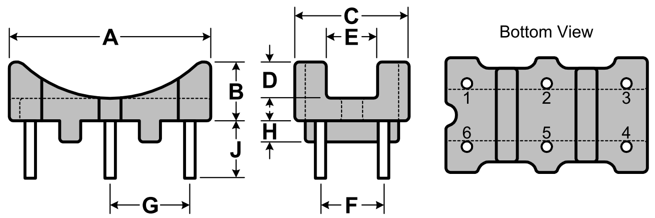
Magnetics has bobbins available for use with Kool Mµ cores. Refer to Magnetics Ferrite Cores catalog for a complete listing of available bobbins. The cores are standard industry sizes that will fit standard bobbins available from many sources. Core pieces can be assembled by bonding the mating surfaces or taping around the perimeter of the core set. Caution is advised if metal clamps are considered, since eddy current heating can occur in conductive material that is very close to the surface of low permeability powder core material.

Core Number	Bobbin Number	Number of Pins	Winding Area (mm^2)	Length Per Turn (mm)
1808E (EI-187)	PCB1808B1	8	31.6	40.5
	00B180801	-	34.2	39.4
2510E (E-2425)	PCB2510V1	10	40.6	54.2
	PCB2510V2	10	20.3	54.2
	00B251001	-	51	45.4
3007E (DIN 30/7)	PCB3007T1	10	83.3	55
3515E (EI-375)	PCB3515M1	12	94.8	73.4
	PCB3515M2	12	47.4	73.4
	00B351501	-	113	72
4020E (DIN 42/15)	PCB4020N1	12	194	91.4
	00B402021	-	207	97.5
4022E (DIN 42/20)	PCB4022N1	12	194	102.1
4317E (EI-21)	PCB4317M1	12	101	85.6
	00B4317B1	-	122	86
5528E (DIN55/25)	PCB5528WC	14	302	107.3
	00B5528B1	-	302	107.3
5530E	PCB5530FA	14	289	133.8
6527E (Metric E65)	00B6527B1	-	490	166
7228E (F11)	00B722801	-	408	149
8020E (Metric E80)	00B802001	-	806	165
114LE	00B114LB1	-	945	230

Toroid Hardware

TVB22066A

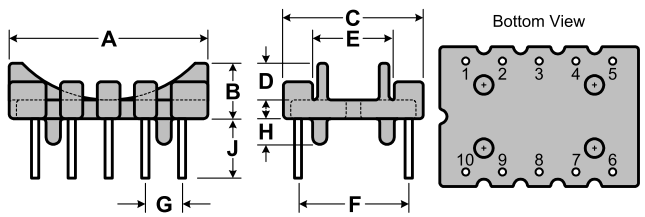
For use with toroids from
12.7 mm through 22.2 mm



Material	6 Pins	A Nom.	B Nom.	C Nom.	D Nom.	E Ref.	F Typ.	G Typ.	H Ref.	J Ref.
Phenolic rated UL94V0	CP wire 0.99 mm	19.0 mm	5.44 mm	10.8 mm	3.51 mm	4.80 mm	6.00 mm	7.49 mm	2.01 mm	5.49 mm

TVB2908TA

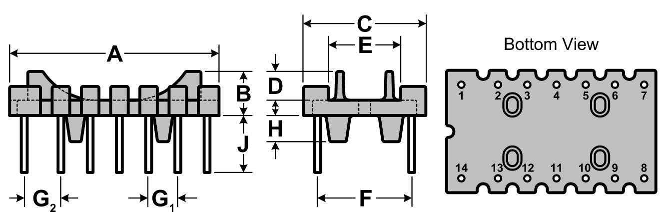
For use with toroids from
20.5 mm through 31.8 mm



Material	10 Pins	A Nom.	B Nom.	C Nom.	D Nom.	E Ref.	F Typ.	G Typ.	H Ref.	J Ref.
Phenolic rated UL94V0	CP wire 0.99 mm	27.0 mm	7.49 mm	19.0 mm	5.00 mm	11.0 mm	15.0 mm	5.00 mm	3.51 mm	8.13 mm

TVB3610FA

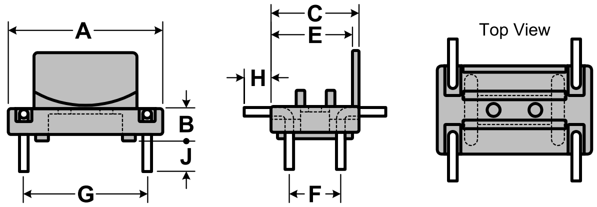
For use with toroids from
28.6 mm through 38.1 mm



Material	14 Pins	A Nom.	B Nom.	C Nom.	D Nom.	E Ref.	F Typ.	G_1 Typ.	G_2 Typ.	H Ref.	J Ref.
Phenolic rated UL94V0	CP wire 0.99 mm	35.8 mm	7.59 mm	20.8 mm	5.00 mm	12.3 mm	16.0 mm	5.00 mm	6.30 mm	4.5 mm	9.75 mm

TVH22064A

For use with toroids from
12.7 mm through 25.4 mm

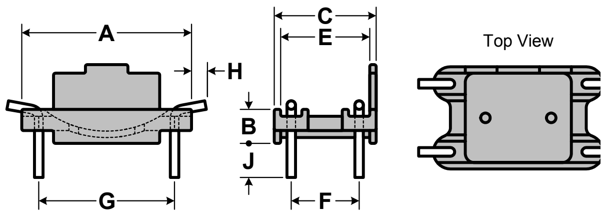


Material	4 Pins	A Nom.	B Nom.	C Nom.	E Ref.	F Typ.	G Typ.	H Ref.	J Ref.
Nylon 6/6 rated UL94V0	CP wire 1.02 mm	19.1 mm	3.94 mm	10.8 mm	9.78 mm	6.35 mm	15.2 mm	3.30 mm	3.81 mm

Toroid Hardware

TVH25074A

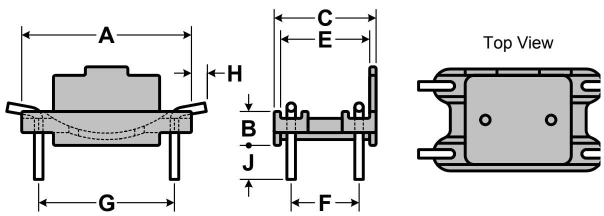
For use with toroids
from 20.5 mm (0.810")
through 30.5 mm



Material	4 Pins	A Nom.	B Nom.	C Nom.	E Ref.	F Typ.	G Typ.	H Ref.	J Ref.
Nylon 6/6 rated UL94V0	CP wire 1.21 mm	25.4 mm	5.08 mm	15.2 mm	13.0 mm	10.2 mm	20.3 mm	2.29 mm	5.08 mm

TVH38134A

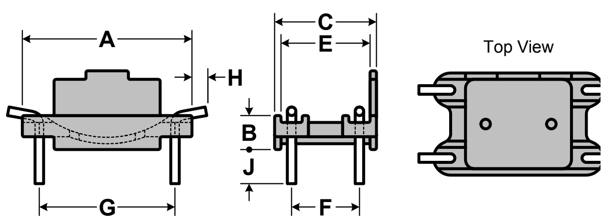
For use with toroids
from 25.4 mm (1.000")
through 40.6 mm



Material	4 Pins	A Nom.	B Nom.	C Nom.	E Ref.	F Typ.	G Typ.	H Ref.	J Ref.
Nylon 6/6 rated UL94V0	CP wire 1.27 mm	27.9 mm	5.08 mm	20.3 mm	18.0 mm	15.2 mm	22.9 mm	2.29 mm	5.08 mm

TVH49164A

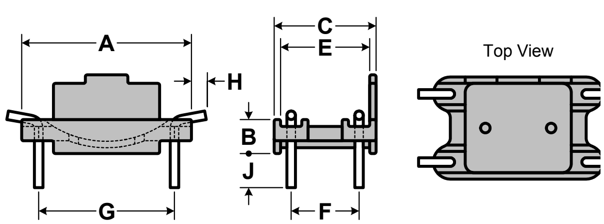
For use with toroids
from 38.1 mm
through 63.5 mm



Material	4 Pins	A Nom.	B Nom.	C Nom.	E Ref.	F Typ.	G Typ.	H Ref.	J Ref.
Nylon 6/6 rated UL94V0	CP wire 1.27 mm	35.6 mm	5.08 mm	22.9 mm	20.6 mm	17.8 mm	30.5 mm	2.29 mm	5.08 mm

TVH61134A

For use with toroids
from 44.4 mm
through 71.1 mm



Material	4 Pins	A Nom.	B Nom.	C Nom.	E Ref.	F Typ.	G Typ.	H Ref.	J Ref.
Nylon 6/6 rated UL94V0	CP wire 1.27 mm	43.2 mm	5.08 mm	27.9 mm	25.7 mm	22.9 mm	38.1 mm	2.29 mm	5.08 mm

Winding Tables

3.56 mm OD (140 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
30	10	0.0286
31	11	0.0392
32	13	0.0567
33	15	0.0821
34	17	0.119
35	20	0.172
36	23	0.246
37	25	0.328
38	28	0.461
39	33	0.704
40	38	1.03
41	43	1.42
42	49	2.01
43	55	2.91
44	59	3.76
45	69	5.65
46	76	7.80
47	85	11.0
48	98	16.0
49	109	22.2

3.94 mm OD (150 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
28	11	0.0251
29	13	0.0364
30	15	0.0529
31	17	0.0749
32	19	0.103
33	22	0.149
34	25	0.218
35	28	0.300
36	32	0.427
37	35	0.574
38	40	0.826
39	46	1.23
40	53	1.80
41	59	2.44
42	68	3.52
43	76	5.06
44	82	6.60
45	96	9.93
46	105	13.6
47	117	19.1

4.65 mm OD (180 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
27	11	0.0212
28	12	0.0289
29	14	0.0414
30	16	0.0597
31	18	0.0838
32	20	0.114
33	23	0.165
34	27	0.249
35	31	0.352
36	34	0.481
37	38	0.661
38	43	0.942
39	50	1.42
40	57	2.05
41	64	2.82
42	73	4.01
43	81	5.73
44	88	7.52
45	103	11.3
46	113	15.6

6.35 mm OD (020 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
26	12	0.0216
27	14	0.0312
28	16	0.0446
29	18	0.0617
30	21	0.0910
31	23	0.125
32	26	0.173
33	30	0.252
34	34	0.367
35	39	0.518
36	44	0.729
37	48	0.977
38	54	1.39
39	62	2.07
40	71	3.00
41	80	4.13
42	91	5.87
43	101	8.40
44	110	11.1
45	128	16.6

6.60 mm OD (240 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
26	11	0.0196
27	13	0.0287
28	15	0.0414
29	17	0.0577
30	19	0.0815
31	22	0.118
32	25	0.165
33	28	0.233
34	32	0.342
35	36	0.473
36	41	0.672
37	45	0.907
38	51	1.30
39	58	1.92
40	67	2.80
41	75	3.84
42	85	5.43
43	95	7.82
44	103	10.3
45	121	15.5

6.60 mm OD (270 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
26	11	0.0266
27	13	0.0390
28	15	0.0566
29	17	0.0790
30	19	0.112
31	22	0.163
32	25	0.228
33	28	0.322
34	32	0.474
35	36	0.658
36	41	0.936
37	45	1.26
38	51	1.81
39	58	2.68
40	67	3.92
41	75	5.37
42	85	7.61
43	95	11.0
44	103	14.4
45	121	21.8

6.86 mm OD (410 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
22	12	0.0116
23	14	0.0168
24	16	0.0239
25	18	0.0334
26	20	0.0465
27	23	0.0663
28	26	0.0942
29	29	0.129
30	33	0.187
31	37	0.262
32	41	0.358
33	47	0.518
34	53	0.752
35	60	1.05
36	67	1.47
37	74	1.99
38	83	2.82
39	96	4.24
40	109	6.11
41	122	8.37

7.87 mm OD (030 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
22	12	0.00988
23	14	0.0142
24	16	0.0201
25	18	0.0281
26	20	0.0390
27	23	0.0556
28	26	0.0787
29	29	0.108
30	33	0.156
31	37	0.218
32	41	0.298
33	47	0.430
34	53	0.623
35	60	0.870
36	67	1.21
37	74	1.65
38	83	2.33
39	96	3.50
40	109	5.04
41	122	6.90

9.65 mm OD (280 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
20	12	0.00684
21	13	0.00914
22	15	0.0131
23	18	0.0194
24	20	0.0268
25	23	0.0383
26	26	0.0541
27	29	0.0747
28	33	0.107
29	37	0.147
30	42	0.212
31	47	0.297
32	52	0.404
33	58	0.568
34	67	0.844
35	75	1.17
36	84	1.63
37	92	2.19
38	104	3.13
39	119	4.66

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Winding Tables

9.65 mm OD (290 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
20	12	0.00747
21	13	0.0100
22	15	0.0144
23	18	0.0213
24	20	0.0295
25	23	0.0421
26	26	0.0596
27	29	0.0825
28	33	0.118
29	37	0.163
30	42	0.234
31	47	0.328
32	52	0.448
33	58	0.630
34	67	0.937
35	75	1.29
36	84	1.81
37	92	2.44
38	104	3.48
39	119	5.18

10.2 mm OD (040 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
20	13	0.00818
21	15	0.0117
22	17	0.0165
23	19	0.0227
24	22	0.0328
25	25	0.0463
26	28	0.0650
27	31	0.0893
28	36	0.130
29	40	0.178
30	45	0.254
31	50	0.354
32	56	0.488
33	63	0.693
34	72	1.02
35	81	1.42
36	91	1.99
37	99	2.66
38	112	3.80
39	128	5.65

11.2 mm OD (130 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
16	10	0.00272
17	11	0.00366
18	13	0.00532
19	15	0.00756
20	17	0.0106
21	20	0.0153
22	23	0.0220
23	25	0.0295
24	29	0.0426
25	33	0.0602
26	37	0.0845
27	41	0.116
28	46	0.164
29	52	0.228
30	59	0.328
31	65	0.453
32	72	0.618
33	81	0.877
34	93	1.30
35	104	1.79

12.7 mm OD (050 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
16	12	0.00364
17	14	0.00520
18	16	0.00733
19	19	0.0107
20	21	0.0147
21	24	0.0207
22	28	0.0302
23	31	0.0413
24	35	0.0582
25	40	0.0829
26	45	0.117
27	50	0.161
28	56	0.227
29	63	0.315
30	71	0.451
31	79	0.629
32	87	0.854
33	98	1.21
34	112	1.79
35	125	2.46

16.5 mm OD (120 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
13	12	0.00234
14	14	0.00336
15	16	0.00471
16	18	0.00654
17	21	0.00940
18	24	0.0133
19	27	0.0185
20	30	0.0255
21	34	0.0359
22	39	0.0516
23	44	0.0722
24	49	0.101
25	56	0.143
26	63	0.203
27	70	0.280
28	78	0.393
29	87	0.542
30	98	0.775
31	108	1.07
32	121	1.48

17.3 mm OD (380 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
13	11	0.00223
14	13	0.00324
15	15	0.00460
16	17	0.00644
17	20	0.00933
18	22	0.0127
19	25	0.0179
20	29	0.0258
21	32	0.0354
22	37	0.0512
23	41	0.0704
24	46	0.099
25	52	0.139
26	59	0.199
27	66	0.277
28	74	0.391
29	82	0.535
30	92	0.764
31	102	1.06
32	114	1.47

20.3 mm OD (206 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
11	12	0.00163
12	14	0.00232
13	16	0.00324
14	18	0.00449
15	21	0.00644
16	24	0.00909
17	27	0.0126
18	31	0.0179
19	35	0.0251
20	39	0.0347
21	45	0.0498
22	50	0.0692
23	56	0.0962
24	63	0.135
25	71	0.191
26	80	0.270
27	89	0.374
28	100	0.529
29	111	0.725
30	125	1.04

22.9 mm OD (310 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
10	12	0.00148
11	14	0.00212
12	16	0.00296
13	18	0.00409
14	21	0.00589
15	24	0.00830
16	27	0.0116
17	31	0.0164
18	35	0.0230
19	39	0.0319
20	44	0.0446
21	50	0.0632
22	56	0.0888
23	63	0.124
24	70	0.173
25	79	0.244
26	89	0.345
27	99	0.479
28	111	0.677
29	123	0.927

23.6 mm OD (350 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
9	11	0.00120
10	13	0.00173
11	15	0.00244
12	17	0.00340
13	19	0.00467
14	22	0.00668
15	25	0.00938
16	28	0.0130
17	32	0.0184
18	36	0.0258
19	41	0.0365
20	46	0.0510
21	51	0.0705
22	58	0.101
23	65	0.140
24	73	0.197
25	82	0.277
26	92	0.392
27	102	0.542
28	115	0.770

Winding Tables

26.9 mm OD (930 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
9	11	0.00141
10	13	0.00205
11	15	0.00292
12	17	0.00407
13	20	0.00592
14	22	0.00808
15	25	0.0114
16	29	0.0164
17	33	0.0232
18	37	0.0324
19	42	0.0459
20	47	0.0640
21	53	0.0902
22	60	0.128
23	66	0.176
24	75	0.251
25	84	0.352
26	94	0.497
27	105	0.693
28	117	0.975

35.8 mm OD (324 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	16	0.00169
9	19	0.00246
10	22	0.00351
11	25	0.00491
12	28	0.00677
13	32	0.00955
14	36	0.0133
15	41	0.0188
16	46	0.0263
17	52	0.0369
18	58	0.0514
19	65	0.0718
20	73	0.1
21	82	0.141
22	93	0.201
23	103	0.277
24	116	0.392
25	130	0.551
26	146	0.78
27	162	1.08

46.7 mm OD (089 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	22	0.00296
9	26	0.00432
10	29	0.00596
11	33	0.00840
12	38	0.0120
13	42	0.0164
14	47	0.0229
15	54	0.0327
16	60	0.0455
17	68	0.0641
18	76	0.0897
19	86	0.127
20	96	0.177
21	108	0.249
22	121	0.352
23	135	0.490
24	151	0.690
25	170	0.975
26	190	1.37
27	211	1.91

33.0 mm OD (548 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	14	0.00147
9	17	0.00218
10	19	0.00299
11	22	0.00427
12	25	0.00598
13	28	0.00826
14	32	0.0117
15	36	0.0163
16	41	0.0232
17	46	0.0322
18	52	0.0455
19	58	0.0632
20	65	0.0883
21	74	0.126
22	83	0.177
23	92	0.245
24	103	0.344
25	116	0.485
26	131	0.691
27	145	0.954

39.9 mm OD (254 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	18	0.00229
9	21	0.00329
10	24	0.00464
11	27	0.00646
12	31	0.00917
13	35	0.0128
14	39	0.0178
15	44	0.0250
16	50	0.0354
17	56	0.0493
18	63	0.0695
19	71	0.0978
20	80	0.138
21	90	0.194
22	101	0.274
23	112	0.379
24	126	0.536
25	141	0.753
26	158	1.06
27	175	1.47

50.8 mm OD (715 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	25	0.00324
9	29	0.00463
10	33	0.00651
11	37	0.00904
12	42	0.0127
13	47	0.0176
14	53	0.0247
15	60	0.0348
16	67	0.0486
17	76	0.0685
18	85	0.0959
19	95	0.134
20	107	0.189
21	120	0.265
22	135	0.375
23	150	0.520
24	168	0.732
25	189	1.03
26	211	1.46
27	234	2.02

34.3 mm OD (585 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	17	0.00160
9	20	0.00229
10	23	0.00323
11	26	0.00449
12	30	0.00636
13	34	0.00887
14	38	0.0123
15	43	0.0172
16	48	0.0238
17	54	0.0332
18	61	0.0467
19	69	0.0657
20	77	0.0913
21	87	0.1287
22	98	0.1821
23	109	0.2519
24	122	0.354
25	137	0.497
26	153	0.699
27	170	0.969

46.7 mm OD (438 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	18	0.00280
9	21	0.00405
10	24	0.00573
11	27	0.00801
12	31	0.0114
13	35	0.0160
14	39	0.0223
15	44	0.0314
16	50	0.0446
17	56	0.0622
18	63	0.0878
19	71	0.124
20	80	0.175
21	90	0.246
22	101	0.349
23	112	0.483
24	126	0.683
25	141	0.961
26	158	1.36
27	175	1.88

57.2 mm OD (195 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	20	0.00322
9	23	0.00458
10	26	0.00642
11	30	0.00921
12	34	0.0130
13	39	0.0185
14	43	0.0254
15	49	0.0362
16	55	0.0508
17	62	0.0714
18	70	0.101
19	78	0.141
20	88	0.199
21	99	0.281
22	111	0.398
23	124	0.555
24	138	0.777
25	156	1.10
26	174	1.56
27	193	2.16

Winding Tables

57.2 mm OD (109 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	29	0.00397
9	33	0.00558
10	37	0.00773
11	42	0.0109
12	48	0.0154
13	54	0.0215
14	60	0.0297
15	68	0.0420
16	76	0.0586
17	85	0.0816
18	96	0.115
19	108	0.162
20	120	0.225
21	135	0.318
22	152	0.451
23	169	0.625
24	189	0.880
25	212	1.24
26	238	1.76
27	263	2.43

62.0 mm OD (620 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
6	20	0.00260
7	23	0.00368
8	26	0.00517
9	30	0.00741
10	34	0.0104
11	38	0.0146
12	43	0.0205
13	49	0.0291
14	54	0.0402
15	61	0.0568
16	69	0.0805
17	78	0.114
18	87	0.159
19	98	0.225
20	110	0.316
21	123	0.444
22	138	0.629
23	154	0.878
24	172	1.24
25	194	1.75

74.1 mm OD (740 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
6	29	0.00450
7	33	0.00632
8	38	0.00907
9	43	0.0128
10	49	0.0182
11	55	0.0255
12	62	0.0358
13	70	0.0505
14	78	0.0706
15	88	0.0997
16	98	0.139
17	110	0.196
18	124	0.277
19	139	0.390
20	155	0.546
21	174	0.769
22	195	1.09
23	217	1.52
24	243	2.14
25	273	3.03

77.8 mm OD (866 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	41	0.00607
9	47	0.00860
10	53	0.0120
11	60	0.0169
12	67	0.0234
13	76	0.0329
14	85	0.0459
15	95	0.0640
16	107	0.0901
17	120	0.126
18	135	0.178
19	151	0.248
20	169	0.348
21	189	0.487
22	212	0.689
23	236	0.958
24	264	1.35
25	296	1.90
26	331	2.68
27	367	3.72

77.8 mm OD (906 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
8	41	0.00660
9	47	0.00937
10	53	0.0131
11	60	0.0184
12	67	0.0256
13	76	0.0361
14	85	0.0504
15	95	0.0703
16	107	0.0991
17	120	0.139
18	135	0.195
19	151	0.274
20	169	0.383
21	189	0.538
22	212	0.761
23	236	1.06
24	264	1.49
25	296	2.10
26	331	2.96
27	367	4.11

101.6 mm OD (102 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
6	38	0.00489
7	43	0.00682
8	49	0.00965
9	55	0.0135
10	62	0.0189
11	70	0.0266
12	79	0.0373
13	89	0.0524
14	99	0.0730
15	112	0.103
16	125	0.145
17	140	0.202
18	157	0.285
19	176	0.400
20	197	0.561
21	221	0.790
22	248	1.12
23	275	1.55
24	308	2.19
25	345	3.09

132.6 mm OD (337 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
6	54	0.00890
7	61	0.0124
8	69	0.0175
9	78	0.0247
10	87	0.0344
11	99	0.0489
12	111	0.0685
13	124	0.0956
14	138	0.133
15	155	0.188
16	174	0.265
17	195	0.371
18	218	0.522
19	244	0.733
20	273	1.03
21	306	1.45
22	343	2.05
23	381	2.85
24	426	4.02
25	478	5.68

165.1 mm OD (165 size)

AWG Wire Size	Single Layer Turns	Single Layer R_{DC} (Ohms, Ω)
6	72	0.0139
7	81	0.0193
8	91	0.0272
9	103	0.0384
10	115	0.0536
11	130	0.0759
12	145	0.106
13	163	0.149
14	182	0.209
15	204	0.293
16	228	0.412
17	256	0.579
18	286	0.814
19	320	1.14
20	358	1.61
21	401	2.26
22	449	3.21
23	499	4.46
24	558	6.29
25	625	8.86

Other Products from Magnetics

Ferrites

Magnetics' ferrite cores are manufactured for a wide variety of applications. Magnetics has developed and produces the leading MnZn ferrite materials for power transformers, power inductors, wideband transformers, common mode chokes, and many other applications. In addition to offering the leading materials, other advantages of ferrites from Magnetics include: the full range of standard planar E, ER, and I cores; the widest range of toroid sizes in power and high permeability materials; standard gapping to precise inductance or mechanical dimension; a wide range of available coil formers and assembly hardware; and superior toroid coatings available in several options.

Power Materials

Five low loss materials are engineered for optimum frequency and temperature performance in power applications. Magnetics' R, P, F, L, and T materials provide superior saturation, high temperature performance, low losses and product consistency.

Shapes: E cores, Planar E cores, ER cores, ETD, EC, U cores, I cores, PQ, Planar PQ, RM, Toroids, Pot cores, RS (round-slab), DS (double slab), EP, Special Shapes.

Applications: Telecomm power supplies, computer power supplies, commercial power supplies, consumer power supplies, automotive, DC-DC converters, telecomm data interfaces, impedance matching transformers, handheld devices, high power control (gate drive), computer servers, distributed power (DC-DC), EMI filters, aerospace, and medical.

High Permeability Materials

Two high permeability materials (5,000µ J material and 10,000µ W material) are engineered for optimum frequency and impedance performance in signal, choke and filter applications. These Magnetics materials provide superior loss factor, frequency response, temperature performance, and product consistency.

Shapes: Toroids, E cores, U cores, RM, Pot cores, RS (round-slab), DS (double slab), EP, Special Shapes.

Applications: common mode chokes, EMI filters, other filters, pulse transformers, current transformers, broadband transformers, current sensors, telecomm data interfaces, impedance matching interfaces, handheld devices, spike suppression, and gate drive transformers.

Tape Wound Cores

Magnetics strip wound cores are made from high permeability magnetic strip alloys of nickel-iron (80% or 50% nickel), and silicon-iron. The alloys are know as Orthonol®, Permalloy 80, Supermalloy, 48 Alloy, Magnesil®, and Supermendur. Tape Wound Cores are produced as small as 0.438" OD to more than 9" OD, in hundreds of sizes. For a wide range of frequency applications, materials are produced in thicknesses from 1/2 mil (0.013 mm) through 4 mils (0.102 mm). Cases are robust nylon and aluminum boxes, rated for 200°C continuous operation and 2,000 minimum voltage breakdown.

Applications: aerospace applications, radar installations, jet engine controls, power supplies, current transformers and other high reliability applications.

Bobbin Cores

Magnetics bobbin cores are miniature tape cores made from ultra-thin (0.000125" to 0.001" thick) strip material wound on nonmagnetic stainless steel bobbins. Bobbin Cores are generally manufactured from Permalloy 80 and Orthonol®. Covered with protective caps and then epoxy coated, Bobbin Cores can be made as small as 0.05" ID and with strip widths down to 0.032". Bobbin Cores can switch from positive to negative saturation in a few microseconds or less, making them ideal for analog logic elements, magnetometers, and pulse transformers.

Applications: high frequency magnetic amplifiers, flux gate magnetometers, harmonic generators, oscillators, pulse transformers, current transformers, analog counters and timers and inverters.

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