ACME

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USI Group

ACME Electronics Corporation
越峯電子材料股份有限公司

ISO 9001 Quality Management Systems CERTIFIED
ISO 14001 Environmental Management CERTIFIED
IATF 16949 Automotive Quality Management CERTIFIED
ISO 50001 Energy Management CERTIFIED

https://www.acme-ferrite.com.tw

COMPANY BRIEF

ACME Electronics Corporation, a subsidiary of USI Corporation, has been developed into one of the world's leading manufacturers of soft magnetic products since her establishment. Incorporated in 1991 and listed in Taiwan OTC market in 2005, ACME with her headquarter in Taipei possesses four manufacturing sites where one is in Taiwan, one in Malaysia, and two in China.

Our Products

A variety of soft magnetic products in different material types, core shapes and sizes are manufactured in ACME. These products are widely used for the manufacture of chokes, inductors, filters, transformers, antennas and other components or devices that are applied in the fields of communication, lighting, alternative energy, automotive, medical system, consumer and industrial electronics. ACME's products are adopted by leading manufacturers of these components and devices worldwide.

Headquarter of USI Group, Taipei

Our History

1991 ACME Electronics Corporation, Taiwan was incorporated.

1994 Built the first manufacturing facility in Kuan-Yin Distrit, Taoyuan County, Taiwan.

2000 Incorporated ACME Electronics (Kunshan) Co., Ltd., China and built a modern manufacturing facility to service the market in Northern and Eastern China. This factory had been expanded and equipped with the latest machinery and equipment. It now has a sintering capacity 6,800 metric tons a year.

2005 Incorporated ACME Electronics(Guangzhou) Co., Ltd., China. Located in Zhengcheng city, this new and well equipped facility has a sintering capacity of 6,300 metric tons a year and sevices the market in southern China.

2009 Acquired ACME Ferrite Products Sdn. Bhd., Malaysia. Located in Ipoh, Perak, ACME Malaysia is a leading Ni-Zn soft ferrite manufacturer that specialises in ferrite products for the automotive industry. This facility has a sintering capacity of 1,200 metric tons a year.

2016 Estiblished a experimental line for high purity SiC powder.

2017 Estiblished a experimental line for ceramic inject molding.

2018 A high-purity SiC powder mass production line was established and mass production was successful.

2021 Metal soft magnetic products in powder cores, nanocrystalline ribbon wound cores and others were launched.

Kuan-Yin Factory, Taiwan

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AGGRESSIVELY
COMMITTED TO
MANUFACTURING
EXCELLENCE

Contents

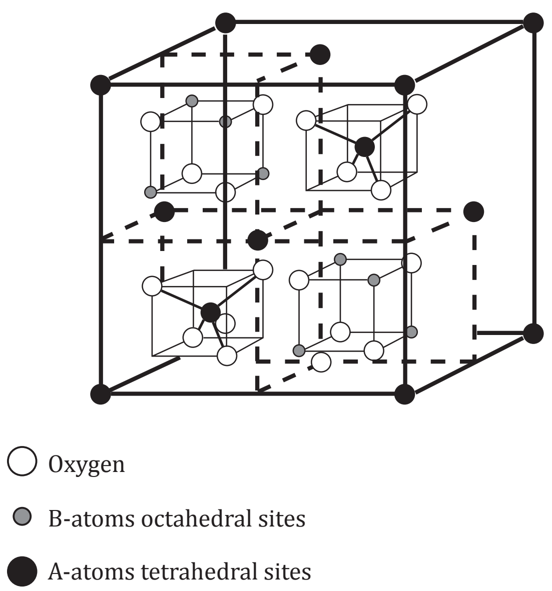
INTRODUCTION TO FERRITES

Ferrites are categorized as electroceramics with ferrimagnetic properties.

Due to superexchange interactions between the electrons of metal and oxygen ions ferrites behave ferrimagnetism. The less parallel spin alignment in ferrites results lower magnetization compared to ferromagnetic metals in which the spin moments are oriented parallel to one another. Due to the intrinsic interactions between oxygen and metal ions in atomic level, ferrites possess higher resistivity in comparison to ferromagnetic metals. This makes ferrites considerably useful in a wide range of applications at higher frequencies and technologically very valuable. The crystal structure of ferrites is formed with spinel lattice having the chemical formula $MeFe_2O_4$ where Me represents a divalent metal ion (e.g. Fe^{2+}, Ni^{2+}, Mn^{2+}, Mg^{2+}, Co^{2+}, Zn^{2+}, Cu^{2+} etc.). Nowadays the most popular compounds of commercial ferrites are $MnZnFe_2O_4$ and $NiZnFe_2O_4$ with major difference in resistivity between each other. The material properties illustrated in the data sheets are defined by toroidal cores for each material grad.

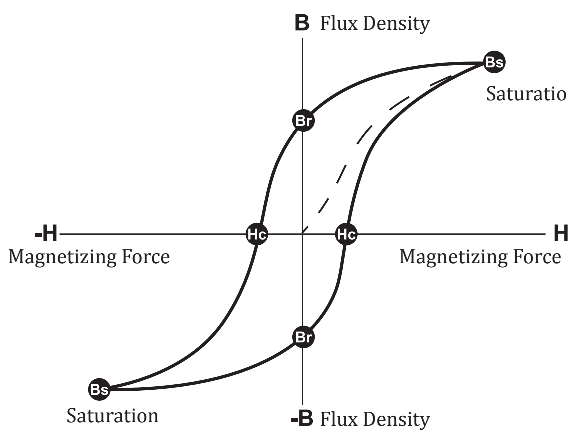
The Spinel Lattice:

The following figure shows a unit cell of the spinel lattice and the sites of various ions. The spinel structure consists of a number of interlaced face-centered cubic lattices. These interlaced lattices are called sub-lattices and they play an important role in the magnetism of ferrites. In a unit cell of spinel crystal structure of ferrites, one metal ion (e.g. Fe^{2+}, Ni^{2+}, Mn^{2+} etc.) is on tetrahedral (A) site and two (e.g. Fe^{3+}, Zn^{2+}) are on octahedral (B) sites. If the spinel were 'normal', the divalent Me ion would occupy the A site while the trivalent Fe ions would occupy the B sites. In an 'inverse' spinel the divalent Me ion occupies one of the B sites while the trivalent Fe ions occupy the other B site and the A site. Many of the commercially important ferrites, such as MnZn-ferrites and NiZn-ferrites, are 'inverse' spinels. In ferrite manufacturing both composition and process conditions are crucial to get the required properties.



Ferrimagnetism:

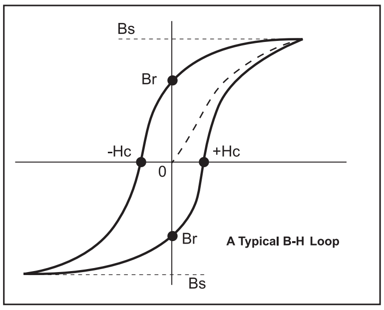
Ferrimagnetism is the term proposed by Néel to describe the magnetism of ferrites. Ferrites behave ferrimagnetism due to the fact that there are net magnetic moments in molecular level as a result of the electronic interactions, called **superexchange**, between metal and oxygen ions. In a bulk ferrite, the crystallite is normally divided into a number of magnetic domains (known as Weiss domains) of various spin orientations, so that there is very little external field arising from the internal magnetization in the crystallite of ferrite polycrystalline structures, i.e. the **demagnetizing fields** are small. If a magnetic field is applied to the ferrite bulk along it's magnetic path, the movements of the domain walls which are irreversible will occur. Due to the irreversible domain wall movements the magnetization will always lag behind the magnetizing field and an open loop will be traced, known as magnetic hysteresis, and the loop is called a **hysteresis loop**.



MAGNETIC PROPERTIES

This section is devoted to a brief glimpse of some important features of MnZn-ferrites and NiZn-ferrites for our valued customers.

1. B-H HYSTERESIS LOOP



It is more usual to consider the dependence of the flux density on field strength. If an alternating field is applied to a soft magnetic material, a hysteresis loop will be obtained. Such a B-H curve is shown behind. If the field strength is large enough to make the material magnetization unable to increase further, the maximum attainable flux density is then reached. This is known as the **saturation flux density**, Bs. If the field is removed, the material returns to a state where a certain flux density remains. The intercept of the hysteresis loop with the B-axis is referred to as the **remanence**, Br, of the material, while the intercept with the H-axis is referred to as the **coercivity, Hc**.

The ease with which the magnetization may be changed by a given magnetic field depends on the anisotropy and the movement of domain wall pinned by the imperfection of the polycrystalline structure, i.e. magnetic stiffness. The energy consumed to overcome the internal magnetic stiffness during the cyclic magnetization process is indicated by the area of the B-H loop and is called **hysteresis loss**.

2. MAGNETIZATION

Under the influence of an applied field (***H***) the magnetic moment of the ions comprising the material are re-orientated, either by the growth and contraction of the various domains, so that ionic moments effectively augment the applied field. This increase in magnetic field is called the magnetization (***M***) and it is expressed in A/m (unit in **SI** hereafter). The resulting flux density (***B***) is composed of that of free space plus the contribution of the magnetization due to the aligned domains in the material and can be expressed as $\boldsymbol{B} = \mu_o (\boldsymbol{H}+\boldsymbol{M})$ where $\mu_o = 4\pi\times10^{-7}$ H/m. The quotient of flux density and applied field is called **absolute permeability** denoted by μ :

$$\mu = \frac{\boldsymbol{B}}{\boldsymbol{H}} = \mu_{\mathrm{o}}\left(1 + \frac{\boldsymbol{M}}{\boldsymbol{H}}\right)$$

The absolute permeability is normally expressed as the product of the magnetic constant of free space, μ_o , and the **relative permeability**, μ_r :

$$\mu = \mu_{\mathrm{o}} \cdot \mu_{\mathrm{r}}$$

where

$$\mu_{\mathrm{r}} = 1 + \frac{\boldsymbol{M}}{\boldsymbol{H}} = 1 + \chi_r$$

In the above equation χ_r is the **relative susceptibility** used normally to classify the various kinds of magnetism (e.g. diamagnetism, paramagnetism, antiferromagnetism, ferromagnetism and ferrimagnetism). Since there are a variety of qualifying subscripts of relative permeability correlated with testing conditions, it is then convenient to drop 'relative' so that the index 'r' is generally replaced by the applicable symbol e.g. μ_i , μ_a , μ_Δ etc. for each specific behavior under the concerned testing conditions.

3. PERMEABILITY

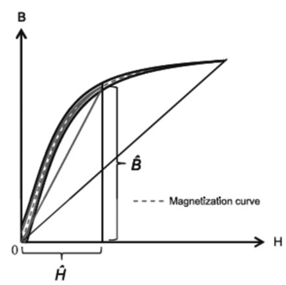
The **initial permeability**, μ_i , is measured in a closed magnetic circuit, usually a toroidal core, at very low field strength, ΔH , without bias:

$$\mu_{\mathrm{i}} = \frac{1}{\mu_{\mathrm{o}}} \times \left(\frac{\Delta B}{\Delta H}\right)_{\Delta H \to 0}$$

Sometimes for the application purpose the core has to be gapped. The effect of an air gap is to change the horizontal scale of the B-H relation of a given core so that the B-H loop is less inclined relative to the horizontal, and this is consistent with a reduction of the concerned permeability at the same test condition. This effect is referred to as the shearing of the B-H relation and applies to both initial magnetization and the hysteresis loop. In such a case the **effective permeability**, μ_e , is introduced as follows:

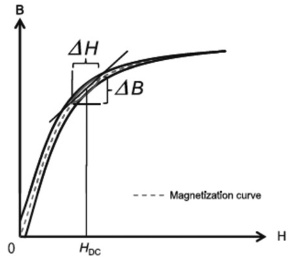
$$\mu_{\mathrm{e}} = \frac{\mu_{\mathrm{i}}}{1 + \dfrac{G \cdot \mu_{\mathrm{i}}}{l_e}}$$

Where G is the air gap and l_e is the effective magnetic path length. The relationship between higher field strength, $\hat{H}$, and flux densities, $\hat{B}$, without the presence of a bias field is given by the **amplitude permeability**, μ_a :



$$\mu_{\mathrm{a}} = \frac{1}{\mu_{\mathrm{o}}} \times \left(\frac{\hat{B}}{\hat{H}}\right)$$

When an alternating magnetic field is superimposed on a static bias field, H_{DC}, the permeability observed is called **incremental permeability**, μ_Δ :



$$\mu_\Delta = \frac{1}{\mu_o} \times \left(\frac{\Delta B}{\Delta H}\right)_{H_{DC}}$$

If the amplitude of the alternating field ΔH is negligibly small, the permeability is then called **reversible permeability**, μ_{rev} . Once the bias H_{DC} approximates to 0, the reversible permeability will revert to initial permeability. The behavior of the reversible permeability is normally shown in the characteristic curves with the subject of 'Permeability v.s. DC Bias field' for the metal dust cores featuring distributed gap.

4. INDUCTANCE FACTOR

To make the calculation of the inductance of a coil more convenient, the inductance factor, known as the *AL* value, is given in the data sheets (unit in nH: nano-Henry). The inductance of the wound core then can be defined as follows,

$$L = N^2 \times AL$$

where *N* is the winding turns of the coil. *AL* value is calculated using the effective core parameters (A_e and l_e) and the initial or effective permeability:

$$AL = \frac{\mu_o \mu_i \cdot A_e}{l_e}$$

where A_e and l_e for the specific core type can be found in the data sheets. For the gapped ferrite cores and metal dust cores, the μ_i will be replaced by μ_e .

5. DISACCOMMODATION FACTOR

If a magnetic material is given a disturbance, which may be magnetic, thermal or mechanical, the initial permeability observed right after the cessation of the disturbance is normally found to be raised to an unstable value from which it returns to its stable value as a function of time. This phenomenon is usually referred to as **disaccommodation**. There are a number of possible mechanisms of disaccommodation in ferrites and they all depend on migratory processes within the lattices of the polycrystalline structure. These processes often involve the anisotropy or preferred distribution of ferrous ions and/or cation vacancies over the four octahedral sublattices of the spinel lattice.

Because it is observed that the change of permeability is approximately proportional to the logarithm of time, the IEC Technical Committee 1 (Terminology) defines a **disaccommodation coefficient** of permeability as

$$d = \frac{\mu_1 - \mu_2}{\mu_1 \cdot \log_{10}\left(\frac{t_2}{t_1}\right)}$$

where t_1 and t_2 are arbitrary but defined time intervals after the disturbance. And the **disaccommodation factor** is defined as

$$D_F = \frac{d}{\mu_1}$$

6. TEMPERATURE FACTOR

The permeability of a magnetic material may change for a variety of reasons. The most obvious cause of variation is the change of temperature. Over a limited temperature range the reversible variation of permeability with temperature can be described by a **temperature coefficient**, α_μ:

$$\alpha_\mu = \frac{\Delta\mu}{\sqrt{\mu_1\mu_2} \cdot \Delta T}$$

where μ_1 and μ_2 are the permeability measured at different temperature. If the range of temperature, ΔT, is small and $\Delta\mu/\sqrt{\mu_1\mu_2}$ is not appreciable, the above expression can be simplified as:

$$\alpha_\mu = \frac{\Delta\mu}{\mu \cdot \Delta T}$$

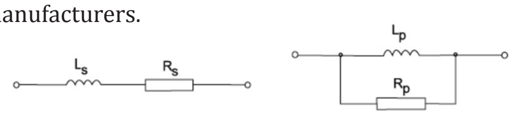
When an air gap is inserted into a magnetic circuit so that the permeability is reduced to the effective value, μ_e , the effect of permeability variations are reduced in the ratio μ_e/μ_i . It is then convenient to divide the temperature coefficient by μ_i so that the temperature coefficient of effective permeability at gapped condition can be obtained by simply multiplying the new factor by μ_e . The new factor designated as **temperature factor of reluctivity** by IEC Technical Committee 1 has the symbol α_F:

$$\alpha_F = \frac{\Delta\mu_i}{\mu_i^2 \cdot \Delta T} \text{ or } \frac{\Delta\mu}{\mu_1\mu_2 \cdot \Delta T}$$

Normally the initial permeability rises with temperature until it reaches a peak just below the Curie temperature, T_c . Over the T_c the permeability falls abruptly to values approaching unity due to disordering of magnetic moments by thermal energy and the material becomes paramagnetic.

7. COMPLEX PERMEABILITY

The equivalent circuit model is normally used to characterize the properties of electronic components. There are two approaches to describe the behavior of inductors with ignorance of winding resistance and parasitic capacitance so that the concerned properties of magnetic core materials can be realized. One is series mode with R_s and L_s where R_s is the series core loss resistance and L_s is the series inductance. The alternative is parallel mode with R_p and L_p where R_p is the parallel core loss resistance and L_p is the parallel inductance. Both of the two approaches are equivalent but the mathematical process of the series mode is more brief. Thus, the series mode is adopted to characterize the low-amplitude properties by most of the ferrite manufacturers.



Series mode Parallel mode

The preliminary theory of inductance may be defined by the linkage of magnetic flux change by applying the alternating current in the coil:

$$L = \frac{N \cdot \Delta\emptyset}{\Delta I}$$

where $\Delta\emptyset$ is the variation of the flux induced in the wound coil with N turns by applying the alternating current, ΔI , on the wire. The basic inductance formula can be rewritten as follows,

$$L = N^2 \cdot \frac{A_e}{l_e} \cdot \frac{\Delta B}{\Delta H} = \frac{\mu_o \cdot \mu_r \cdot N^2 \cdot A_e}{l_e} = L_o \cdot \mu_r$$

where L_o is the virtual inductance and supposed to be measured if the core had unity permeability with the flux distribution in its original magnetic circuit remaining unchanged. The unit of inductance L is in Henry(H), A_e in meter square(m^2), l_e in meter(m) and μ_o = 4π×10^{-7} H/m. The total impedance of the inductance circuit model in series mode is the combination of pure inductive reactance and core loss resistance:

$$Z = \mathrm{j}\omega L_s + R_s \text{ (unit in } \Omega)$$

where the angular frequency, ω, equals 2πf with the frequency unit in Hertz (Hz). In comparison to the inductive reactance, $\mathrm{j}\omega L_s = \mathrm{j}\omega L_o \cdot \mu_r$, the impedance can be rewritten as follows,

$$Z = \mathrm{j}\omega L_o\left(\mu_r - \mathrm{j}\frac{R_s}{\omega L_o}\right) = \mathrm{j}\omega L_o(\mu_s' - \mathrm{j}\mu_s'')$$

where μ_s' , the real part of the complex permeability, equals μ_r and μ_s'' , the imaginary part of the complex permeability, equals $R_s/\omega L_o$. The form of complex permeability is obtained. The impedance value can be calculated as follows,

$$|Z| = \omega L_o\sqrt{\mu_s'^2 + \mu_s''^2}$$

It then can be realized that the core loss related part, μ_s'', plays one of the crucial roles of impedance behavior as well. The above equation provides a convenient way to check the impedance spectrum through the concerned material grade by complex permeability, core geometry by A_e/l_e and winding turns by N with the ignorance of parasitic effects due to winding.

8. RESONANT FREQUENCY

In the complex permeability spectrum of μ_s' and μ_s'' it normally can be observed that μ_s'' rises to a pronounced peak as μ_s' falls. This dispersion is mainly due to **dimensional resonance** and **ferromagnetic resonance**. Concerning the dimensional resonance, the high values of permeability and **permittivity** (in a typical MnZn-ferrite, ε_r=10^5) of ferrites give rise to standing electromagnetic waves within the ferrite if the smallest cross-sectional dimension of the ferrite core is half the wave length. Under this condition the net reactive flux is zero and it leads to μ_s' dropping down to zero at certain frequency. As to ferromagnetic resonance (**spin precession resonance**) due to the fact that the origin of ferromagnetism is not an orbital motion but a spin motion of the electron, the atomic magnetic moment has angular momentum which is similar to the behavior of a top. When a spinning top is placed in a gravitational field, it precesses. This phenomenon is called **gyromagnetic effect**. It is found that the frequency of ferromagnetic resonance varies inversely as the initial permeability, known as Snoek's law. The frequency at which μ_s'' rises to the maximum is about the one that ferromagnetic resonance occurs.

For practical inductor measurement, as the frequency increases the measured inductance might remain level at first and then rise to a sharp peak before falling rapidly to negative values. The frequency at which the inductance swing happens is called **self-resonant frequency** of an inductor and is normally lower than the dimensional and ferromagnetic resonance frequency of the core. The self-resonant frequency is mainly due to winding parasitic/stray capacitance of the coil. To avoid the influence of self-resonance phenomenon on measurement, the IEC publication (IEC 62044-2) specifies the testing frequency to be far below the self-resonant frequency of the wound cores.

9. LOSS TANGENT

At the condition of low-amplitude measurement the common methods to indicate ferrite performance as a function of frequency is to characterize not only the complex permeability but also the value of $\tan\delta_m$, known as loss tangent. The total magnetic loss tangent can be expressed as follows,

$$\tan\delta_{\mathrm{m}} = \frac{R_{\mathrm{s}}}{\omega L_{\mathrm{s}}} = \frac{\mu_{\mathrm{s}}''}{\mu_{\mathrm{s}}'}$$

where δ_m is the loss angle, i.e. the phase angle between B and H. There are also some standard expressions on the quotient of loss angle and permeability, called **loss factors** by IEC Technical Committee 51 as follows,

$$\frac{\tan\delta_{\mathrm{m}}}{\mu} = \frac{\tan\delta_{\mathrm{h}}}{\mu} + \frac{\tan\delta_{\mathrm{F}}}{\mu} + \frac{\tan\delta_{\mathrm{r}}}{\mu}$$

where the total loss factor is the sum over hysteresis loss, eddy current loss and residual loss factors respectively.

10. QUALITY FACTOR

To characterize the circuit/network performance the quality factor (Q-factor hereafter) is normally used as one of the important measures. Through the inductance circuit model in series or parallel mode the Q-factor of wire-wound magnetic cores can be defined as follows,

$$\mathrm{Q} = \frac{\omega L_{\mathrm{s}}}{R_{\mathrm{s}}} = \frac{R_{\mathrm{p}}}{\omega L_{\mathrm{p}}}$$

which is just the inverse of loss tangent. For practical inductors the term $R_{s/p}$ involves the winding resistance as well. As a result of that, Q-factor is dependent on the testing frequency, winding condition and core loss.

11. RESISTIVITY

The resistivity, ρ, of ferrites ranging from 1Ω-m to greater than 10^6Ω-m is dependent on the chemical compounds. NiZn-ferrites feature high resistivity (>10^6Ω-m) while MnZn-ferrites behave much lower span over several Ω-m. The partial short-circuit due to electron hopping between the grain boundaries of polycrystalline ferrites creates significant eddy current loss at high frequencies and gives rise to dispersion of permeability, resulting the reduction of impedance. This phenomenon normally happens to MnZn-ferrites featuring much lower impedance at high frequencies. The DC resistivity of each material grade shown in the data sheets is measured at room temperature.

12. CORE CONSTANTS

A recent IEC publication (IEC 60205) lists standard formulae for calculating core constants and effective dimensions for a number of widely used core shapes. For a non-uniform core, an equivalent ideal toroid is introduced hypothetically to get effective core parameters, A_e and l_e , through its core constants:

$$\mathrm{C}_1 = \sum_i \frac{l_i}{A_i} \text{ and } \mathrm{C}_2 = \sum_i \frac{l_i}{A_i^2}$$

These constants give rise to the calculation of $A_e = C_1/C_2$ and $l_e = C_1^2/C_2$. C_1 is also used to calculate inductance factor of a core configuration without gap through

$$AL(\mathrm{nH}) = \frac{4\pi\mu_{\mathrm{i}} \cdot 10^{-1}}{\mathrm{C}_1}$$

with the unit of C_1 in mm^{-1}. If air gap is concerned, μ_i should be replaced by μ_e in the above equation.

FERRITE MANUFACTURING PROCESS

Ferrite cores are manufactured to meet the requirements of customers. The effect of the process variables on the properties of ferrite pieces have always been a subject of great importance. The major factors include the purity of the constituent oxides, their proportions and homogeneity in the powder mix and the control of temperature and atmosphere during sintering.

Manufacturing flow sheet

Quality check	Process step	Purpose
RM quality	Raw Material	Select raw materials in required purity and physical properties
	Weighing	In proportion to the mole ratio to get the required chemistry
	Mixing	To achieve the uniformity to effective chemical reaction
Calcination quality	Calcination	Adjust the furnace condition to get the required ferrite formation
	Crushing	Crush the calcined material to suit further milling
Particle size analysis	Additives / Milling	Additives for modifying magnetic properties and milling to get fine particle to control shrinkage and microstructure
	Binder Addition	Binder in the required amount to get sufficient mechanical strength to the green body
Granulometry	Granulation	For achieving free flowing powder, which can flow in to die part easily.
	Pressing	To get the required size and shape. Size is adjusted according to the shrinkage of powder
	Sintering	To achieve the required magnetic, electrical and mechanical properties for the ferrite component.
Dimensions, Ferrite properties check	Surface Grinding and Polishing	To control the dimensions to the close tolerance
	Marking / Packaging	

MnZn-ferrite power materials

Features	Grade	Initial Permeability μ_i	Saturation Flux Density Bs (mT)	Remanence Br (mT)	Coercivity Hc (A/m)	Curie Temperature Tc (℃)	Resistivity ρ (Ω・m)	Page
Conventional Low Loss	P4	2500	480	135	14	220	5.50	20
	P41	2400	495	170	13	230	4.00	21
	P42	1800	520	230	13	240	8.00	22
	P48	2500	515	150	13	220	5.00	23
Wide temp. Low Loss	P45	3100	530	80	8	215	5.00	24
	P451	3800	540	70	8	215	5.00	25
	P452	3000	520	100	13	215	5.00	26
	P47	3000	520	100	11	220	5.00	27
High Bs	P49	1700	540	280	15	280	3.00	28
	P491	1500	600	140	21	300	5.00	29
High Frequency Low Loss	P5	2000	470	135	17	220	6.40	30
	P51	1500	490	215	35	250	12.00	31
	P52	2000	500	140	21	250	6.50	32
	P53	1200	515	180	38	280	10.00	33
	P61	900	515	200	50	280	10.00	34
	P63	900	540	205	50	280	10.00	35

MnZn-ferrite hi-permeability materials

Features	Grade	Initial Permeability μ_i	Saturation Flux Density Bs (mT)	Remanence Br (mT)	Temperature Factor α_F (x10^{-6}/℃)	Curie Temperature Tc (℃)	Resistivity ρ (Ω・m)	Page
Conventional High μ for CM Chokes	A10	10000	410	140	-0.5~1	130	0.15	36
	A121	12000	380	130	-0.5~1	110	0.12	37
	A13	12000	400	120	-1~1	125	0.15	38
	A151	15000	400	220	-1~1	110	0.10	39
Wide Band Filter	A05	5000	440	80	0~2	140	0.20	40
	A06	6000	420	70	0~2.5	140	0.20	41
	A07	7000	400	150	-1~1	130	0.35	42
	A071	7000	440	80	-1~1	145	0.35	43
	A102	10000	380	95	-1~1	120	0.15	44
High μ & Tc for Automotives	A072	7000	485	95	-1.5~1.5	180	0.20	45
	A104	10000	460	105	-1.5~0	155	0.15	46
High μ Wide Temperature	A044	4000	450	55	-1~1	170	1.00	47
	A064	6000	470	135	-1~1	170	1.00	48
	N10	10000	380	160	-1~1	100	0.12	49

MnZn-ferrite telecommunication materials

Features	Grade	Initial Permeability μ_i	Saturation Flux Density Bs (mT)	Remanence Br (mT)	Loss Factor tanδ/μ (x10^{-6})	Curie Temperature Tc (℃)	Resistivity ρ (Ω・m)	Page
For Wide Temp. LAN	A043	4500	460	65	<10	160	0.20	50
	A062	6000	460	100	<30	160	0.20	51
	N07	7000	400	70	<30	130	0.15	52
Low THD	A101	10000	400	175	<90	130	0.15	53
Low η_B	N4	2500	450	180	<3	170	7.50	54
	N42	3800	530	100	<2.5	250	5.00	55
	N43	750	490	400	<15	250	2.00	56

MnZn-ferrite EMI suppression materials

Features	Grade	Initial Permeability μ_i	Saturation Flux Density Bs (mT)	Remanence Br (mT)	Temperature Factor α_F (x10^{-6}/℃)	Curie Temperature Tc (℃)	Resistivity ρ (Ω・m)	Page
EMI Filter	N5	2000	370	240	<1.1	130	140	57

NiZn-ferrite EMI suppression materials

Features	Grade	Initial Permeability μ_i	Saturation Flux Density Bs (mT)	Remanence Br (mT)	Coercivity Hc (A/m)	Curie Temperature Tc (℃)	Resistivity ρ (Ω・m)	Page
Automotive EMI Suppression	K081	800	400	280	21	190	10^6	58
	K10	1000	355	250	19	160	10^6	59
	K12	1200	355	250	12	160	10^6	60
	K13	1300	340	190	16	150	10^6	61
	K15	1500	330	200	11	130	10^6	62
	K151	1500	290	150	20	110	10^6	63
	K20	2000	300	150	11	100	10^6	64
	K25	2500	275	170	14	90	10^6	65
Automotive EMI Suppression	D1C	350	360	255	31	160	10^6	66
	D25	500	390	260	58	180	10^6	67
	D27	700	365	235	20	150	10^6	68
	D28	800	365	180	26	150	10^6	69
	D30	1000	340	115	28	140	10^6	70
	D35	1100	305	140	22	120	10^6	71
	D37	1500	290	150	20	110	10^6	72
	D40	2000	275	115	8	90	10^6	73
Conventional High Bs	A30	300	435	300	68	250	10^6	74
	A31	300	435	180	52	250	10^6	75
	A40	400	430	320	62	250	10^6	76
	A50	500	330	125	56	150	10^6	77
Automotive High Bs	B25	250	445	320	95	250	10^6	78
	B30	300	470	250	80	300	10^6	79
	B40	400	430	300	45	240	10^6	80
	B45	450	450	270	49	240	10^6	81
	B60	600	430	300	40	210	10^6	82
	B90	900	390	250	38	180	10^6	83
Low Permeability	L1	150	410	170	105	250	10^6	84
	L2	60	420	275	140	250	10^6	85
	L3	20	305	120	600	300	10^6	86
	L4	50	395	255	200	300	10^6	87
	L5	100	390	175	140	250	10^6	88
	L6	14	265	175	1540	300	10^6	89

NiZn-ferrite RFID/antenna materials

Features	Grade	Initial Permeability μ_i	Saturation Flux Density Bs (mT)	Remanence Br (mT)	Coercivity Hc(A/m)	Curie Temperature Tc (℃)	Resistivity ϱ(Ω・m)	Page
Rod Core For Antenna	H2	50	400	195	155	300	10^6	90
	H3	100	330	225	95	250	10^6	91
	H3A	125	320	235	80	230	10^6	92
	H3B	150	330	245	90	220	10^6	93
	H4	300	330	205	55	160	10^6	94
	H5	250	410	295	40	250	10^6	95
	H5M	230	430	250	75	280	10^6	96
	H5R	200	400	290	55	240	10^6	97
	H5N	300	390	260	155	200	10^6	98
Wide Temperature RFID	F10	100	330	185	220	170	10^6	99
	F52	500	330	150	70	140	10^6	100
	F80	800	360	155	45	150	10^6	101
	F100	1000	335	140	33	130	10^6	102

MgZn-ferrite EMI suppression materials

Features	Grade	Initial Permeability μ_i	Saturation Flux Density Bs (mT)	Remanence Br (mT)	Coercivity Hc (A/m)	Curie Temperature Tc (℃)	Resistivity ρ (Ω・m)	Page
EMI Filter	M80	800	315	215	17	140	10^6	103

Material Characteristics (1)

	Symbol	Unit	Measuring Conditions			Conventional Low Loss Materials			
			Freq.	Flux den.	Temp.	P4	P41	P42	P48
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2500 ± 25%	2400 ± 25%	1800 ± 25%	2500 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 4500	> 4500	> 5000	> 5000
					100°C	> 4500	> 4500	> 5000	> 5000
Power Loss	Pv	KW/m³	25kHz	200mT	25°C	105	125	125	-
					100°C	55	50	50	-
			100kHz	200mT	25°C	630	650	750	550
					100°C	450	350	350	250
			300kHz	100mT	25°C	660	820	900	570
					100°C	430	500	500	330
			500kHz	50mT	25°C	380	400	450	250
					100°C	330	300	300	200
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	480	495	520	515
					100°C	380	395	420	410
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	135	170	230	150
					100°C	75	55	60	55
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	14	13	13	13
					100°C	9	6	8	6
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1.2	< 1	< 1	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2	< 2	< 2	< 2
Curie Temperature	Tc	°C				≥ 220	≥ 230	≥ 240	≥ 220
Resistivity	ρ	Ωm				5.50	4.00	8.00	5.00
Density	d	g/cm³				4.80	4.85	4.90	4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (2)

	Symbol	Unit	Measuring Conditions			Wide Temperature Low Loss Materials			
			Freq.	Flux den.	Temp.	P45	P451	P452	P47
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	3100 ± 25%	3800 ± 25%	3000 ± 25%	3000 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 5000	> 5000	> 3900	> 4500
					100°C	> 5000	> 5000	> 4450	> 4500
Power Loss	Pv	KW/m³	100kHz	200mT	25°C	360	270	310	340
					100°C	260	310	380	350
			300kHz	100mT	25°C	400	295	300	350
					100°C	350	385	260	350
			500kHz	50mT	25°C	200	165	100	230
					100°C	200	230	120	230
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	530	540	520	520
					100°C	405	420	415	420
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	80	70	100	100
					100°C	50	40	80	70
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	8	8	13	11
					100°C	5	6	11	8
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.6	< 0.6	< 0.6	< 0.6
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.1 mT	25°C	< 1	< 1	< 1	< 1
Curie Temperature	Tc	°C				≥ 215	≥ 215	≥ 215	≥ 220
Resistivity	ρ	Ωm				5.00	5.00	5.00	5.00
Density	d	g/cm³				4.90	4.90	4.85	4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (3)

	Symbol	Unit	Measuring Conditions			High Bs Materials	
			Freq.	Flux den.	Temp.	P49	P491
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1700 ± 25%	1500 ± 25%
Power Loss	Pv	KW/m^3	25kHz	200mT	25°C	-	160
					100°C	-	240
			100kHz	200mT	25°C	800	900
					100°C	400	1390
			500kHz	50mT	25°C	450	250
					100°C	220	560
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	540	600
					100°C	460	500
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	280	140
					100°C	50	235
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	15	21
					100°C	7	20
Curie Temperature	Tc	°C				≥ 280	≥ 300
Resistivity	ρ	Ωm				3.00	5.00
Density	d	g/cm^3				4.90	4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (4)

	Symbol	Unit	Measuring Conditions			High Frequency Low Loss Materials					
			Freq.	Flux den.	Temp.	P5	P51	P52	P53	P61	P63 NEW
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2000 ± 25%	1500 ± 25%	2000 ± 25%	1200 ± 25%	900 ± 25%	900 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 4000	> 2500	> 4000	> 1900	> 1700	> 1700
					100°C	> 4000	> 2500	> 4000	> 2000	> 1800	> 1800
Power Loss	Pv	KW/m^3	300kHz	100mT	25°C	600	410	510	350	-	-
					100°C	350	370	450	310	-	-
			500kHz	50mT	25°C	220	200	150	80	-	-
					100°C	250	100	140	60	-	-
			700kHz	50mT	25°C	600	300	300	-	-	-
					100°C	550	250	350	-	-	-
			1MHz	50mT	25°C	-	600	750	300	250	80
					100°C	-	600	1000	300	110	80
			2MHz	80mT	25°C	-	-	-	-	-	1600
					100°C	-	-	-	-	-	2000
			3MHz	10mT	25°C	-	-	-	-	50	20
					100°C	-	-	-	-	50	20
			3MHz	30mT	25°C	-	-	-	-	450	200
					100°C	-	-	-	-	370	250
			5MHz	9mT	25°C	-	-	-	-	150	80
					100°C	-	-	-	-	170	80
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	470	490	500	515	515	540
					100°C	350	400	400	420	430	450
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	135	215	140	180	200	205
					100°C	70	125	110	120	135	115
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	17	35	21	38	50	50
					100°C	10	27	18	33	40	40
Hysteresis Material Constant	η_B	$10^{-6}/mT$	10kHz	1.5-3.0mT	25°C	< 1	< 1	< 1	<1	< 1	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2	< 2	< 2	<2	< 2	< 2
Curie Temperature	Tc	°C				≥ 220	≥ 250	≥ 250	≥ 280	≥ 280	≥ 280
Resistivity	ρ	Ωm				6.40	12.00	6.50	10.00	10.00	10.00
Density	d	g/cm^3				4.70	4.85	4.85	4.80	4.80	4.80

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (5)

	Symbol	Unit	Measuring Conditions			Conventional High μ For CM Chokes Materials			
			Freq.	Flux den.	Temp.	A10	A121	A13	A151
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	10000 ± 30%	12000 ± 30%	12000 ± 30%	15000 ± 30%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 10	< 10	< 8	< 10
			100kHz		25°C	< 60	< 60	< 40	< 110
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	410	380	400	400
					100°C	210	180	200	170
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	140	130	120	220
					100°C	110	110	65	100
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	0 ~ 1.5	0 ~ 1.5	1 ~ 3	-1 ~ 1
					20 ~ 70°C	-0.5 ~ 1	-0.5 ~ 1	-1 ~ 1	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5	< 0.5	< 0.5	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2	< 2	< 2	< 2
Curie Temperature	Tc	°C				≥ 130	≥ 110	≥ 125	≥ 110
Resistivity	ρ	Ωm				0.15	0.12	0.15	0.10
Density	d	g/cm³				4.90	4.90	4.90	5.00

Remark: Best impedance, and permeability v. s. frequency performance for 10,000μ_i materials.
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (6)

	Symbol	Unit	Measuring Conditions			Wide Band Filter Materials				
			Freq.	Flux den.	Temp.	A05	A06 NEW	A07	A071	A102
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	5000 ± 25%	6000 ± 25%	7000 ± 25%	7000 ± 25%	10000 ± 30%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 4	< 4	< 8	< 8	< 10
			100kHz		25°C	< 15	< 15	< 30	< 30	< 60
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	440	420	400	440	380
					100°C	300	280	200	280	180
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	80	70	150	80	95
					100°C	90	80	110	60	75
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	0 ~ 2	0 ~ 2.5	-1~1	-1~1	-1 ~ 1
					20 ~ 70°C	0 ~ 2	0 ~ 2.5	-1~1	-1~1	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.8	< 0.8	< 1.2	< 1.2	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 3	< 3	< 2	< 2	< 2
Curie Temperature	Tc	°C				≥ 140	≥ 140	≥ 130	≥ 145	≥ 120
Resistivity	ρ	Ωm				0.20	0.20	0.35	0.35	0.15
Density	d	g/cm³				4.85	4.85	4.90	4.90	4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (7)

	Symbol	Unit	Measuring Conditions			High μ & Tc For Automotives Materials	
			Freq.	Flux den.	Temp.	A072 NEW	A104
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	7000 ± 25%	10000 ±30%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 5	< 10
			100kHz		25°C	< 15	< 30
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	485	460
					100°C	340	295
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	95	105
					100°C	80	105
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	1.5 ~ 3.5	1 ~ 3
					20 ~ 70°C	-1.5 ~ 1.5	-1.5 ~ 0
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1.0	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 1.0	< 2.0
Curie Temperature	Tc	°C				≥ 180	≥ 155
Resistivity	ρ	Ωm				0.20	0.15
Density	d	g/cm³				4.90	4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (8)

	Symbol	Unit	Measuring Conditions			High μ Wide Temperature Materials		
			Freq.	Flux den.	Temp.	A044	A064	N10
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	4000 ± 25%	6000 ± 25%	10000 ± 30%
					-20°C	-	-	> 9000
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 8	< 8	< 10
			100kHz		25°C	< 40	< 40	< 90
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	450	470	380
					100°C	315	330	130
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	55	135	160
					100°C	45	115	110
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 1	-1 ~ 1	-1 ~ 0
					20 ~ 70°C	-1 ~ 1	-1 ~ 1	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5	< 0.5	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2	< 2	< 2
Curie Temperature	Tc	°C				≥ 170	≥ 170	≥ 100
Resistivity	ρ	Ωm				1.00	1.00	0.12
Density	d	g/cm³				4.90	4.90	5.00

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (9)

	Symbol	Unit	Measuring Conditions			For Wide Temperature LAN Materials		
			Freq.	Flux den.	Temp.	A043	A062	N07
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	4500 ± 25%	6000 ± 25%	7000 ± 25%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 10	< 10	< 5
			100kHz		25°C	< 10	< 30	< 30
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	460	460	400
					100°C	300	320	220
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	65	100	70
					100°C	60	80	60
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	1 ~ 2	1 ~ 3	-1 ~ 1
					20 ~ 70°C	-1 ~ 1	-1 ~ 1	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5	< 0.5	< 0.2
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2	< 2	< 2
Curie Temperature	Tc	°C				≥ 160	≥ 160	≥ 130
Resistivity	ρ	Ωm				0.20	0.20	0.15
Density	d	g/cm³				4.85	4.85	4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (10)

	Symbol	Unit	Measuring Conditions			Low THD Material
			Freq.	Flux den.	Temp.	A101
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	10000 ± 30%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 10
			100kHz		25°C	< 90
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	400
					100°C	220
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	175
					100°C	125
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 1
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.2
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 130
Resistivity	ρ	Ωm				0.15
Density	d	g/cm³				4.90

Remark: Best THD performance for 10,000μi materials.
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (11)

	Symbol	Unit	Measuring Conditions			Low η_B Materials		
			Freq.	Flux den.	Temp.	N4	N42	N43
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	2500 ± 25%	3800 ± 25%	750 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 7	< 3.5	< 60
			100kHz		25°C	< 3	< 3.5	< 15
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	450	530	490
					100°C	320	425	400
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	180	100	400
					100°C	150	125	325
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	14	9	35
					100°C	9	13	21
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	5 ~ 25°C	< 1.3	7 ~ 9	< 2.2
					25 ~ 55°C	< 1.3	-4 ~ -2	< 1.8
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.6	< 0.3	< 2.5 (100kHz)
Curie Temperature	Tc	°C				≥ 170	≥ 250	≥ 250
Resistivity	ρ	Ωm				7.50	5.00	2.00
Density	d	g/cm³				4.70	4.90	4.70

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (12)

	Symbol	Unit	Measuring Conditions			EMI Filter Material
			Freq.	Flux den.	Temp.	N5
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	2000 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 1.24
			100kHz		25°C	< 23
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	370
					100°C	285
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	240
					100°C	140
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	-
					100°C	-
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	5 ~ 25°C	< 1.1
					25 ~ 55°C	< 5.8
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.36
Curie Temperature	Tc	°C				≥ 130
Resistivity	ρ	Ωm				140
Density	d	g/cm³				4.95

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (13)

	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Materials							
			Freq.	Flux den.	Temp.	K081	K10	K12	K13 NEW	K15	K151 NEW	K20	K25 NEW
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	800 ± 25%	1000 ± 25%	1200 ± 25%	1300 ± 25%	1500 ± 25%	1500 ± 25%	2000 ± 25%	2500 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	400	355	-	-	-	-	-	-
				H = 1200A/m		-	-	355	340	330	290	300	275
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	280	250	-	-	-	-	-	-
				H = 1200A/m		-	-	250	190	200	150	150	170
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	21	19	-	-	-	-	-	-
				H = 1200A/m		-	-	12	16	11	20	11	14
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	17	11	13	15	11	10	11	15
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	8	8	11	8	6	4	3	3
Curie Temperature	Tc	°C				≥ 190	≥ 160	≥ 160	≥ 150	≥ 130	≥ 110	≥ 100	≥ 90
Resistivity	ρ	Ωm				$> 10^6$	$> 10^6$	$> 10^6$	$> 10^6$	$> 10^6$	$> 10^6$	$> 10^6$	$> 10^6$
Density	d	g/cm^3				5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (14)

	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Materials							
			Freq.	Flux den.	Temp.	D1C	D25	D27	D28	D30	D35	D37 NEW	D40
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	350 ± 25%	500 ± 25%	700 ± 25%	800 ± 25%	1000 ± 25%	1100 ± 25%	1500 ± 25%	2000 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	360	390	365	365	340	-	-	-
				H = 1200A/m		-	-	-	-	-	305	290	275
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	255	260	235	180	115	-	-	-
				H = 1200A/m		-	-	-	-	-	140	150	115
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	31	58	20	26	28	-	-	-
				H = 1200A/m		-	-	-	-	-	22	20	8
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	0.1MHz	< 0.25mT	25°C	-	-	20	20	35	20	10	18
			1MHz			30	248	-	-	-	-	-	-
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25mT	20 ~ 80°C	≤ 50	≤ 35	≤ 7	≤ 5	≤ 6	≤ 2	≤ 4	≤ 20
					-50 ~ 80°C	-	-	-	≤ 1.5	-	-	-	-
Curie Temperature	Tc	°C				≥ 160	≥ 180	≥ 150	≥ 150	≥ 140	≥ 120	≥ 110	≥ 90
Resistivity	ρ	Ωm				$> 10^6$	$> 10^6$	$> 10^6$	$> 10^6$	$> 10^6$	$> 10^6$	$> 10^6$	$> 10^6$
Density	d	g/cm^3				5.00	5.00	4.80	5.00	5.00	5.00	5.00	5.00

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (15)

	Symbol	Unit	Measuring Conditions			Conventional High Bs Materials			
			Freq.	Flux den.	Temp.	A30	A31	A40	A50
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	300 ± 25%	300 ± 25%	400 ± 25%	500 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H =4000A/m	25°C	435	435	430	330
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	300	180	320	125
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	68	52	62	56
Relative Loss Factor	tanδ/μ_i	10^{-6}	0.1MHz	< 0.25mT	25°C	-	-	-	30
			0.4MHz			-	50	-	-
			1MHz			40	-	35	-
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 25	≤ 25	≤ 20	1 ~ 5
Curie Temperature	Tc	°C				≥ 250	≥ 250	≥ 250	≥ 150
Resistivity	ρ	Ωm				> 10^6	> 10^6	> 10^6	> 10^6
Density	d	g/cm^3				5.00	5.00	5.00	5.00

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (16)

	Symbol	Unit	Measuring Conditions			Automotive High Bs Materials					
			Freq.	Flux den.	Temp.	B25	B30	B40	B45	B60	B90
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	250 ± 25%	300 ± 25%	400 ± 25%	450 ± 25%	600 ± 25%	900 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	445	470	430	450	430	390
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	320	250	300	270	300	250
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	95	80	45	49	40	38
Relative Loss Factor	tanδ/μ_i	10^{-6}	100kHz	< 0.25mT	25°C	70	60	40	40	25	13
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	12	16	10	15	12	8
Curie Temperature	Tc	°C				≥ 250	≥ 300	≥ 240	≥ 240	≥ 210	≥ 180
Resistivity	ρ	Ωm				> 10^6	> 10^6	> 10^6	> 10^6	> 10^6	> 10^6
Density	d	g/cm^3				5.20	5.20	5.20	5.20	5.20	5.20

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (17)

	Symbol	Unit	Measuring Conditions			Low Permeability Materials					
			Freq.	Flux den.	Temp.	L1	L2	L3	L4	L5	L6
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	150 ± 25%	60 ± 25%	20 ± 25%	50 ± 25%	100 ± 25%	14 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	410	420	305*	395	390	265*
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	170	275	120*	255	175	175*
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	105	140	600*	200	140	1540*
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10MHz	< 0.25mT	25°C	180**	150	445	170	350**	705
Curie Temperature	Tc	°C				≥ 250	≥ 250	≥ 300	≥ 300	≥ 250	≥ 300
Resistivity	ρ	Ωm				> 10^6	> 10^6	> 10^6	> 10^6	> 10^6	> 10^6
Density	d	g/cm^3				5.10	5.10	5.10	5.10	5.10	5.10

* Measuring Conditions H=8000A/m
** Measuring Conditions Freq.=100KHz
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (18)

	Symbol	Unit	Measuring Conditions			For Rod Core Antenna Materials								
			Freq.	Flux den.	Temp.	H2	H3	H3A	H3B	H4	H5	H5M	H5R	H5N
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	50 ± 25%	100 ± 25%	125 ± 25%	150 ± 25%	300 ± 25%	250 ± 25%	230 ± 25%	200 ± 25%	300 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	1MHz		25°C	185	70	110	70	35	75	50	40	475
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	400	330	320	330	330	410	430	400	390
					100°C	350	275	260	270	240	345	365	330	310
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	195	225	235	245	205	295	250	290	260
					100°C	195	180	175	185	130	200	180	210	185
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	155	95	80	90	55	40	75	55	155
					100°C	120	65	50	60	35	30	60	35	125
Temperature Factor of Permeability	α_F	10^{-6}/°C			20 ~ 80°C	100	80	110	60	100	40	30	25	≤ 5
Curie Temperature	Tc	°C				≥ 300	≥ 250	≥ 230	≥ 220	≥ 160	≥ 250	≥ 280	≥ 240	≥ 200
Resistivity	ρ	Ωm				> 10^6	> 10^6	> 10^6	> 10^6	> 10^6	> 10^6	> 10^6	> 10^6	> 10^6
Density	d	g/cm^3				5.10	4.80	4.60	4.80	4.80	5.10	5.10	5.10	5.00

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (19)

	Symbol	Unit	Measuring Conditions			Wide Temperature RFID Materials			
			Freq.	Flux den.	Temp.	F10	F52	F80	F100 NEW
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	100 ± 25%	500 ± 25%	800 ± 25%	1000 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	330	330	360	335
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	185	150	155	140
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	220	70	45	33
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	0.1MHz	< 0.25mT	25°C	-	20	20	16
			1MHz			55	-	-	-
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25mT	20 ~ 60°C	-	1 ~ 2	-1 ~ 1	-1 ~ 1
					20 ~ 80°C	≤ 35	-	-	-
Curie Temperature	Tc	°C				≥ 170	≥ 140	≥ 150	≥ 130
Resistivity	ρ	Ωm				> 10^6	> 10^6	> 10^6	> 10^6
Density	d	g/cm³				5.10	5.10	5.10	5.10

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Material Characteristics (20)

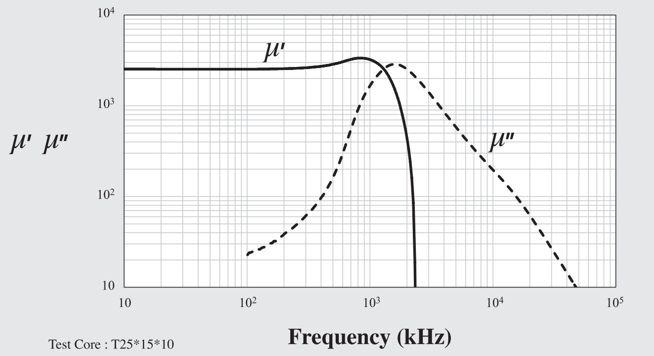
	Symbol	Unit	Measuring Conditions			EMI-Filter Material
			Freq.	Flux den.	Temp.	M80
Initial Permeability	μ_i		≤10kHz	0.25mT	25°C	800 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	315
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	215
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	17
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	19
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	10
Curie Temperature	Tc	°C				≥ 140
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

	Symbol	Unit	Measuring Conditions			Conventional Low Loss Material
			Freq.	Flux den.	Temp.	P4
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2500 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 4500
					100°C	> 4500
Power Loss	Pv	KW/m³	25kHz	200mT	25°C	105
					100°C	55
			100kHz	200mT	25°C	630
					100°C	450
			300kHz	100mT	25°C	660
					100°C	430
			500kHz	50mT	25°C	380
					100°C	330
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	480
					100°C	380
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	135
					100°C	75
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	14
					100°C	9
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1.2
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 220
Resistivity	ρ	Ωm				5.50
Density	d	g/cm³				4.80

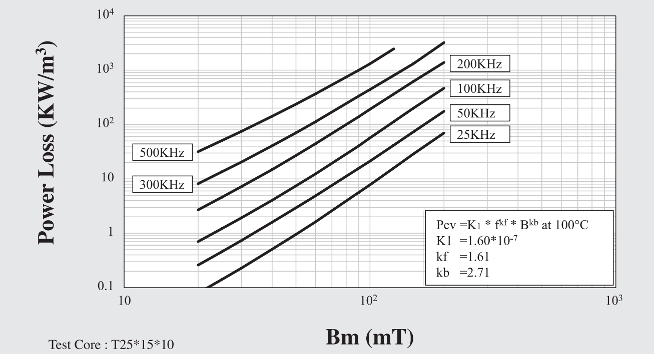
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Complex Permeability V.S. Frequency



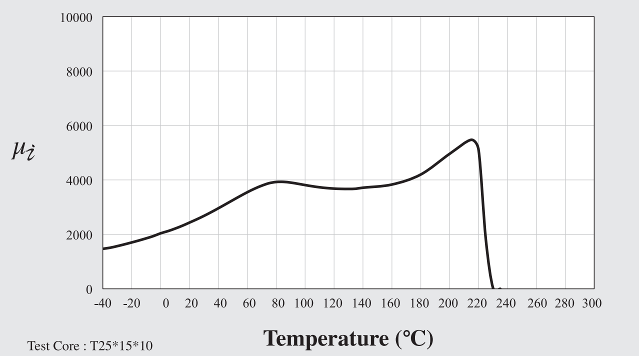
Test Core : T25*15*10

Power Loss V.S. Temperature/Flux Density/Frequency



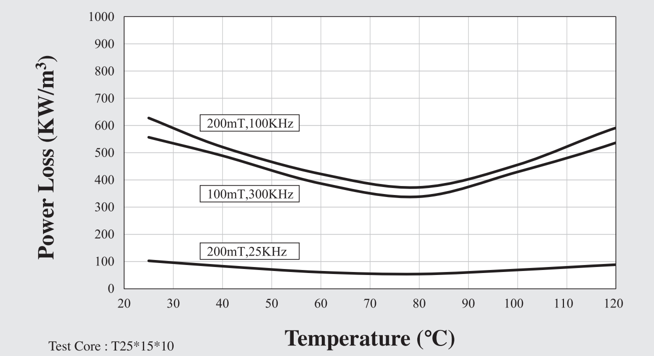
Test Core : T25*15*10

Initial Permeability V.S. Temperature



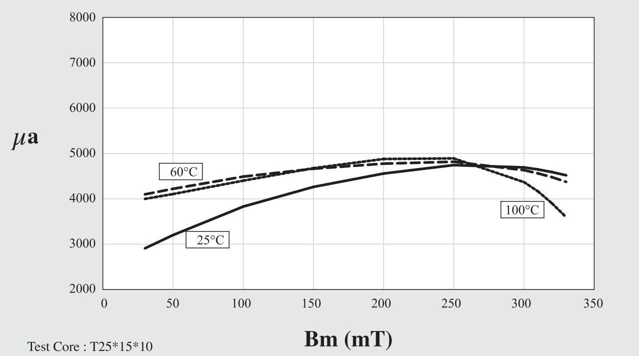
Test Core : T25*15*10

Power Loss V.S. Temperature



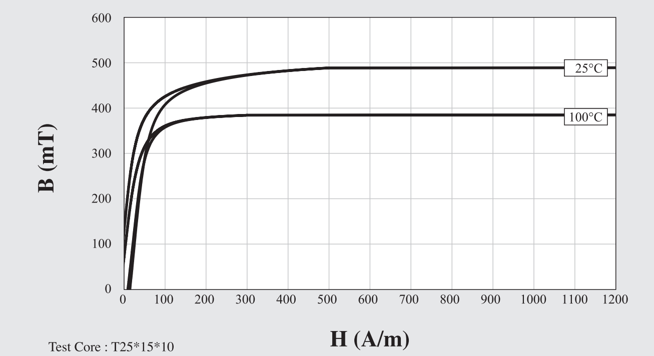
Test Core : T25*15*10

Amplitude Permeability V.S. Flux Density (Bm)



Test Core : T25*15*10

Saturation Flux Density V.S. Magnetic Field

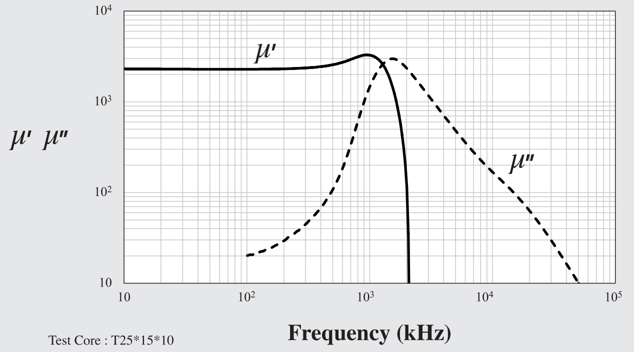


Test Core : T25*15*10

	Symbol	Unit	Measuring Conditions			Conventional Low Loss Material
			Freq.	Flux den.	Temp.	P41
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2400 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 4500
					100°C	> 4500
Power Loss	Pv	KW/m³	25kHz	200mT	25°C	125
					100°C	50
			100kHz	200mT	25°C	650
					100°C	350
			300kHz	100mT	25°C	820
					100°C	500
			500kHz	50mT	25°C	400
					100°C	300
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	495
					100°C	395
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	170
					100°C	55
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	13
					100°C	6
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 230
Resistivity	ρ	Ωm				4.00
Density	d	g/cm³				4.85

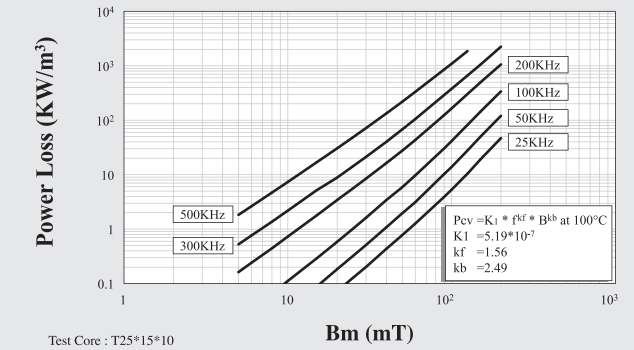
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Complex Permeability V.S. Frequency



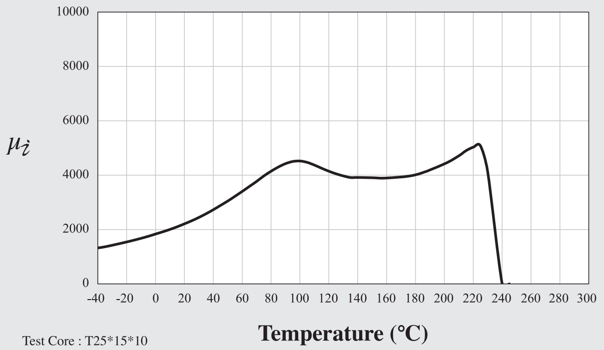
Test Core : T25*15*10

Power Loss V.S. Temperature/Flux Density/Frequency



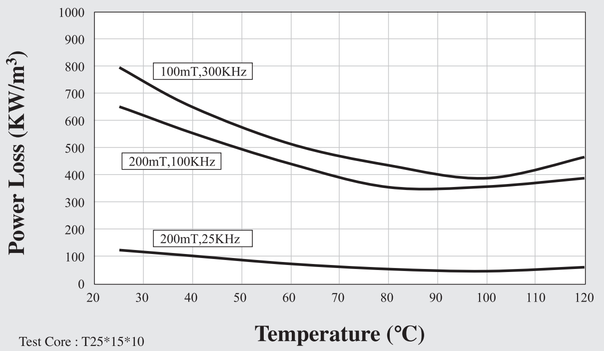
Test Core : T25*15*10

Initial Permeability V.S. Temperature



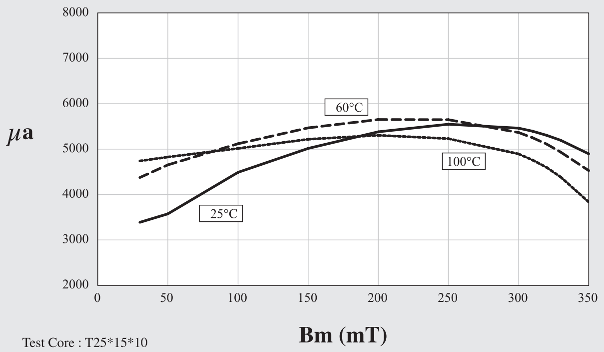
Test Core : T25*15*10

Power Loss V.S. Temperature



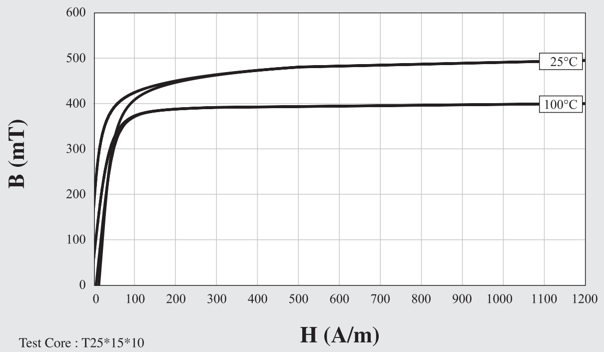
Test Core : T25*15*10

Amplitude Permeability V.S. Flux Density (Bm)



Test Core : T25*15*10

Saturation Flux Density V.S. Magnetic Field

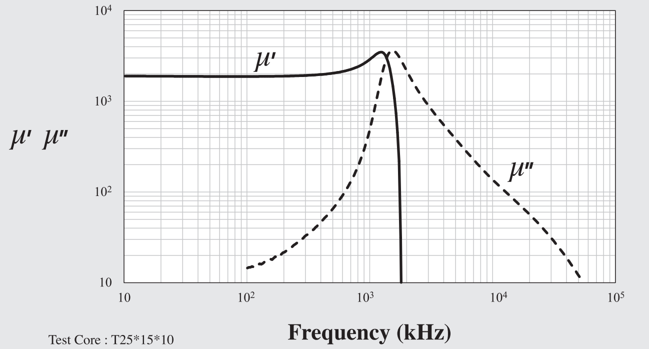


Test Core : T25*15*10

	Symbol	Unit	Measuring Conditions			Conventional Low Loss Material
			Freq.	Flux den.	Temp.	P42
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1800 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 5000
					100°C	> 5000
Power Loss	Pv	KW/m³	25kHz	200mT	25°C	125
					100°C	50
			100kHz	200mT	25°C	750
					100°C	350
			300kHz	100mT	25°C	900
					100°C	500
			500kHz	50mT	25°C	450
					100°C	300
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	520
					100°C	420
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	230
					100°C	60
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	13
					100°C	8
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 240
Resistivity	ρ	Ωm				8.00
Density	d	g/cm³				4.90

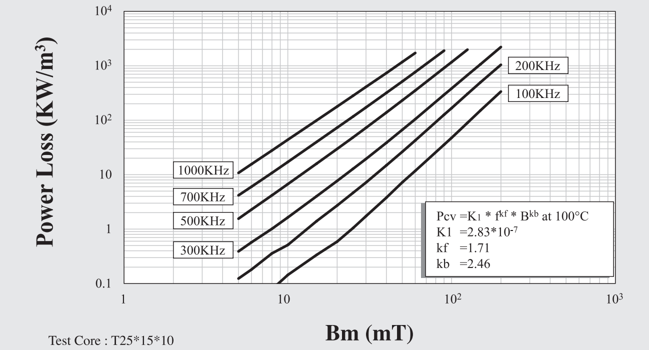
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Complex Permeability V.S. Frequency



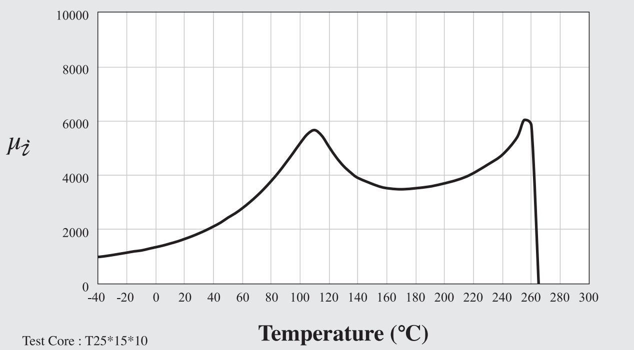
Test Core : T25*15*10

Power Loss V.S. Temperature/Flux Density/Frequency



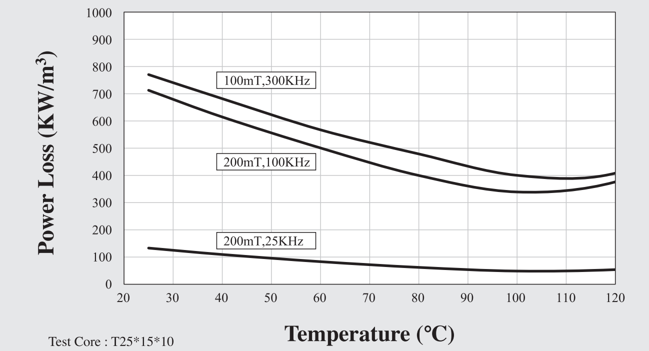
Test Core : T25*15*10

Initial Permeability V.S. Temperature



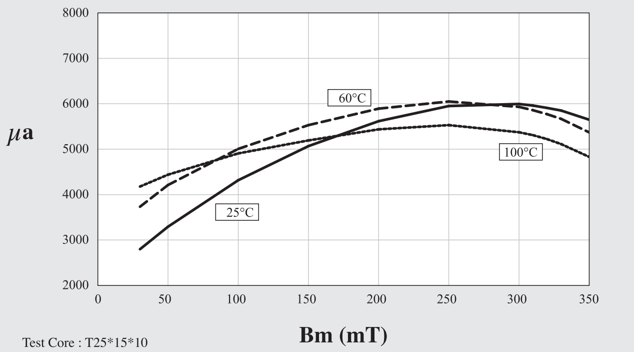
Test Core : T25*15*10

Power Loss V.S. Temperature



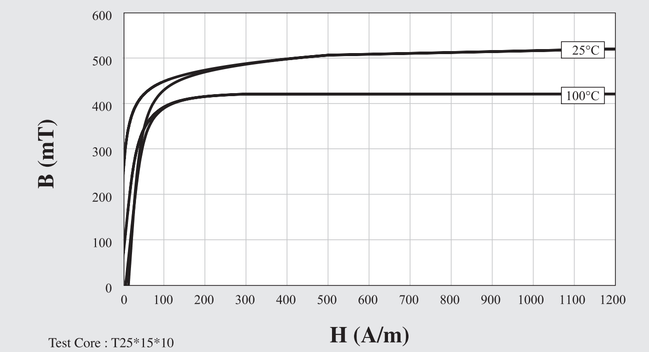
Test Core : T25*15*10

Amplitude Permeability V.S. Flux Density (Bm)



Test Core : T25*15*10

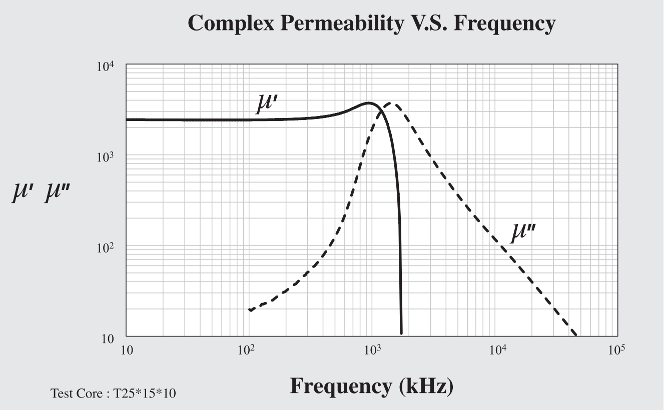
Saturation Flux Density V.S. Magnetic Field



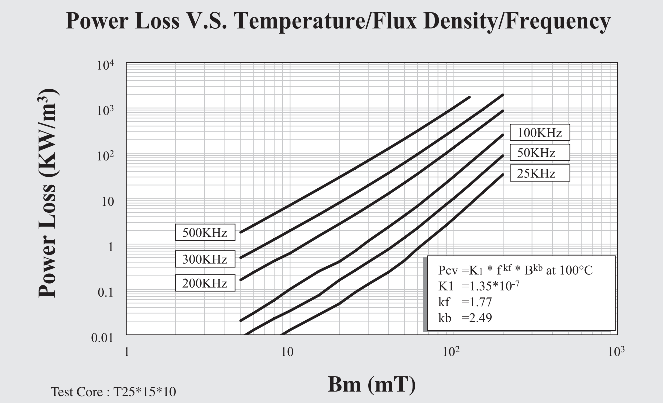
Test Core : T25*15*10

	Symbol	Unit	Measuring Conditions			Conventional Low Loss Material
			Freq.	Flux den.	Temp.	P48
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2500 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 5000
					100°C	> 5000
Power Loss	Pv	KW/m³	100kHz	200mT	25°C	550
					100°C	250
			300kHz	100mT	25°C	570
					100°C	330
			500kHz	50mT	25°C	250
					100°C	200
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	515
					100°C	410
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	150
					100°C	55
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	13
					100°C	6
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 220
Resistivity	ρ	Ωm				5.00
Density	d	g/cm³				4.90

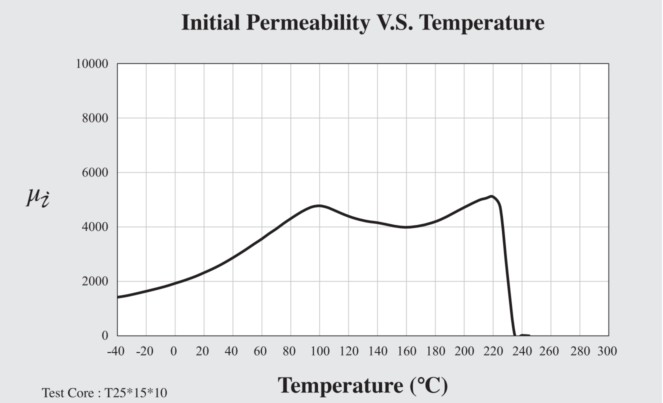
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.



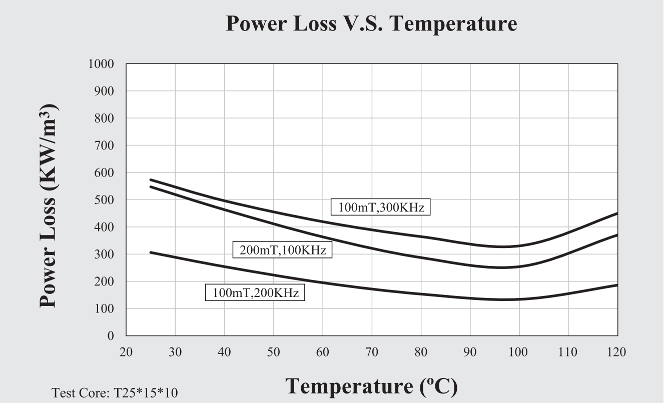
Test Core : T25*15*10



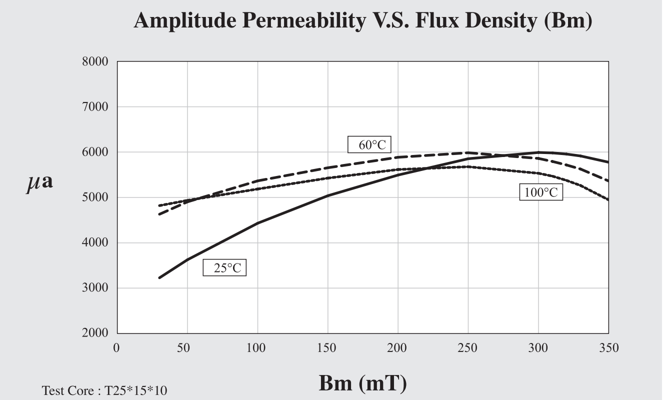
Test Core : T25*15*10



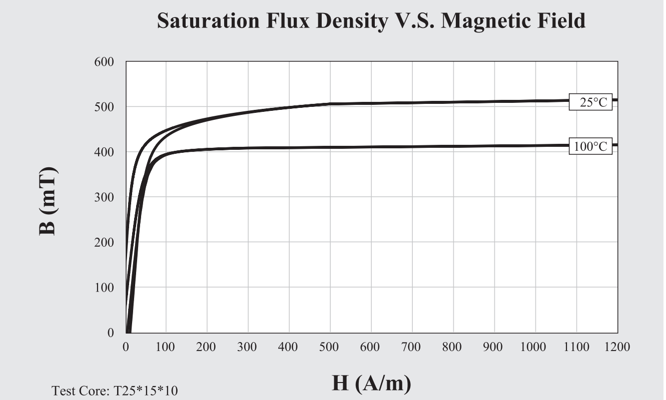
Test Core : T25*15*10



Test Core: T25*15*10



Test Core : T25*15*10

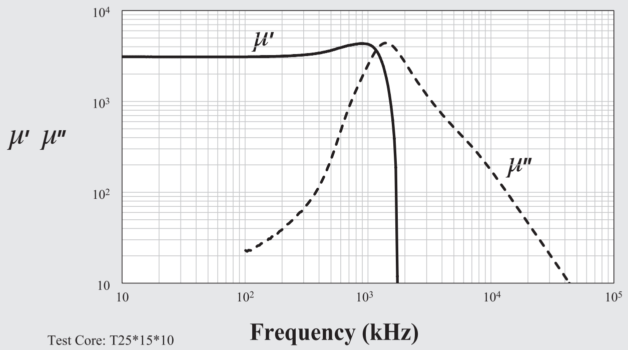


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			Wide Temperature Low Loss Material
			Freq.	Flux den.	Temp.	P45
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	3100 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 5000
					100°C	> 5000
Power Loss	Pv	KW/m³	100kHz	200mT	25°C	360
					100°C	260
			300kHz	100mT	25°C	400
					100°C	350
			500kHz	50mT	25°C	200
					100°C	200
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	530
					100°C	405
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	80
					100°C	50
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	8
					100°C	5
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.6
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 1
Curie Temperature	Tc	°C				≥ 215
Resistivity	ρ	Ωm				5.00
Density	d	g/cm³				4.90

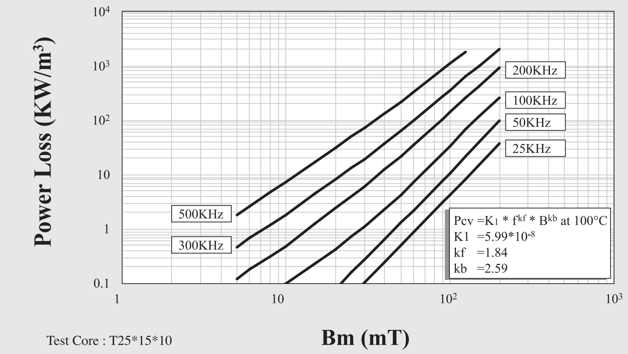
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Complex Permeability V.S. Frequency



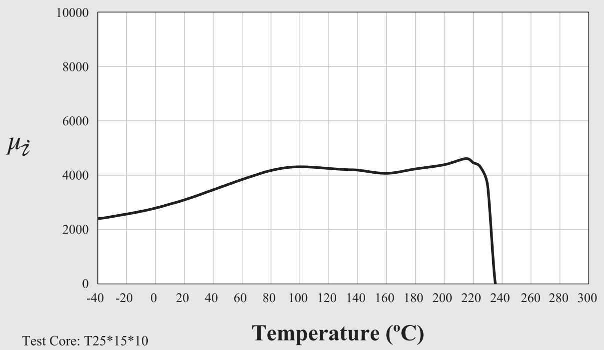
Test Core: T25*15*10

Power Loss V.S. Temperature/Flux Density/Frequency



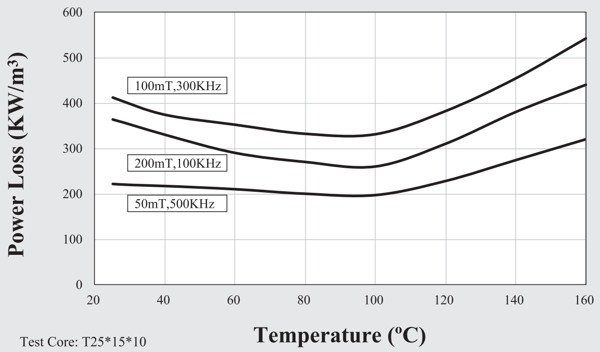
Test Core : T25*15*10

Initial Permeability V.S. Temperature



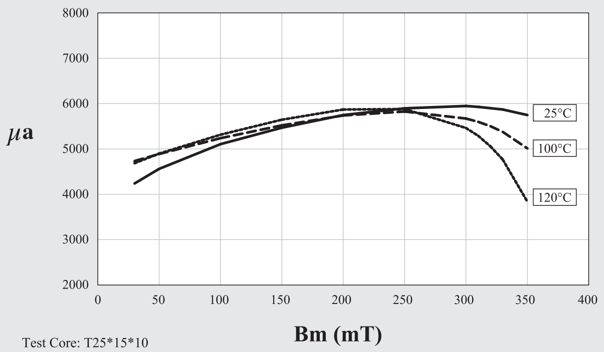
Test Core: T25*15*10

Power Loss V.S. Temperature



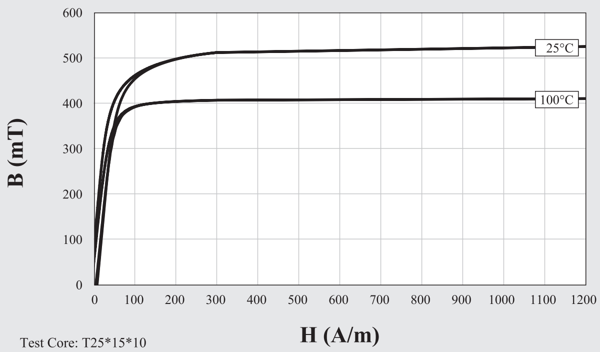
Test Core: T25*15*10

Amplitude Permeability V.S. Flux Density (Bm)



Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field

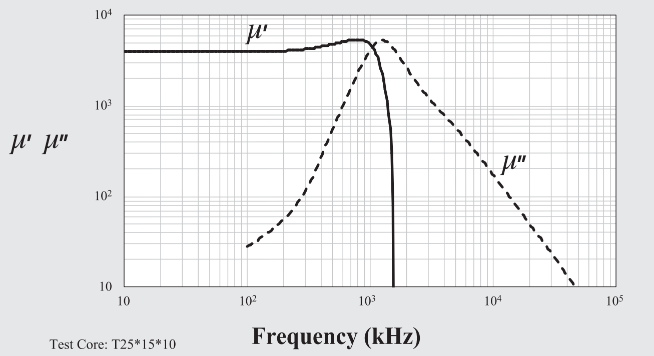


Test Core: T25*15*10

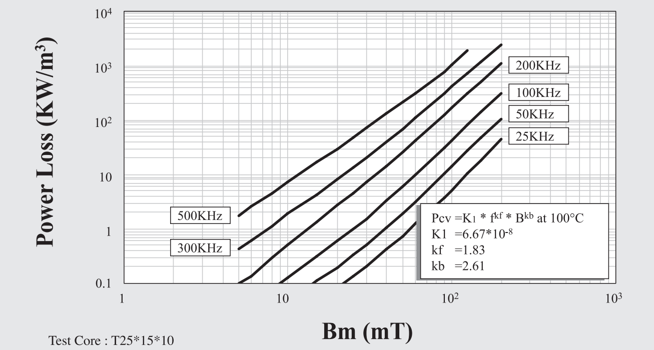
	Symbol	Unit	Measuring Conditions			Wide Temperature Low Loss Material
			Freq.	Flux den.	Temp.	P451
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	3800 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 5000
					100°C	> 5000
Power Loss	Pv	KW/m³	100kHz	200mT	25°C	270
					100°C	310
			300kHz	100mT	25°C	295
					100°C	385
			500kHz	50mT	25°C	165
					100°C	230
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	540
					100°C	420
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	70
					100°C	40
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	8
					100°C	6
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.6
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 1
Curie Temperature	Tc	°C				≥ 215
Resistivity	ρ	Ωm				5.00
Density	d	g/cm³				4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

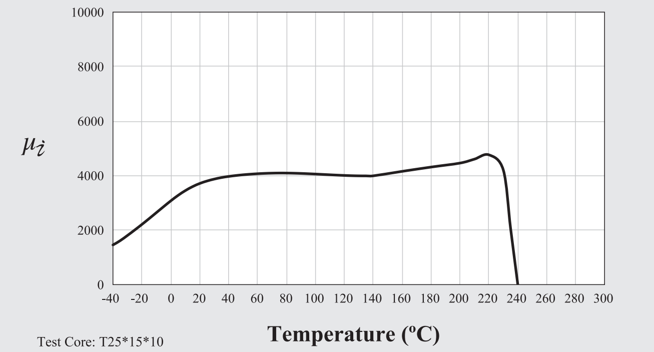
Complex Permeability V.S. Frequency



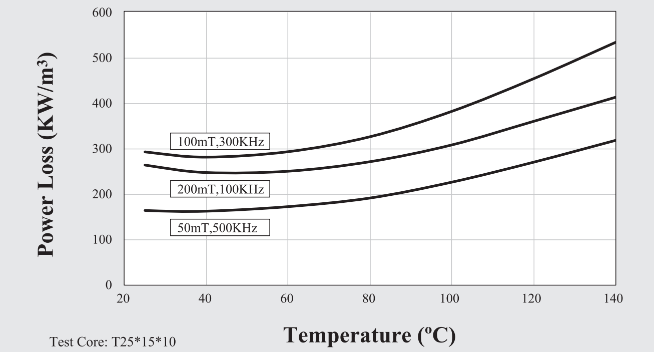
Power Loss V.S. Temperature/Flux Density/Frequency



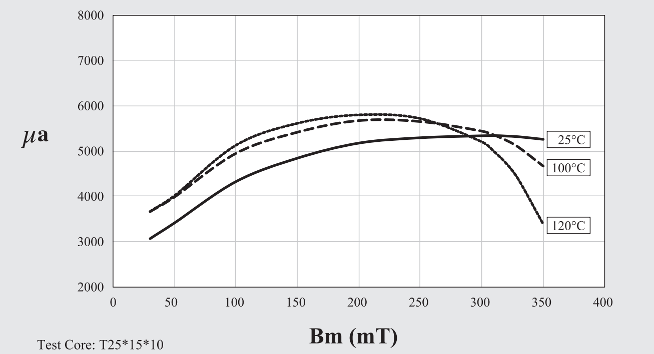
Initial Permeability V.S. Temperature



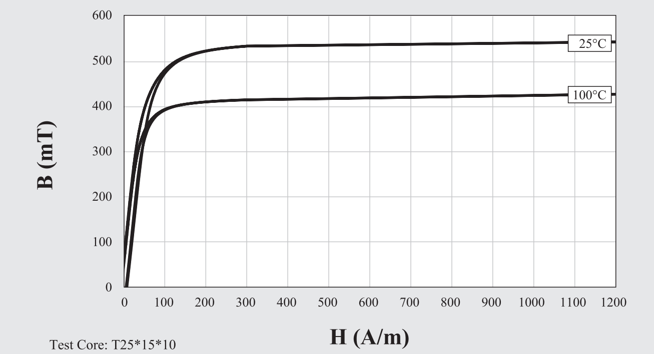
Power Loss V.S. Temperature



Amplitude Permeability V.S. Flux Density (Bm)



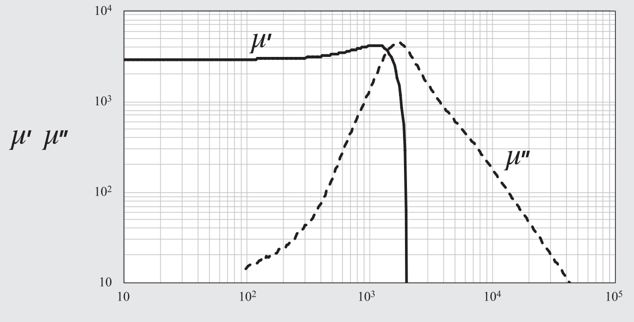
Saturation Flux Density V.S. Magnetic Field



	Symbol	Unit	Measuring Conditions			Wide Temperature Low Loss Material
			Freq.	Flux den.	Temp.	P452
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	3000 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 3900
					100°C	> 4450
Power Loss	Pv	KW/m³	100kHz	200mT	25°C	310
					100°C	380
			300kHz	100mT	25°C	300
					100°C	260
			500kHz	50mT	25°C	100
					100°C	120
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	520
					100°C	415
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	100
					100°C	80
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	13
					100°C	11
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.6
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 1
Curie Temperature	Tc	°C				≥ 215
Resistivity	ρ	Ωm				5.00
Density	d	g/cm³				4.85

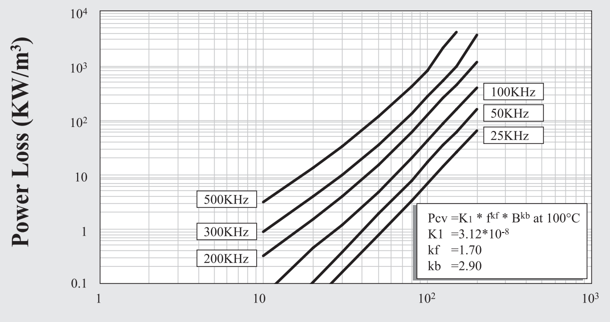
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Complex Permeability V.S. Frequency



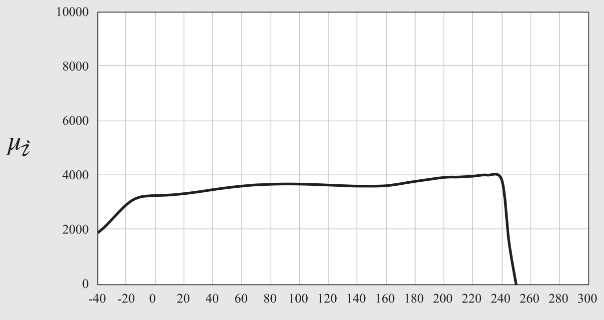
Test Core: T25*15*10

Power Loss V.S. Temperature/Flux Density/Frequency



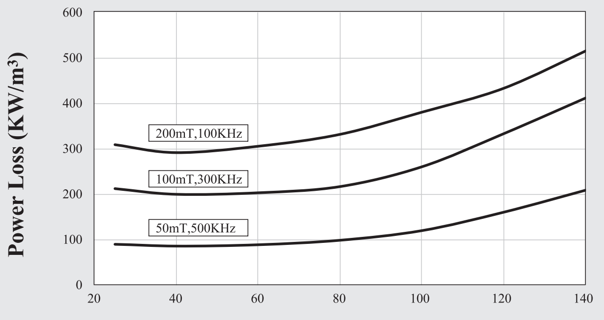
Test Core : T25*15*10

Initial Permeability V.S. Temperature



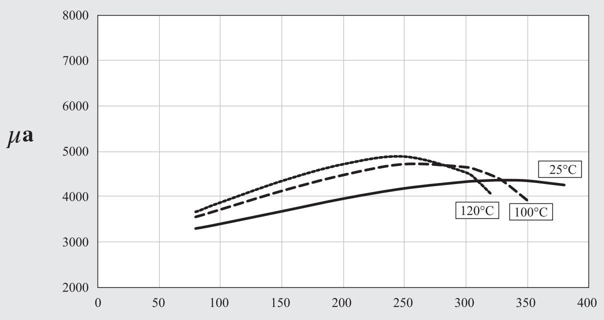
Test Core: T25*15*10

Power Loss V.S. Temperature



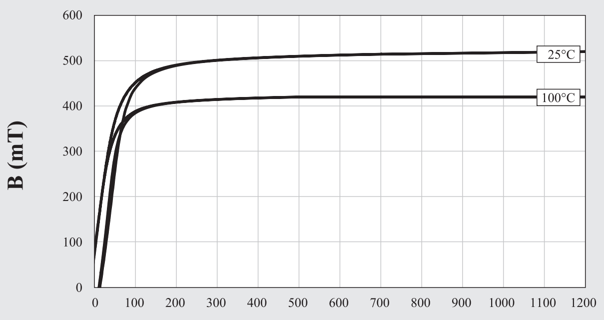
Test Core: T25*15*10

Amplitude Permeability V.S. Flux Density (Bm)



Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field

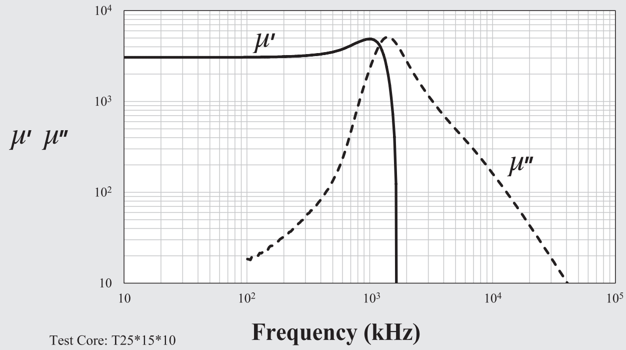


Test Core: T25*15*10

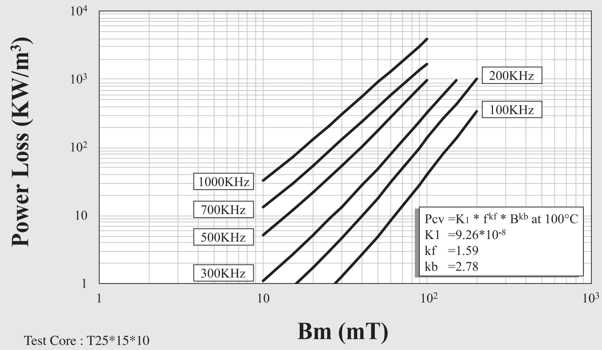
	Symbol	Unit	Measuring Conditions			Wide Temperature Low Loss Material
			Freq.	Flux den.	Temp.	P47
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	3000 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 4500
					100°C	> 4500
Power Loss	Pv	KW/m^3	100kHz	200mT	25°C	340
					100°C	350
			300kHz	100mT	25°C	350
					100°C	350
			500kHz	50mT	25°C	230
					100°C	230
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	520
					100°C	420
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	100
					100°C	70
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	11
					100°C	8
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.6
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 1
Curie Temperature	Tc	°C				≥ 220
Resistivity	ρ	Ωm				5.00
Density	d	g/cm^3				4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

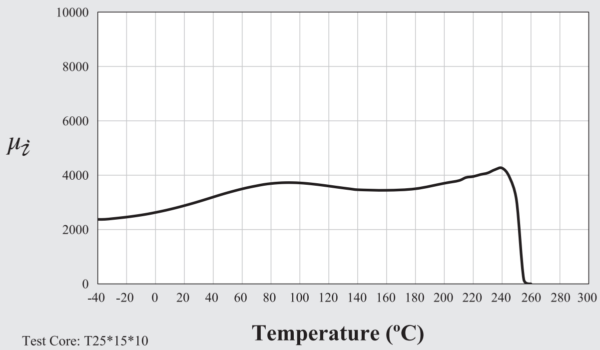
Complex Permeability V.S. Frequency



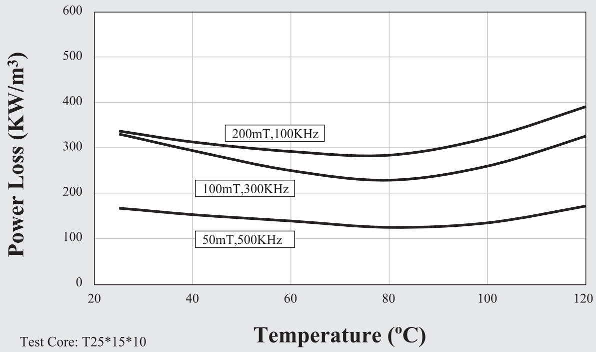
Power Loss V.S. Temperature/Flux Density/Frequency



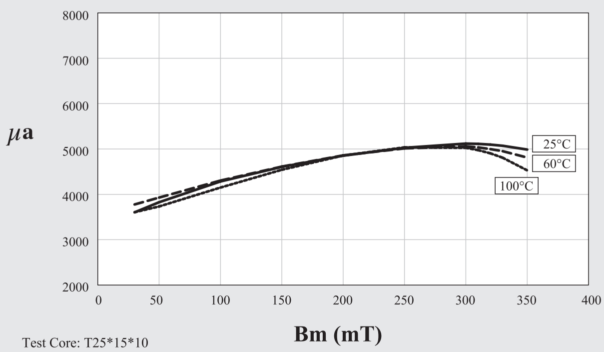
Initial Permeability V.S. Temperature



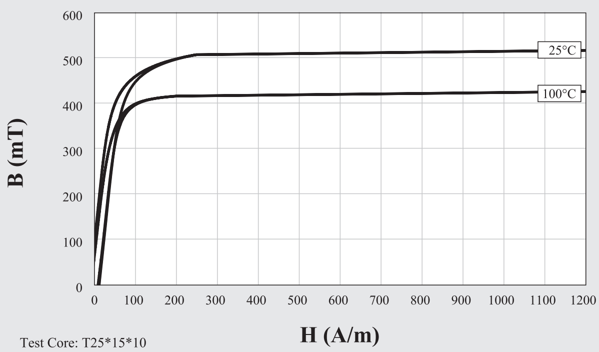
Power Loss V.S. Temperature



Amplitude Permeability V.S. Flux Density (Bm)



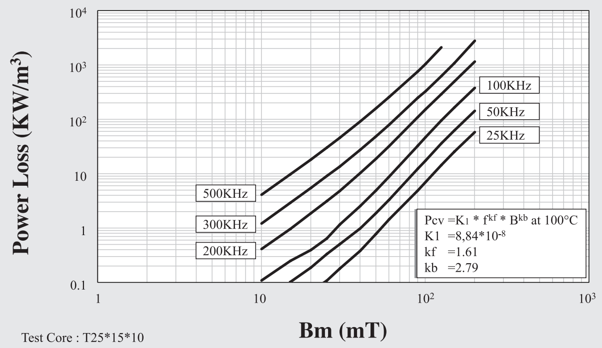
Saturation Flux Density V.S. Magnetic Field



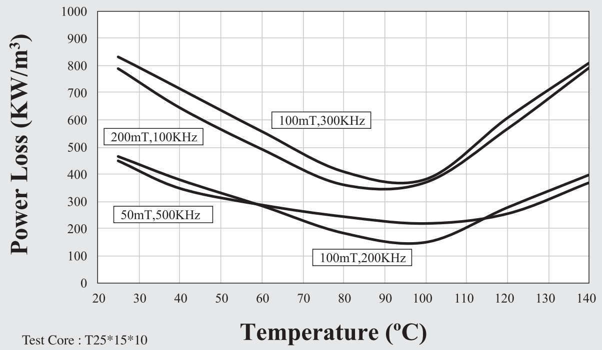
	Symbol	Unit	Measuring Conditions			High Bs Material
			Freq.	Flux den.	Temp.	P49
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1700 ± 25%
Power Loss	Pv	KW/m³	100kHz	200mT	25°C	800
					100°C	400
			500kHz	50mT	25°C	450
					100°C	220
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	540
					100°C	460
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	280
					100°C	50
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	15
					100°C	7
Curie Temperature	Tc	°C				≥ 280
Resistivity	ρ	Ωm				3.00
Density	d	g/cm³				4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

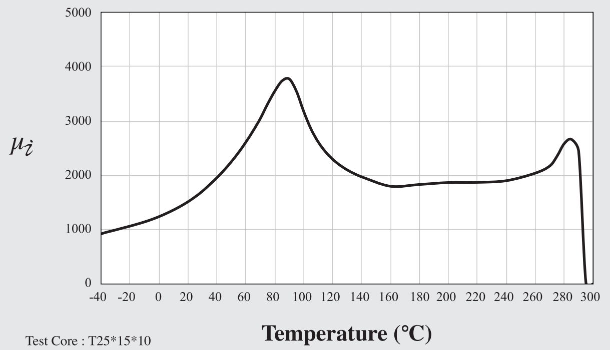
Power Loss V.S. Temperature/Flux Density/Frequency



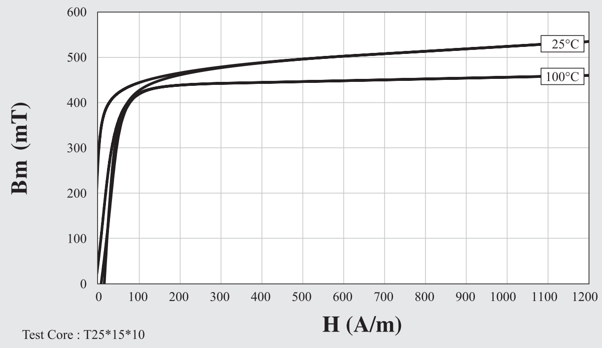
Power Loss V.S. Temperature



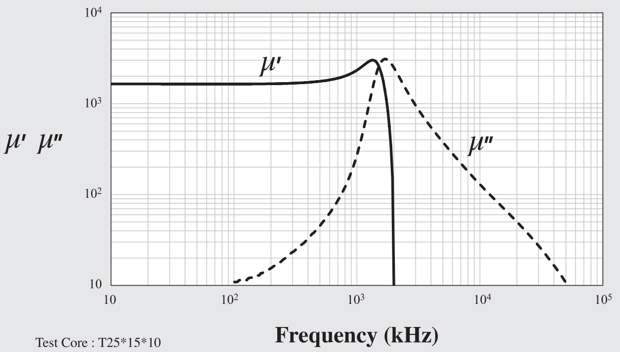
Initial Permeability V.S. Temperature



Saturation Flux Density V.S. Magnetic Field



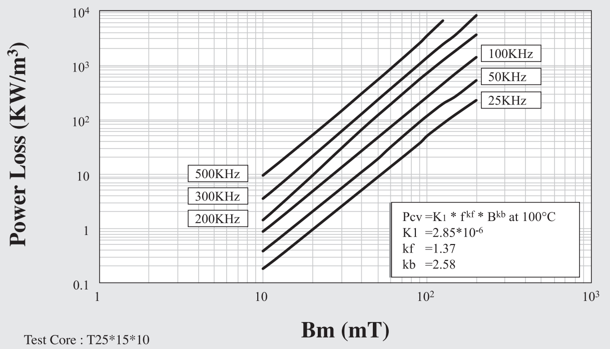
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			High Bs Material
			Freq.	Flux den.	Temp.	P491
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1500 ± 25%
Power Loss	Pv	KW/m³	25kHz	200mT	25°C	160
					100°C	240
			100kHz	200mT	25°C	900
					100°C	1390
			500kHz	50mT	25°C	250
					100°C	560
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	600
					100°C	500
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	140
					100°C	235
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	21
					100°C	20
Curie Temperature	Tc	°C				≥ 300
Resistivity	ρ	Ωm				5.00
Density	d	g/cm³				4.90

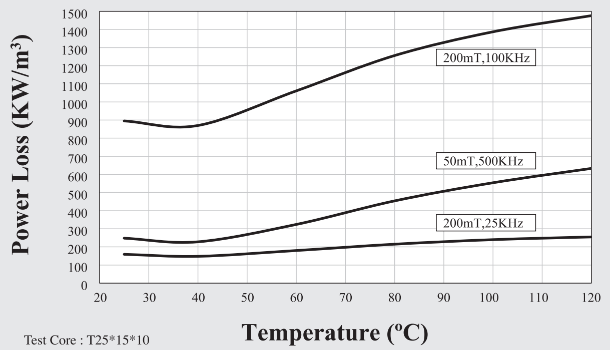
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Power Loss V.S. Temperature/Flux Density/Frequency



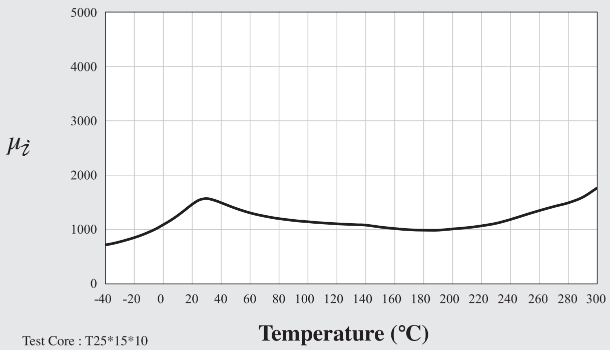
Test Core : T25*15*10

Power Loss V.S. Temperature



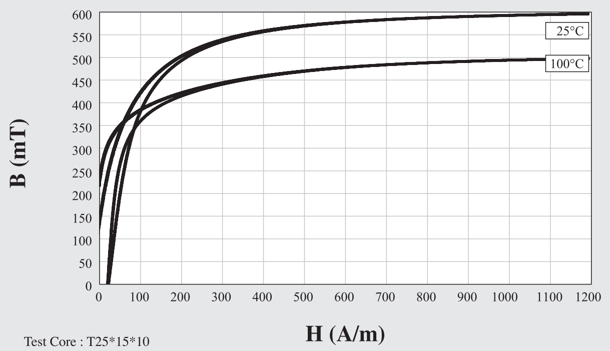
Test Core : T25*15*10

Initial Permeability V.S. Temperature



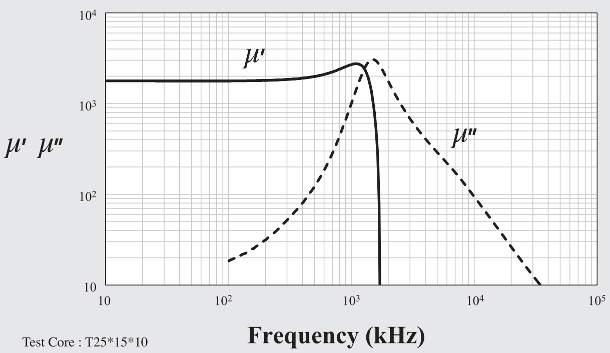
Test Core : T25*15*10

Saturation Flux Density V.S. Magnetic Field



Test Core : T25*15*10

Complex Permeability V.S. Frequency

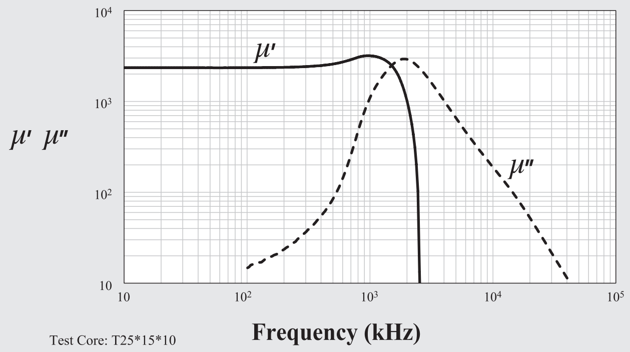


Test Core : T25*15*10

	Symbol	Unit	Measuring Conditions			High Frequency Low Loss Material
			Freq.	Flux den.	Temp.	P5
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2000 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 4000
					100°C	> 4000
Power Loss	Pv	KW/m³	300kHz	100mT	25°C	600
					100°C	350
			500kHz	50mT	25°C	220
					100°C	250
			700kHz	50mT	25°C	600
					100°C	550
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	470
					100°C	350
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	135
					100°C	70
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	17
					100°C	10
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 220
Resistivity	ρ	Ωm				6.40
Density	d	g/cm³				4.70

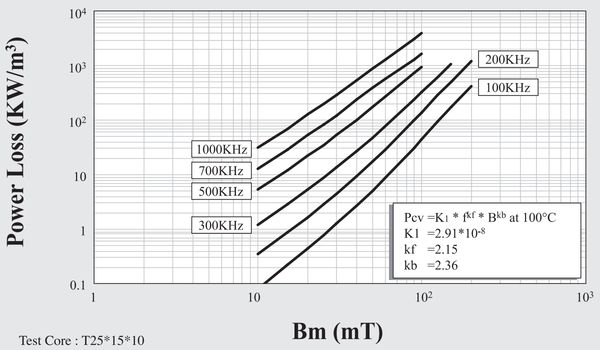
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Complex Permeability V.S. Frequency



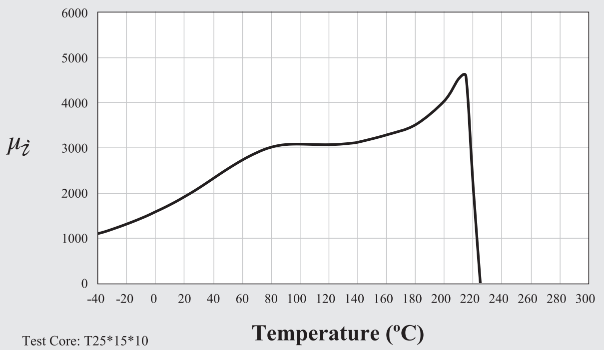
Test Core: T25*15*10

Power Loss V.S. Temperature/Flux Density/Frequency



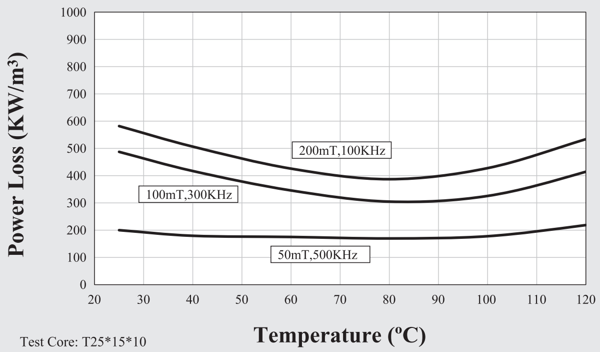
Test Core : T25*15*10

Initial Permeability V.S. Temperature



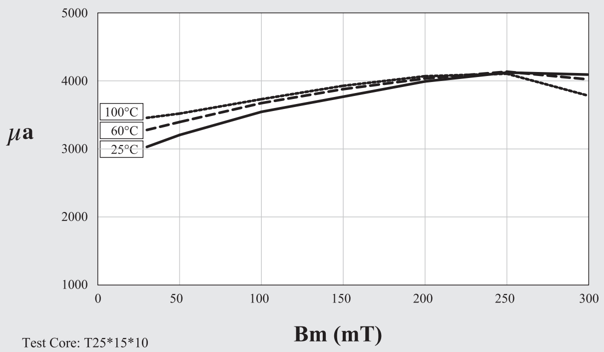
Test Core: T25*15*10

Power Loss V.S. Temperature



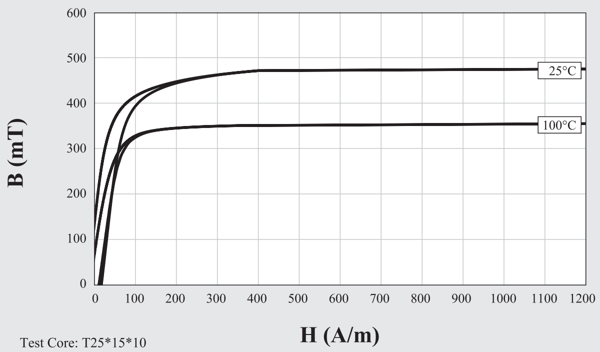
Test Core: T25*15*10

Amplitude Permeability V.S. Flux Density (Bm)



Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field

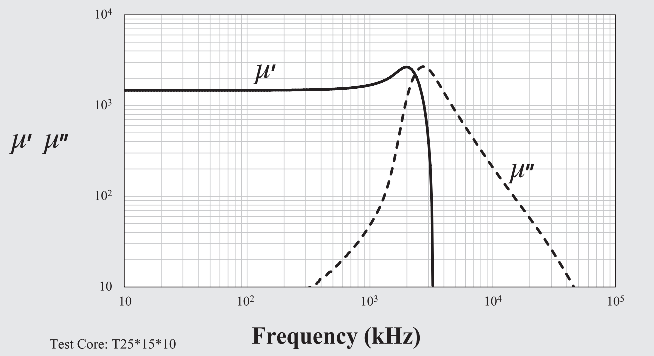


Test Core: T25*15*10

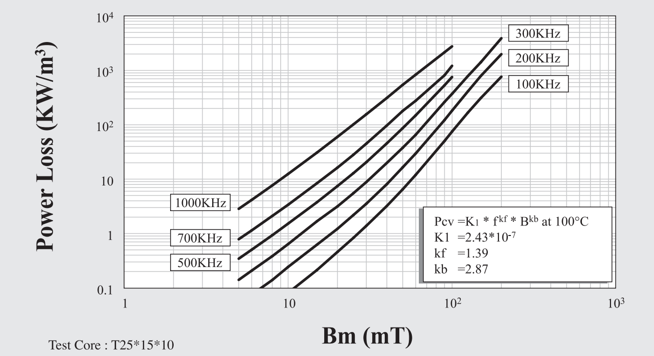
	Symbol	Unit	Measuring Conditions			High Frequency Low Loss Material
			Freq.	Flux den.	Temp.	P51
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1500 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 2500
					100°C	> 2500
Power Loss	Pv	KW/m³	300kHz	100mT	25°C	410
					100°C	370
			500kHz	50mT	25°C	200
					100°C	100
			700kHz	50mT	25°C	300
					100°C	250
			1000kHz	50mT	25°C	600
					100°C	600
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	490
					100°C	400
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	215
					100°C	125
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	35
					100°C	27
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 250
Resistivity	ρ	Ωm				12.00
Density	d	g/cm³				4.85

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

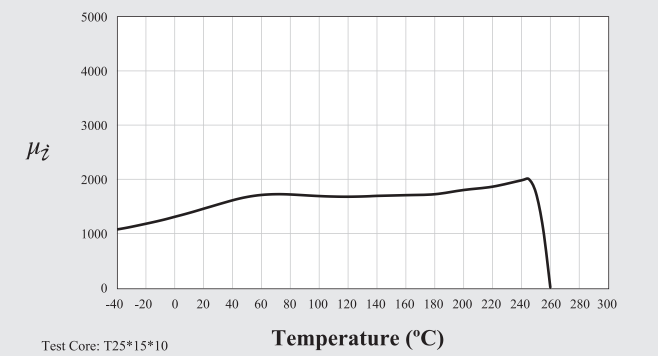
Complex Permeability V.S. Frequency



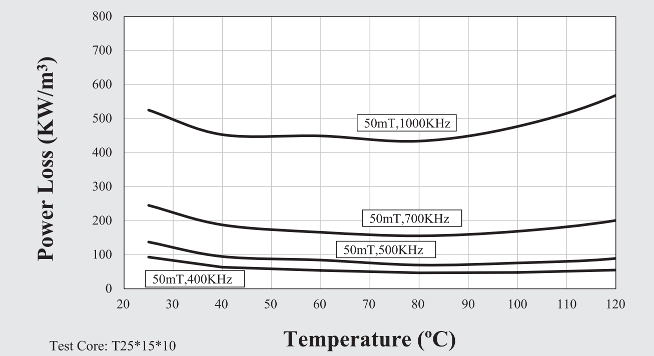
Power Loss V.S. Temperature/Flux Density/Frequency



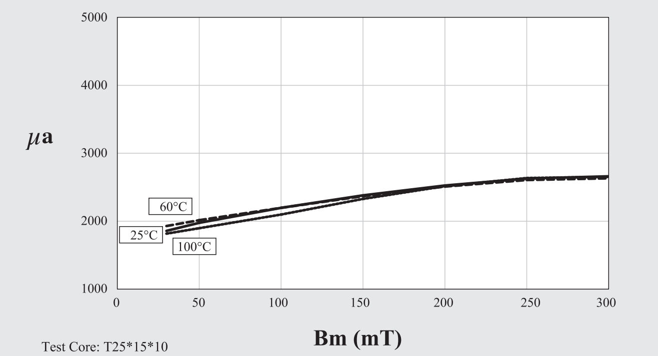
Initial Permeability V.S. Temperature



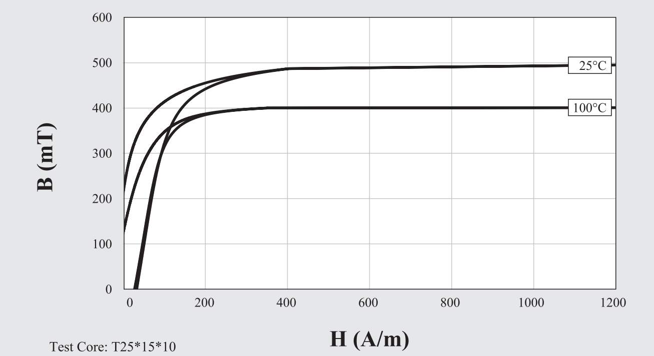
Power Loss V.S. Temperature



Amplitude Permeability V.S. Flux Density (Bm)



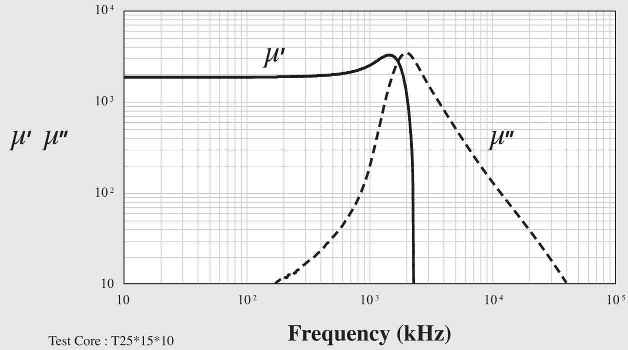
Saturation Flux Density V.S. Magnetic Field



	Symbol	Unit	Measuring Conditions			High Frequency Low Loss Material
			Freq.	Flux den.	Temp.	P52
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2000 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 4000
					100°C	> 4000
Power Loss	Pv	KW/m³	300kHz	100mT	25°C	510
					100°C	450
			500kHz	50mT	25°C	150
					100°C	140
			700kHz	50mT	25°C	300
					100°C	350
			1000kHz	50mT	25°C	750
					100°C	1000
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	500
					100°C	400
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	140
					100°C	110
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	21
					100°C	18
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 250
Resistivity	ρ	Ωm				6.50
Density	d	g/cm³				4.85

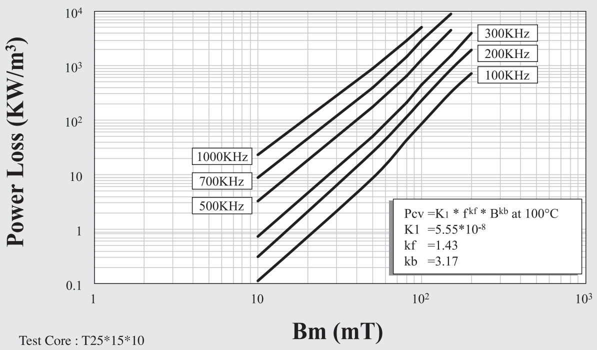
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Complex Permeability V.S. Frequency



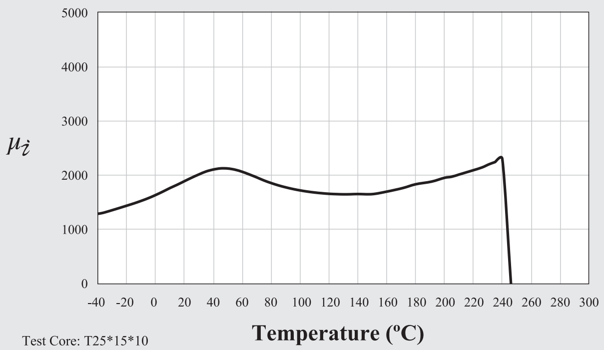
Test Core : T25*15*10

Power Loss V.S. Temperature/Flux Density/Frequency



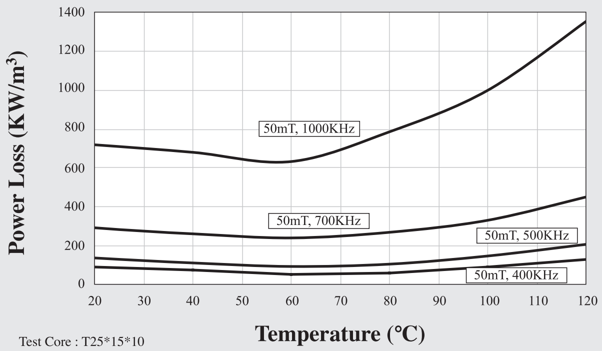
Test Core : T25*15*10

Initial Permeability V.S. Temperature



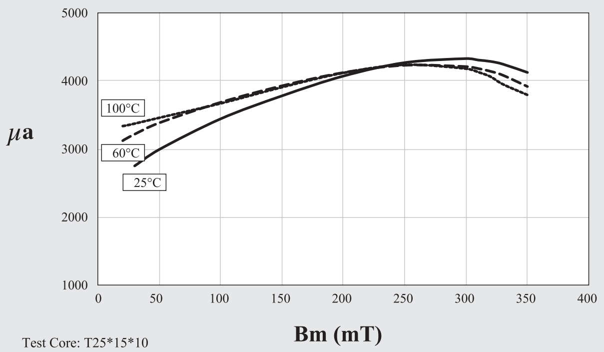
Test Core: T25*15*10

Power Loss V.S. Temperature



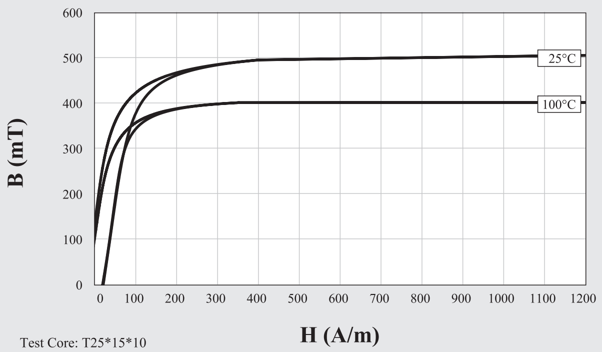
Test Core : T25*15*10

Amplitude Permeability V.S. Flux Density (Bm)



Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field

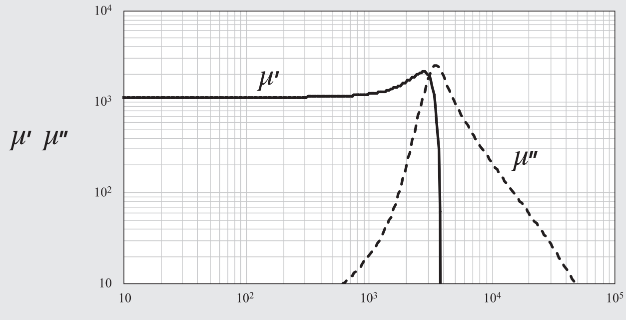


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions Freq.	Flux den.	Temp.	High Frequency Low Loss Material P53
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1200 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 1900
					100°C	> 2000
Power Loss	Pv	KW/m³	300kHz	100mT	25°C	350
					100°C	310
			500kHz	50mT	25°C	80
					100°C	60
			500kHz	100mT	25°C	650
					100°C	650
			1000kHz	50mT	25°C	300
					100°C	300
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	515
					100°C	420
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	180
					100°C	120
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	38
					100°C	33
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 280
Resistivity	ρ	Ωm				10.00
Density	d	g/cm³				4.80

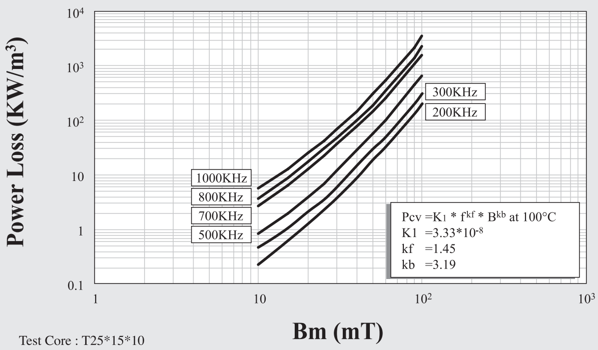
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Complex Permeability V.S. Frequency



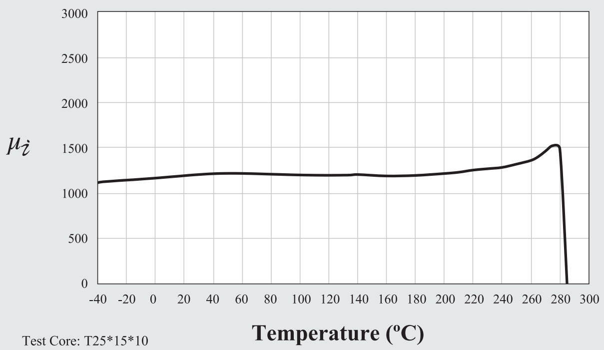
Test Core: T25*15*10

Power Loss V.S. Temperature/Flux Density/Frequency



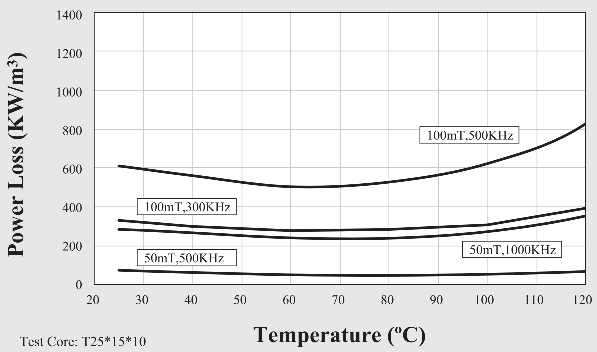
Test Core : T25*15*10

Initial Permeability V.S. Temperature



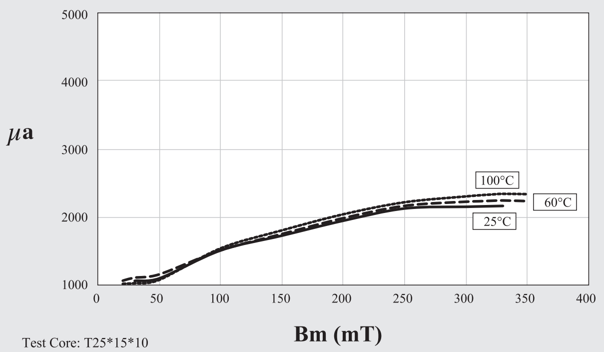
Test Core: T25*15*10

Power Loss V.S. Temperature



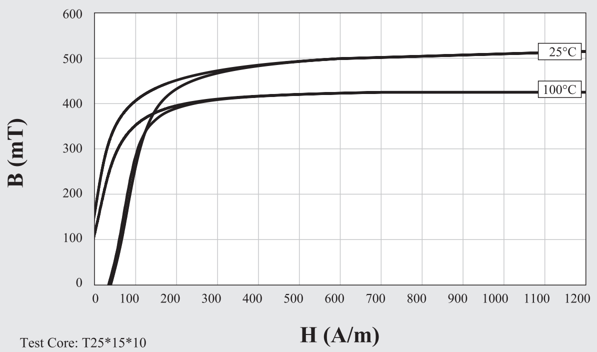
Test Core: T25*15*10

Amplitude Permeability V.S. Flux Density (Bm)



Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field

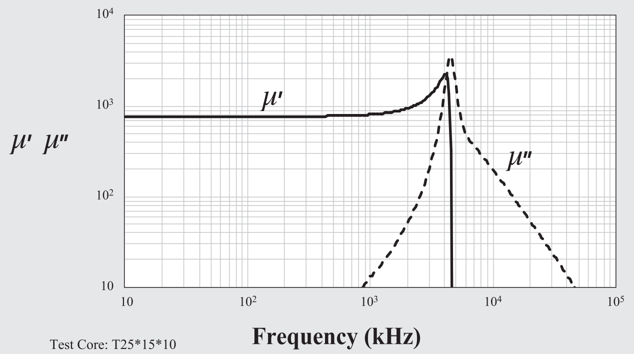


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			High Frequency Low Loss Material
			Freq.	Flux den.	Temp.	P61
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	900 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 1700
					100°C	> 1800
Power Loss	Pv	KW/m³	1MHz	50mT	25°C	250
					100°C	110
			3MHz	10mT	25°C	50
					100°C	50
			3MHz	30mT	25°C	450
					100°C	370
			5MHz	9mT	25°C	150
					100°C	170
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	515
					100°C	430
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	200
					100°C	135
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	50
					100°C	40
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 280
Resistivity	ρ	Ωm				10.00
Density	d	g/cm³				4.80

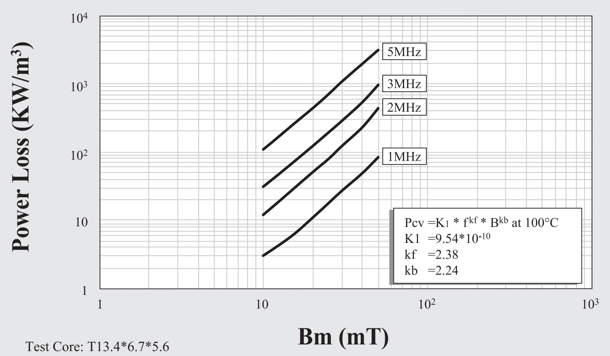
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Complex Permeability V.S. Frequency



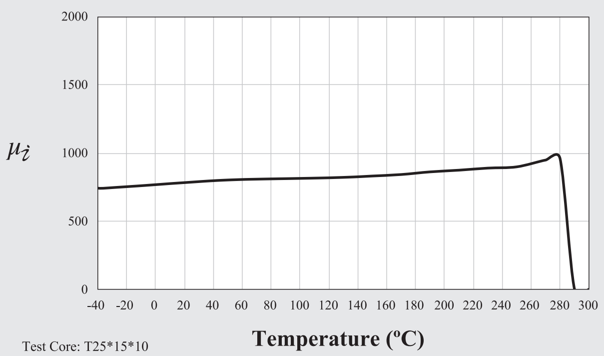
Test Core: T25*15*10

Power Loss V.S. Temperature/Flux Density/Frequency



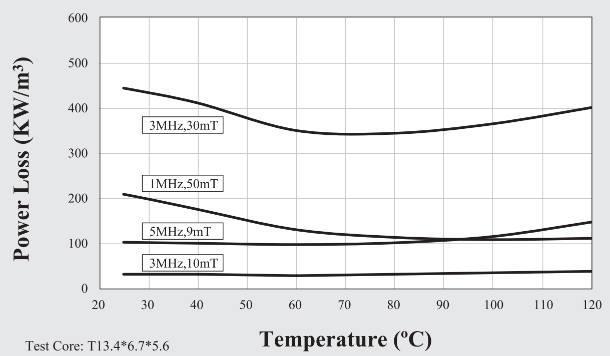
Test Core: T13.4*6.7*5.6

Initial Permeability V.S. Temperature



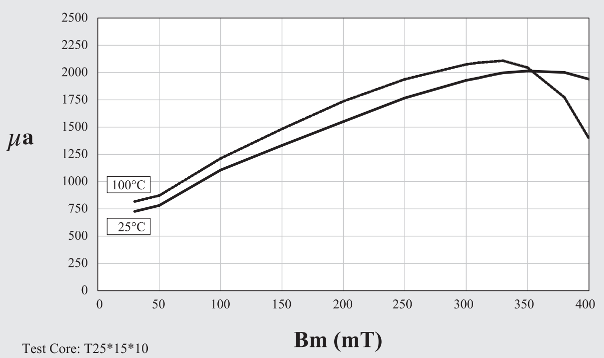
Test Core: T25*15*10

Power Loss V.S. Temperature



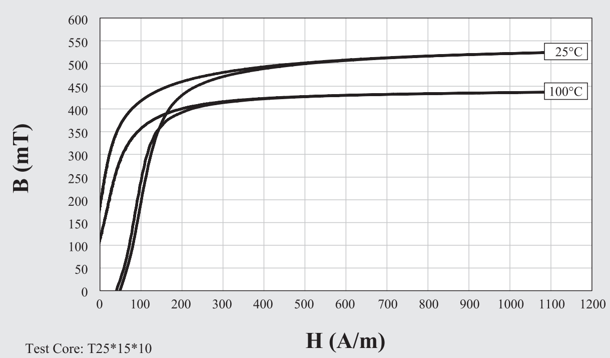
Test Core: T13.4*6.7*5.6

Amplitude Permeability V.S. Flux Density (Bm)



Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field

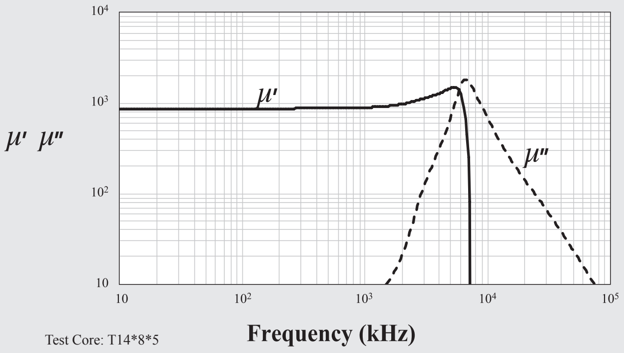


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			High Frequency Low Loss Material
			Freq.	Flux den.	Temp.	P63
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	900 ± 25%
Amplitude Permeability	μ_a		25kHz	200mT	25°C	> 1700
					100°C	> 1800
Power Loss	Pv	KW/m³	1MHz	50mT	25°C	80
					100°C	80
			2MHz	80mT	25°C	1600
					100°C	2000
			3MHz	10mT	25°C	20
					100°C	20
			3MHz	30mT	25°C	200
					100°C	250
			5MHz	9mT	25°C	80
					100°C	80
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	540
					100°C	450
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	205
					100°C	115
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	50
					100°C	40
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 280
Resistivity	ρ	Ωm				10.00
Density	d	g/cm³				4.80

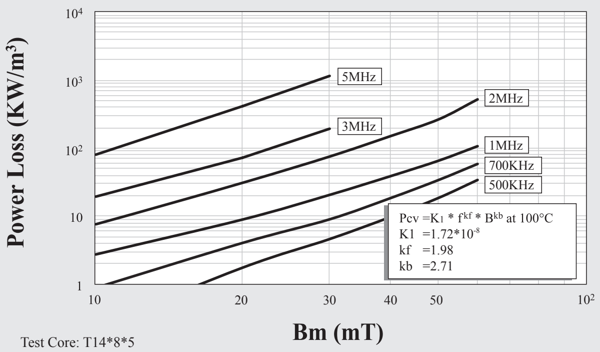
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Complex Permeability V.S. Frequency



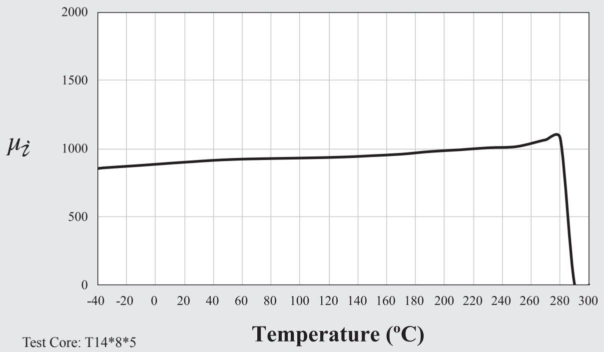
Test Core: T14*8*5

Power Loss V.S. Temperature/Flux Density/Frequency



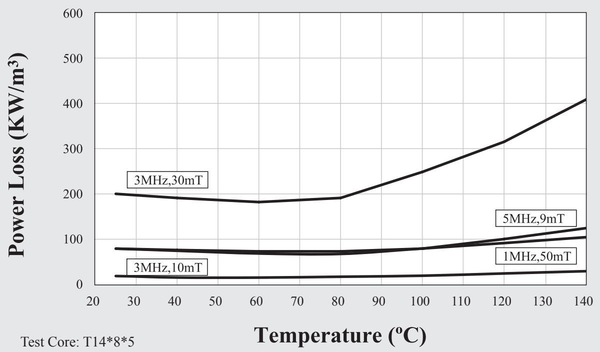
Test Core: T14*8*5

Initial Permeability V.S. Temperature



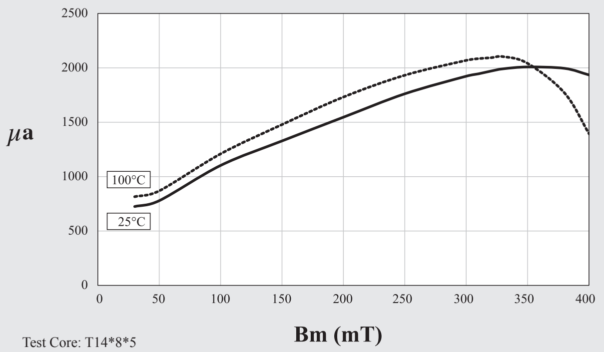
Test Core: T14*8*5

Power Loss V.S. Temperature



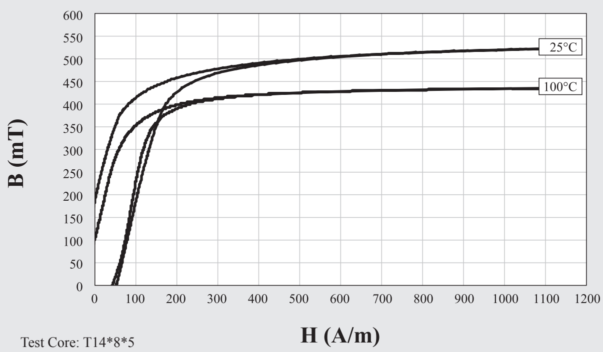
Test Core: T14*8*5

Amplitude Permeability V.S. Flux Density (Bm)



Test Core: T14*8*5

Saturation Flux Density V.S. Magnetic Field

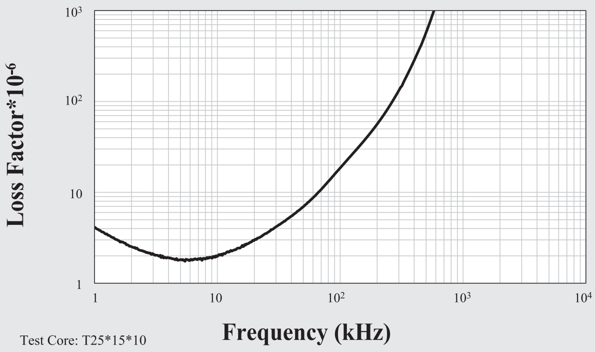


Test Core: T14*8*5

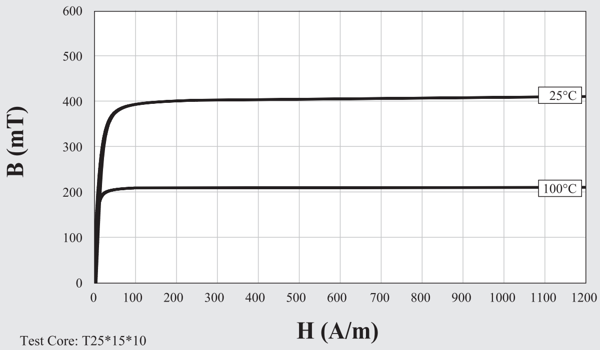
	Symbol	Unit	Measuring Conditions			Conventional High μ For CM Chokes Material
			Freq.	Flux den.	Temp.	A10
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	10000 ± 30%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 10
			100kHz		25°C	< 60
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	410
					100°C	210
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	140
					100°C	110
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	0 ~ 1.5
					20 ~ 70°C	-0.5 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 130
Resistivity	ρ	Ωm				0.15
Density	d	g/cm³				4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

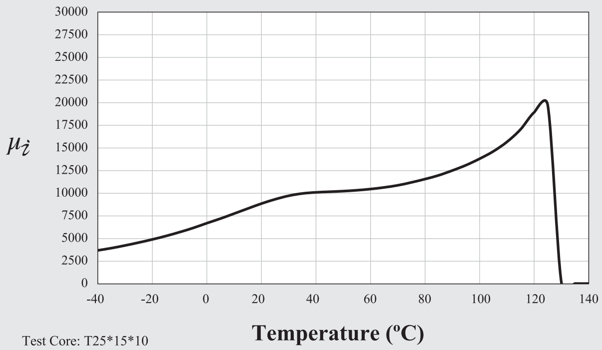
Loss Factor V.S. Frequency



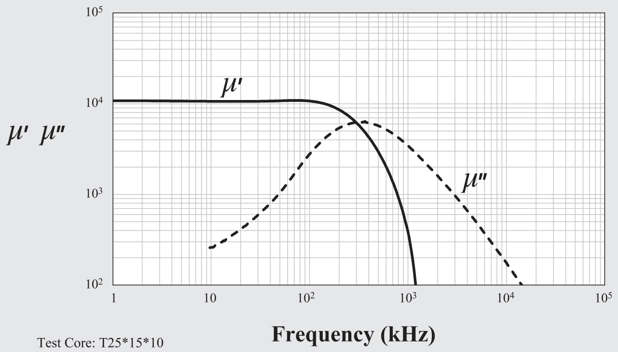
Saturation Flux Density V.S. Magnetic Field



Initial Permeability V.S. Temperature



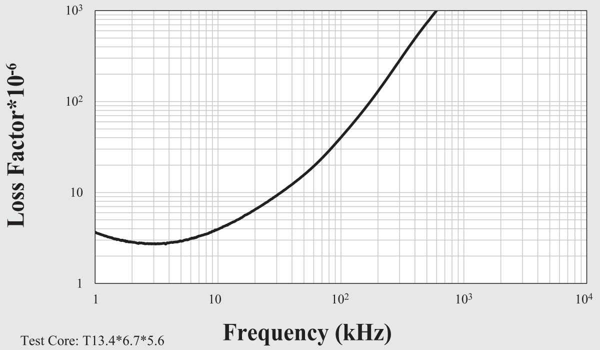
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			Conventional High μ For CM Chokes Material
			Freq.	Flux den.	Temp.	A121
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	12000 ± 30%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 10
			100kHz		25°C	< 60
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	380
					100°C	180
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	130
					100°C	110
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	0 ~ 1.5
					20 ~ 70°C	-0.5 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 110
Resistivity	ρ	Ωm				0.12
Density	d	g/cm³				4.90

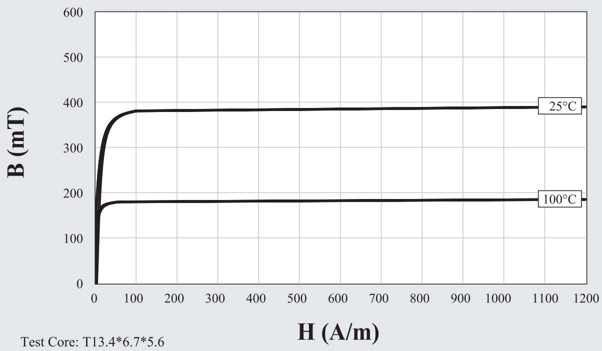
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



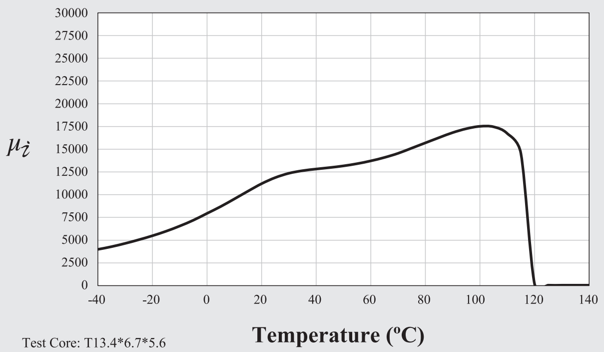
Test Core: T13.4*6.7*5.6

Saturation Flux Density V.S. Magnetic Field



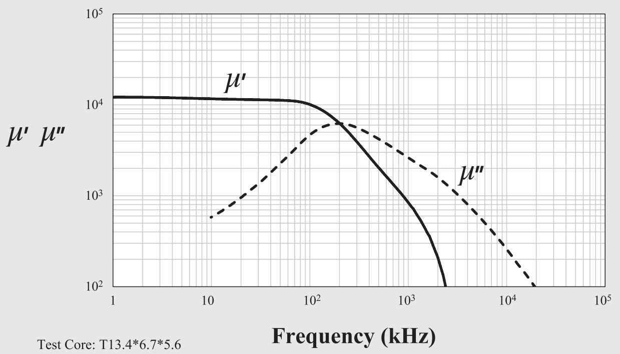
Test Core: T13.4*6.7*5.6

Initial Permeability V.S. Temperature



Test Core: T13.4*6.7*5.6

Complex Permeability V.S. Frequency

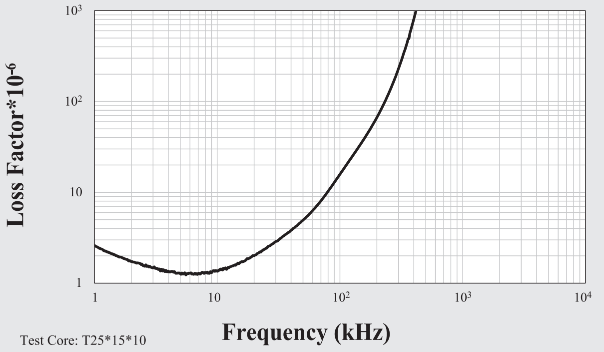


Test Core: T13.4*6.7*5.6

	Symbol	Unit	Measuring Conditions			Conventional High μ For CM Chokes Material
			Freq.	Flux den.	Temp.	A13
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	12000 ± 30%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 8
			100kHz		25°C	< 40
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	400
					100°C	200
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	120
					100°C	65
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	1 ~ 3
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 125
Resistivity	ρ	Ωm				0.15
Density	d	g/cm³				4.90

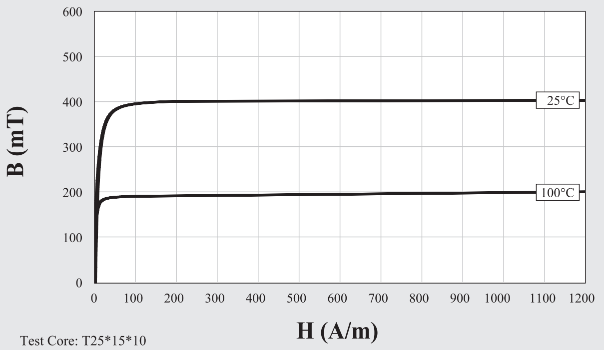
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



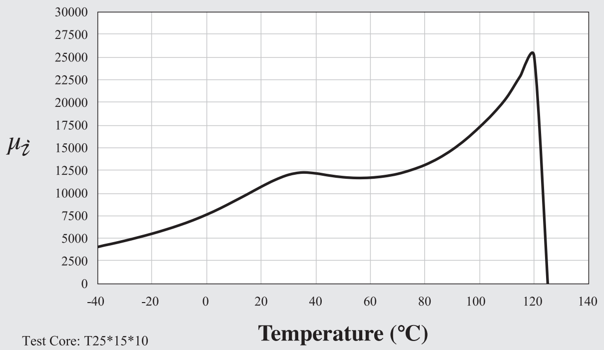
Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field



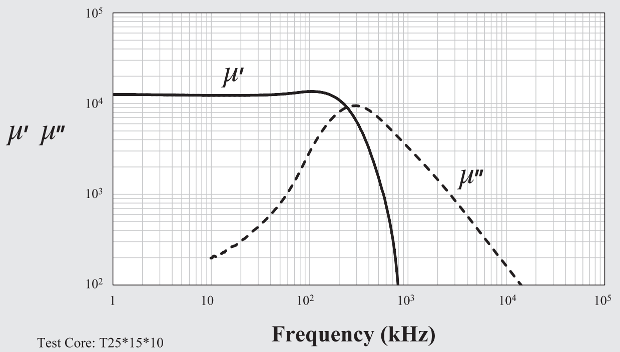
Test Core: T25*15*10

Initial Permeability V.S. Temperature



Test Core: T25*15*10

Complex Permeability V.S. Frequency

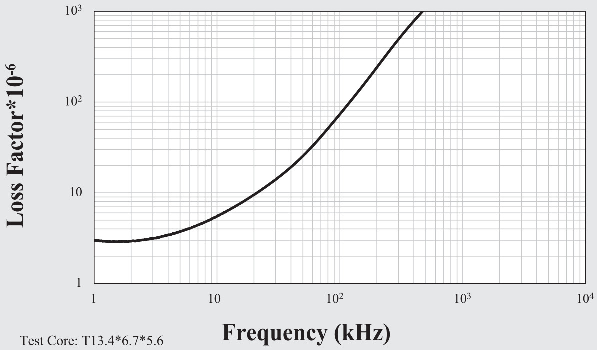


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			Conventional High μ For CM Chokes Material
			Freq.	Flux den.	Temp.	A151
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	15000 ± 30%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 10
			100kHz		25°C	< 110
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	400
					100°C	170
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	220
					100°C	100
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 1
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 110
Resistivity	ρ	Ωm				0.10
Density	d	g/cm³				5.00

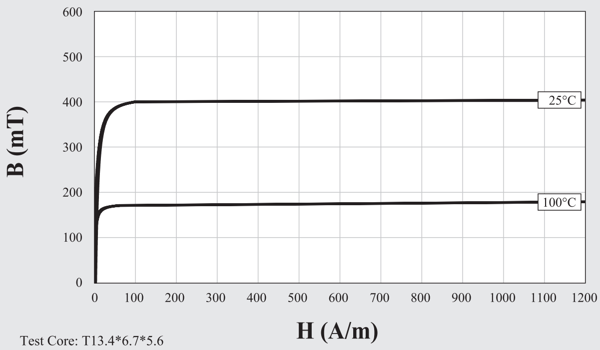
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



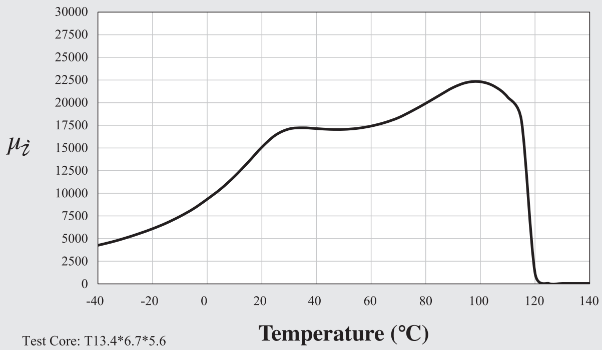
Test Core: T13.4*6.7*5.6

Saturation Flux Density V.S. Magnetic Field



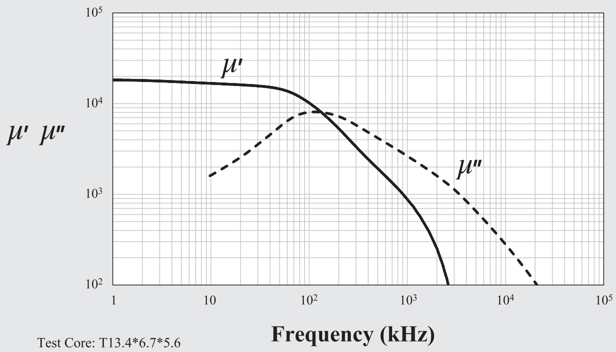
Test Core: T13.4*6.7*5.6

Initial Permeability V.S. Temperature



Test Core: T13.4*6.7*5.6

Complex Permeability V.S. Frequency

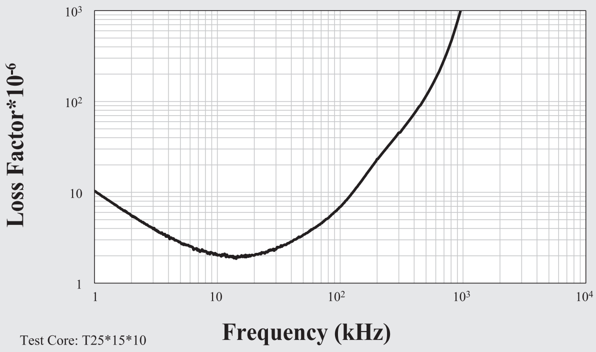


Test Core: T13.4*6.7*5.6

	Symbol	Unit	Measuring Conditions			Wide Band Filter Material
			Freq.	Flux den.	Temp.	A05
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	5000 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 4
			100kHz		25°C	< 15
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	440
					100°C	300
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	80
					100°C	90
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	0 ~ 2
					20 ~ 70°C	0 ~ 2
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.8
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 3
Curie Temperature	Tc	°C				≥ 140
Resistivity	ρ	Ωm				0.20
Density	d	g/cm³				4.85

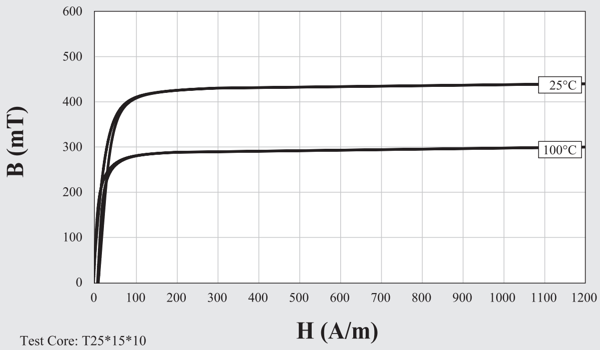
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



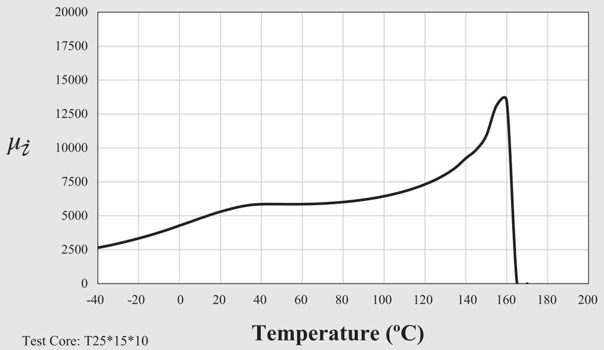
Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field



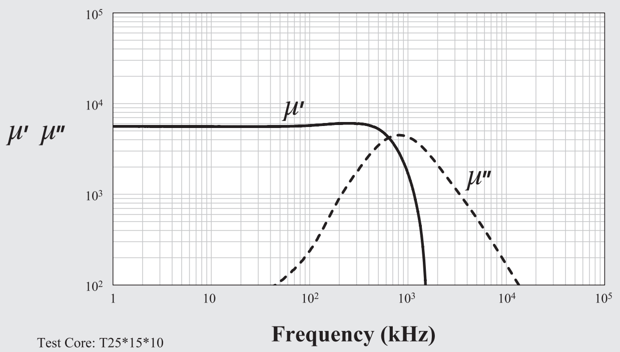
Test Core: T25*15*10

Initial Permeability V.S. Temperature



Test Core: T25*15*10

Complex Permeability V.S. Frequency

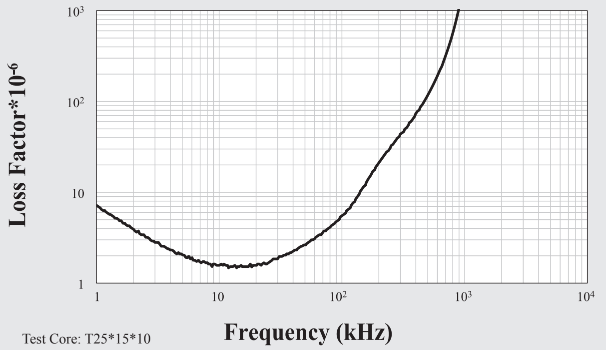


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			Wide Band Filter Material
			Freq.	Flux den.	Temp.	A06
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	6000 ± 25%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 4
			100kHz		25°C	< 15
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	420
					100°C	280
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	70
					100°C	80
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	0 ~ 2.5
					20 ~ 70°C	0 ~ 2.5
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.8
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 3
Curie Temperature	Tc	°C				≥ 140
Resistivity	ρ	Ωm				0.20
Density	d	g/cm³				4.85

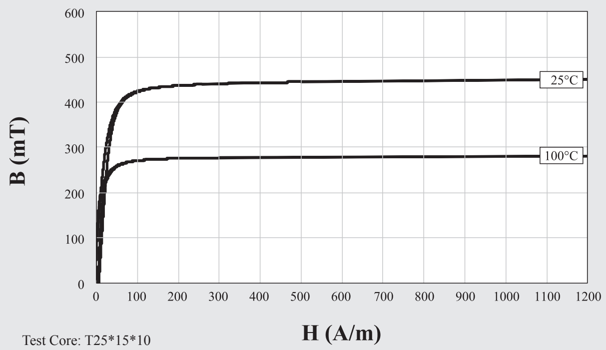
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



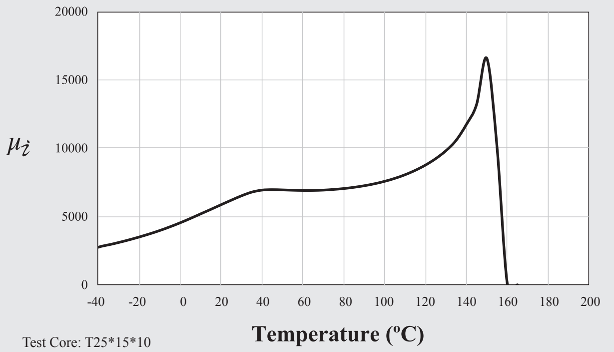
Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field



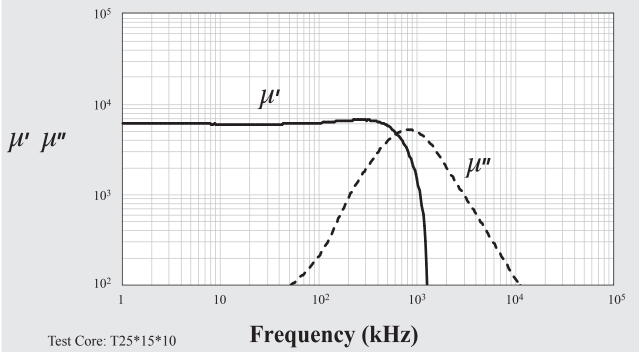
Test Core: T25*15*10

Initial Permeability V.S. Temperature



Test Core: T25*15*10

Complex Permeability V.S. Frequency

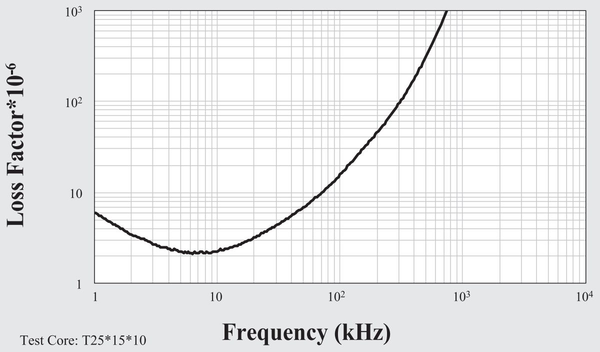


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			Wide Band Filter Material
			Freq.	Flux den.	Temp.	A07
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	7000 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 8
			100kHz		25°C	< 30
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	400
					100°C	200
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	150
					100°C	110
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 1
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1.2
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 130
Resistivity	ρ	Ωm				0.35
Density	d	g/cm³				4.90

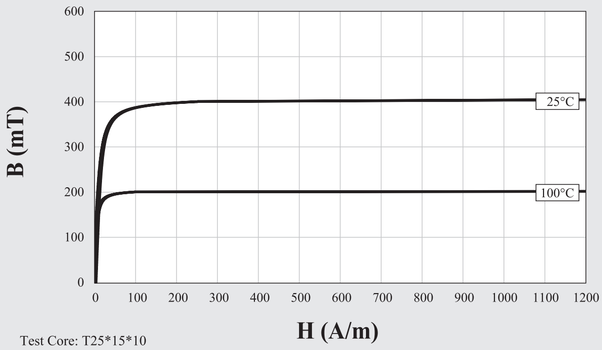
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



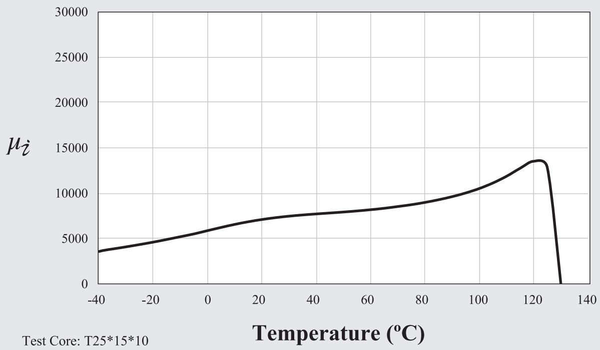
Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field



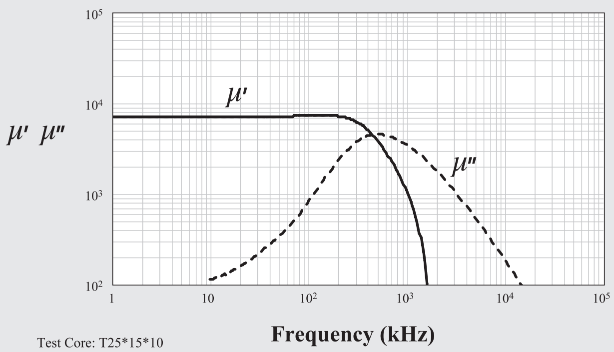
Test Core: T25*15*10

Initial Permeability V.S. Temperature



Test Core: T25*15*10

Complex Permeability V.S. Frequency

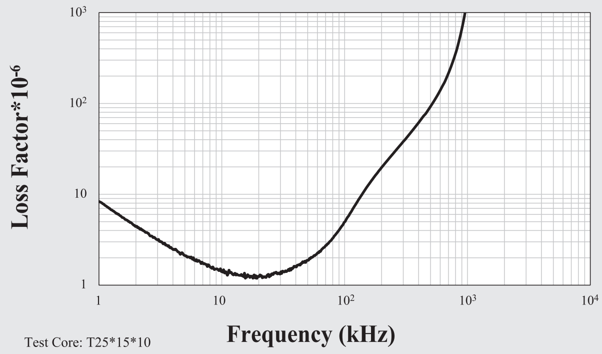


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			Wide Band Filter Material
			Freq.	Flux den.	Temp.	A071
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	7000 ± 25%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 8
			100kHz		25°C	< 30
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	440
					100°C	280
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	80
					100°C	60
Temperature Factor of	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 1
Permeability					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1.2
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 145
Resistivity	ρ	Ωm				0.35
Density	d	g/cm³				4.90

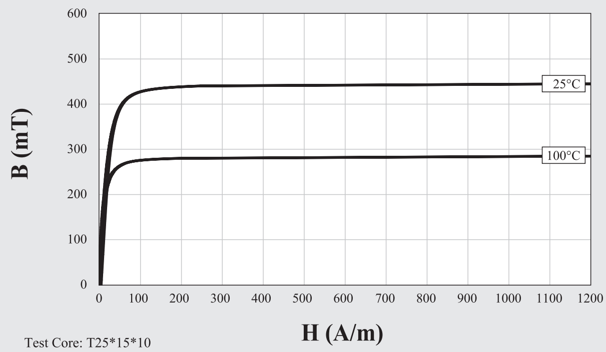
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



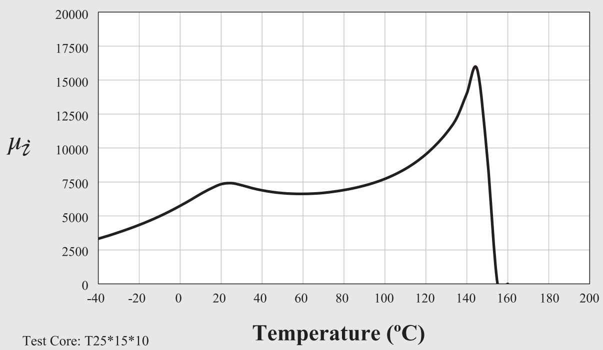
Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field



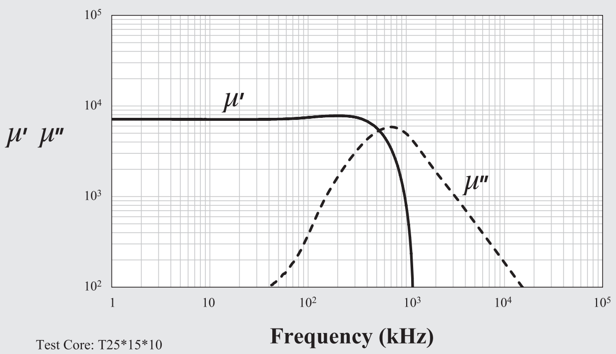
Test Core: T25*15*10

Initial Permeability V.S. Temperature



Test Core: T25*15*10

Complex Permeability V.S. Frequency



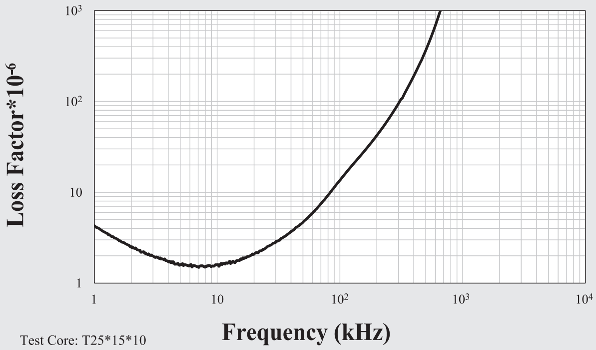
Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			Wide Band Filter Material
			Freq.	Flux den.	Temp.	A102
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	10000 ± 30%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 10
			100kHz		25°C	< 60
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	380
					100°C	180
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	95
					100°C	75
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 1
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 120
Resistivity	ρ	Ωm				0.15
Density	d	g/cm³				4.90

Remark: Best impedance, and permeability v. s. frequency performance for 10,000μ_i materials.

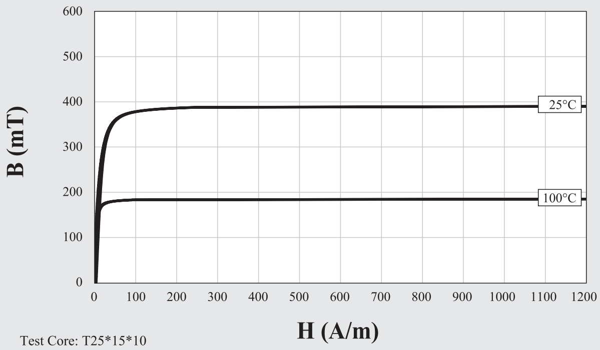
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



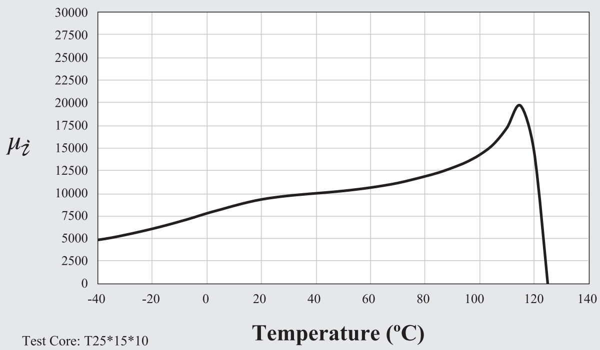
Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field



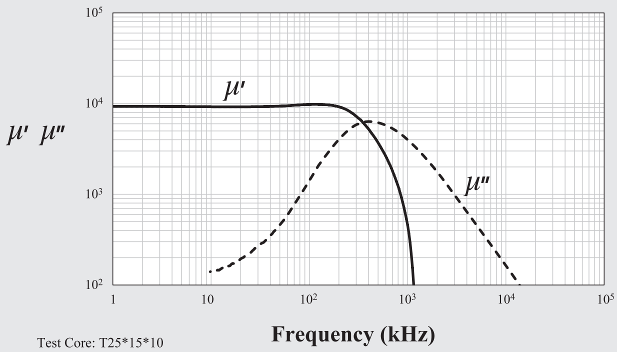
Test Core: T25*15*10

Initial Permeability V.S. Temperature



Test Core: T25*15*10

Complex Permeability V.S. Frequency

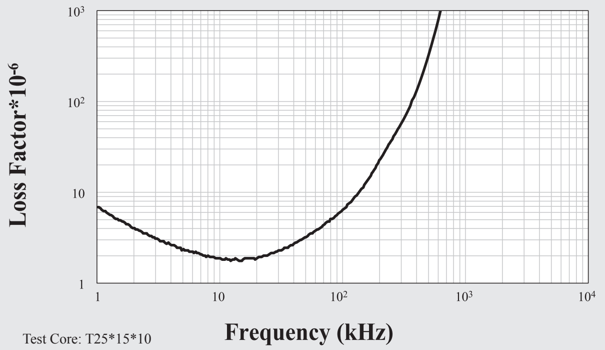


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			High μ & Tc For Automotives Material
			Freq.	Flux den.	Temp.	A072
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	7000 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 5
			100kHz		25°C	< 15
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	485
					100°C	340
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	95
					100°C	80
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	1.5 ~ 3.5
					20 ~ 70°C	-1.5 ~ 1.5
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 1.0
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 1.0
Curie Temperature	Tc	°C				≥ 180
Resistivity	ρ	Ωm				0.20
Density	d	g/cm³				4.90

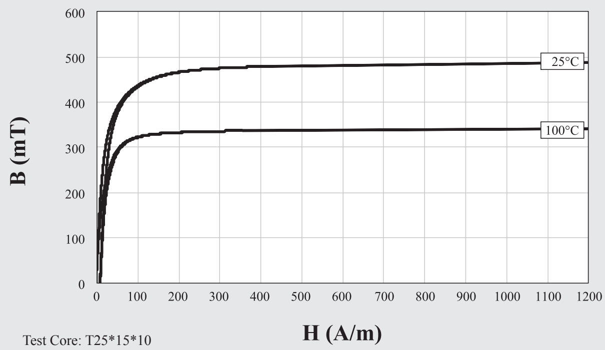
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



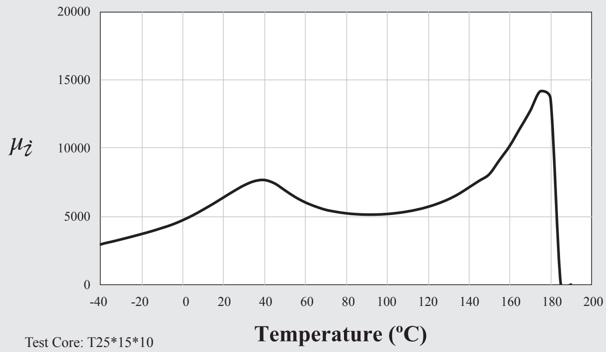
Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field



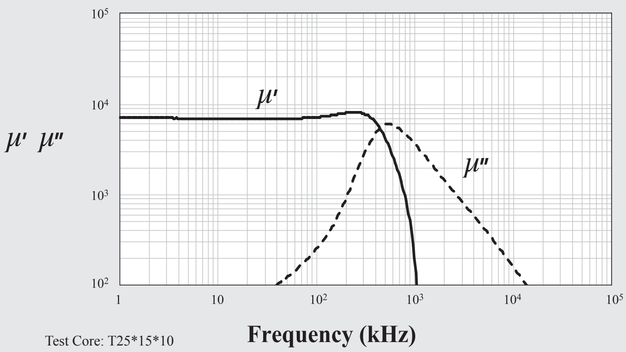
Test Core: T25*15*10

Initial Permeability V.S. Temperature



Test Core: T25*15*10

Complex Permeability V.S. Frequency

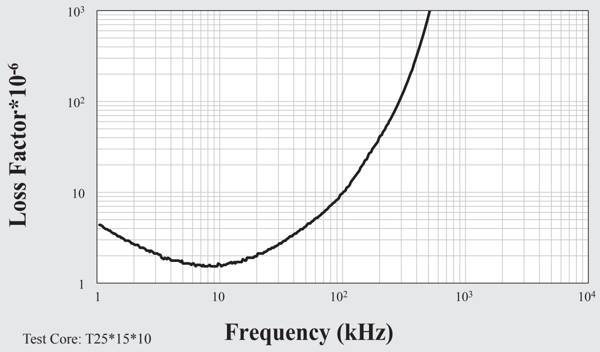


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			High μ & Tc For Automotives Material
			Freq.	Flux den.	Temp.	A104
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	10000 ± 30%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 10
			100kHz		25°C	< 30
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	460
					100°C	295
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	105
					100°C	105
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	1 ~ 3
					20 ~ 70°C	-1.5 ~ 0
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 155
Resistivity	ρ	Ωm				0.15
Density	d	g/cm³				4.90

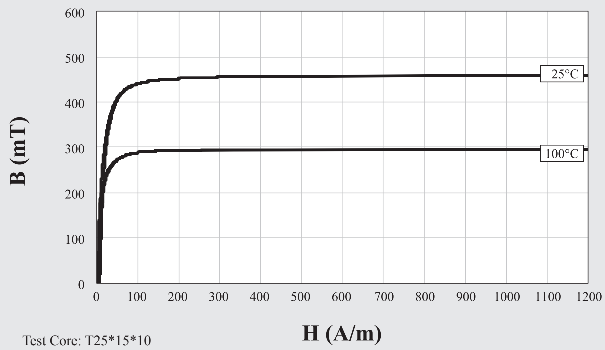
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



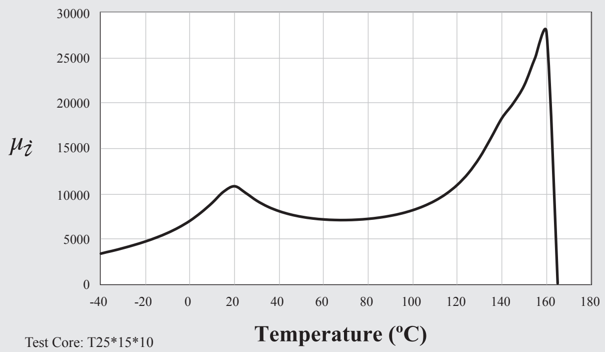
Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field



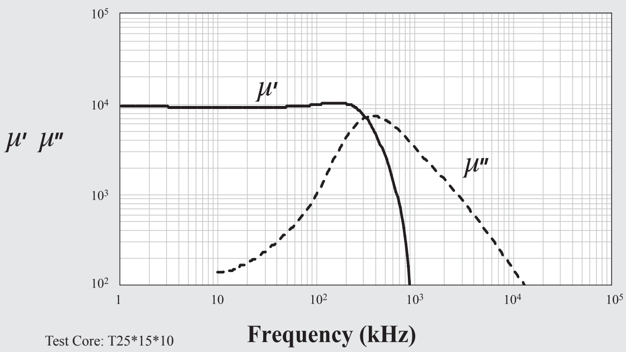
Test Core: T25*15*10

Initial Permeability V.S. Temperature



Test Core: T25*15*10

Complex Permeability V.S. Frequency

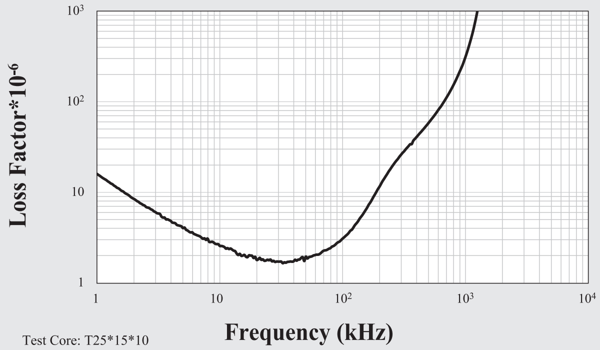


Test Core: T25*15*10

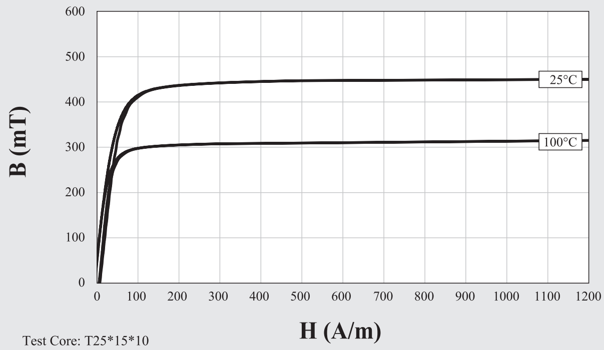
	Symbol	Unit	Measuring Conditions			High μ Wide Temperature Material
			Freq.	Flux den.	Temp.	A044
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	4000 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 8
			100kHz		25°C	< 40
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	450
					100°C	315
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	55
					100°C	45
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 1
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 170
Resistivity	ρ	Ωm				1.00
Density	d	g/cm³				4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

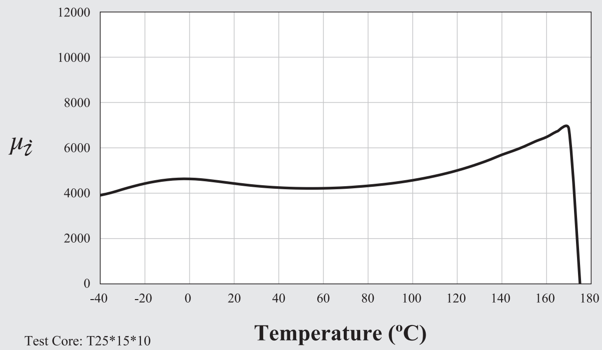
Loss Factor V.S. Frequency



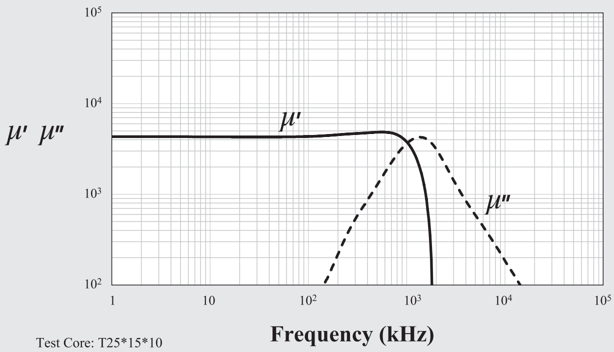
Saturation Flux Density V.S. Magnetic Field



Initial Permeability V.S. Temperature



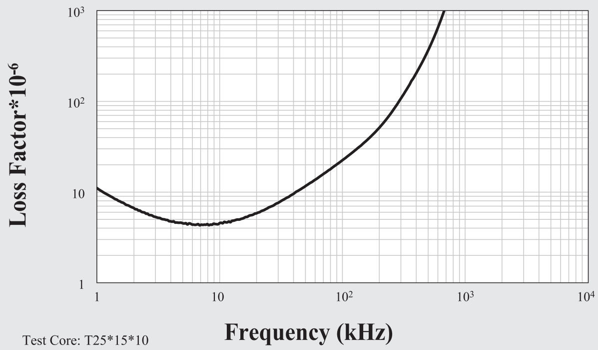
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			High μ Wide Temperature Material
			Freq.	Flux den.	Temp.	A064
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	6000 ± 25%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 8
			100kHz		25°C	< 40
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	470
					100°C	330
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	135
					100°C	115
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 1
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 170
Resistivity	ρ	Ωm				1.00
Density	d	g/cm³				4.90

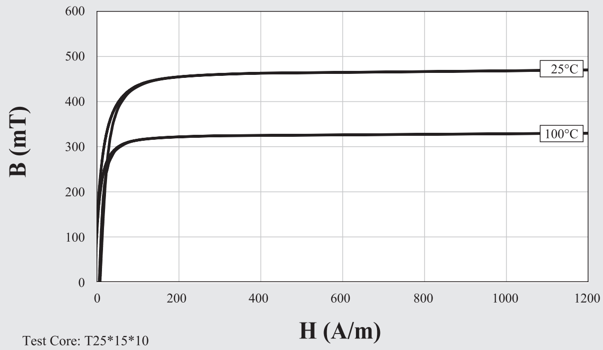
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



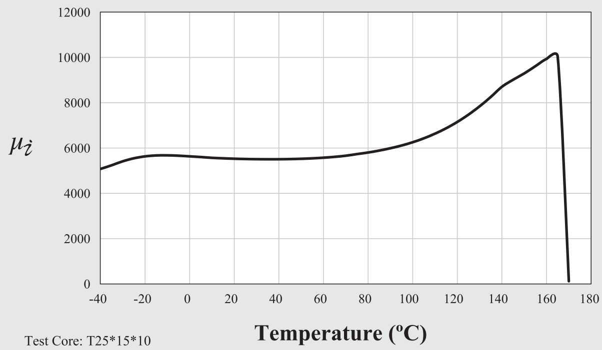
Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field



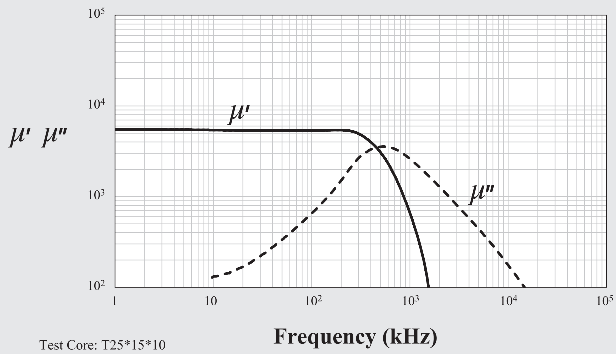
Test Core: T25*15*10

Initial Permeability V.S. Temperature



Test Core: T25*15*10

Complex Permeability V.S. Frequency

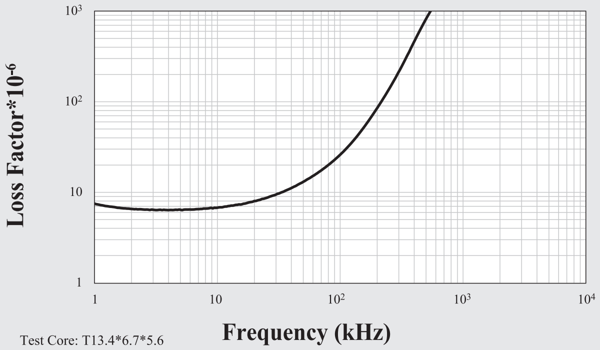


Test Core: T25*15*10

	Symbol	Unit	Measuring Conditions			High μ Wide Temperature Material
			Freq.	Flux den.	Temp.	N10
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	10000 ± 30%
					-20°C	> 9000
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 10
			100kHz		25°C	< 90
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	380
					100°C	130
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	160
					100°C	110
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 0
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 100
Resistivity	ρ	Ωm				0.12
Density	d	g/cm³				5.00

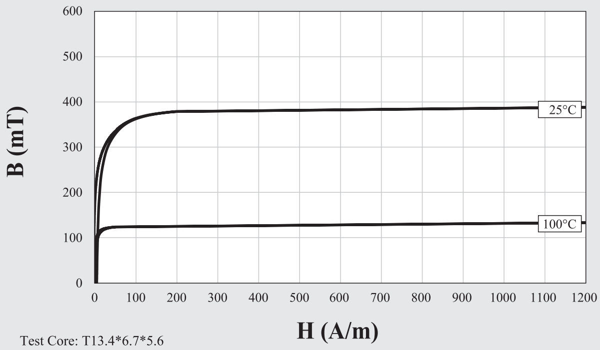
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



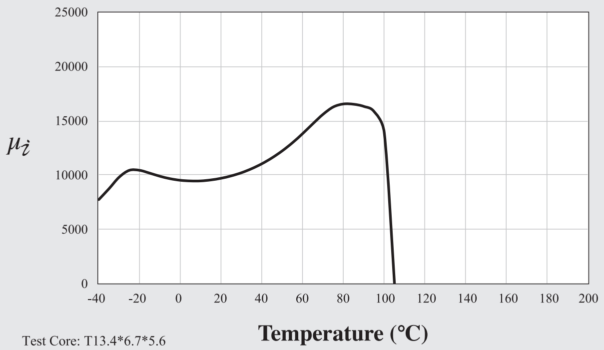
Test Core: T13.4*6.7*5.6

Saturation Flux Density V.S. Magnetic Field



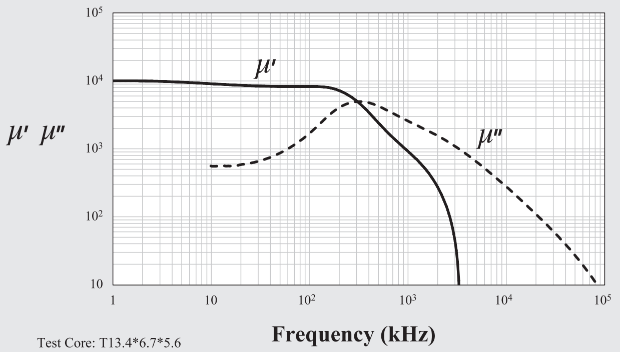
Test Core: T13.4*6.7*5.6

Initial Permeability V.S. Temperature



Test Core: T13.4*6.7*5.6

Complex Permeability V.S. Frequency

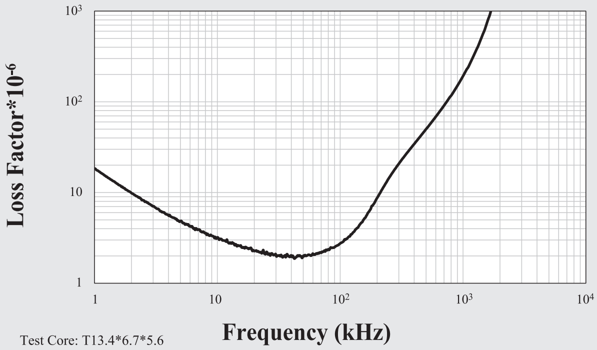


Test Core: T13.4*6.7*5.6

	Symbol	Unit	Measuring Conditions			For Wide Temperature LAN Material
			Freq.	Flux den.	Temp.	A043
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	4500 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 10
			100kHz		25°C	< 10
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	460
					100°C	300
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	65
					100°C	60
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	1 ~ 2
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 160
Resistivity	ρ	Ωm				0.20
Density	d	g/cm³				4.85

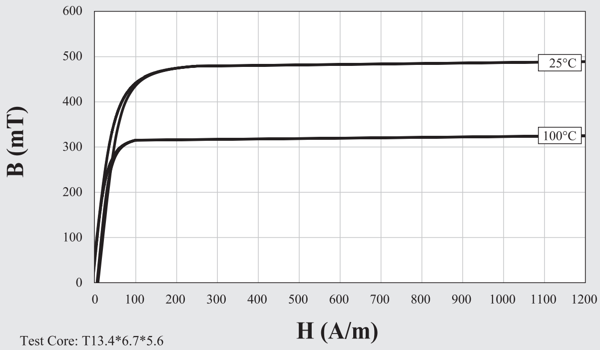
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



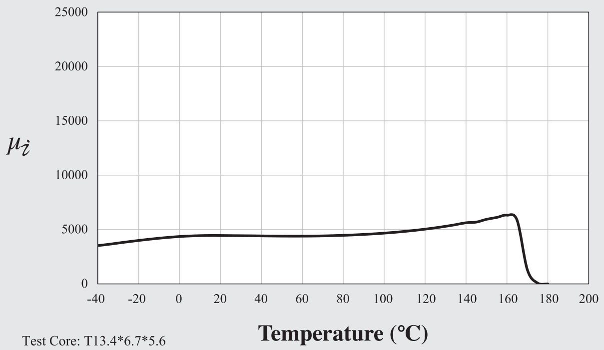
Test Core: T13.4*6.7*5.6

Saturation Flux Density V.S. Magnetic Field



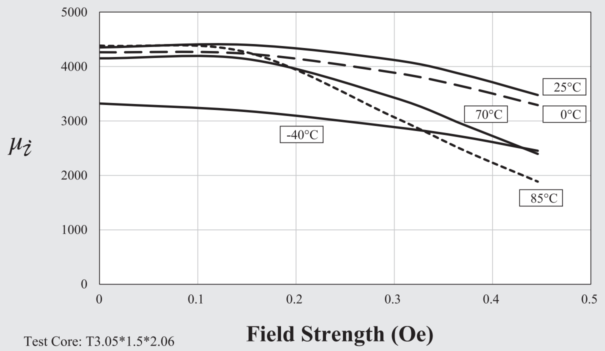
Test Core: T13.4*6.7*5.6

Initial Permeability V.S. Temperature



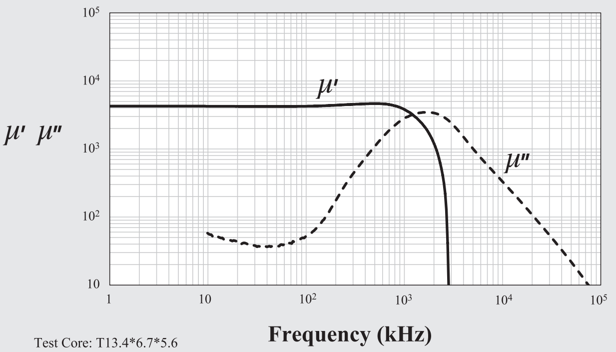
Test Core: T13.4*6.7*5.6

Initial Permeability V.S. Field Strength



Test Core: T3.05*1.5*2.06

Complex Permeability V.S. Frequency

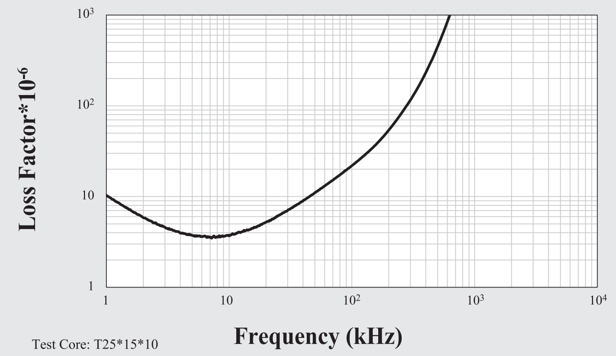


Test Core: T13.4*6.7*5.6

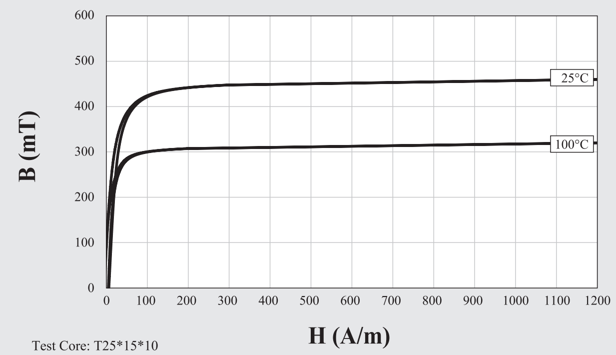
	Symbol	Unit	Measuring Conditions			For Wide Temperature LAN Material
			Freq.	Flux den.	Temp.	A062
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	6000 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 10
			100kHz		25°C	< 30
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	460
					100°C	320
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	100
					100°C	80
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	1 ~ 3
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.5
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 160
Resistivity	ρ	Ωm				0.20
Density	d	g/cm³				4.85

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

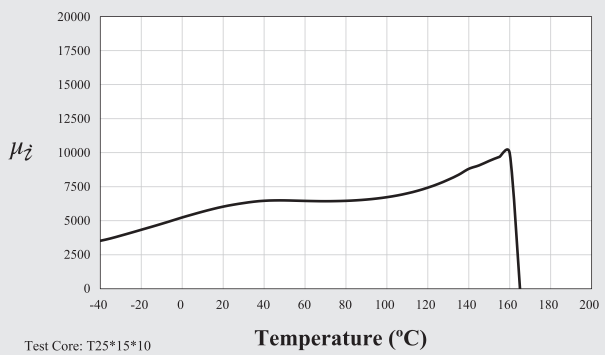
Loss Factor V.S. Frequency



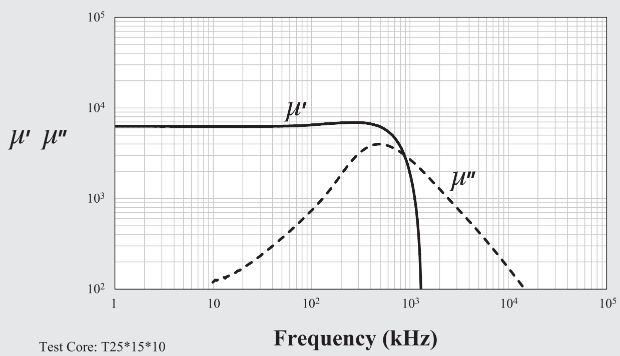
Saturation Flux Density V.S. Magnetic Field



Initial Permeability V.S. Temperature



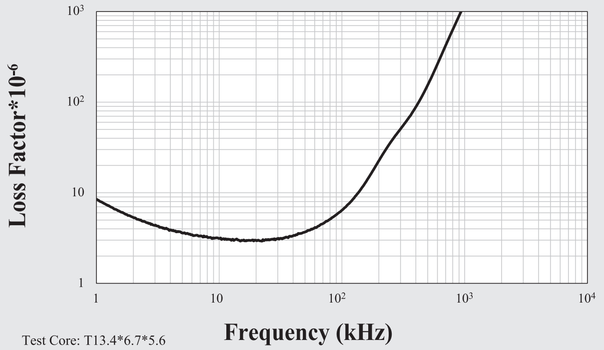
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			For Wide Temperature LAN Material
			Freq.	Flux den.	Temp.	N07
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	7000 ± 25%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 5
			100kHz		25°C	< 30
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	400
					100°C	220
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	70
					100°C	60
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 1
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.2
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 130
Resistivity	ρ	Ωm				0.15
Density	d	g/cm³				4.90

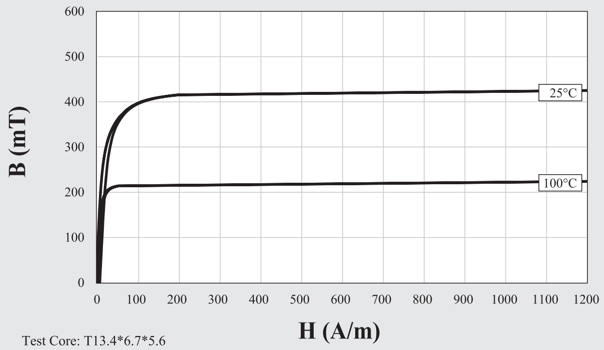
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



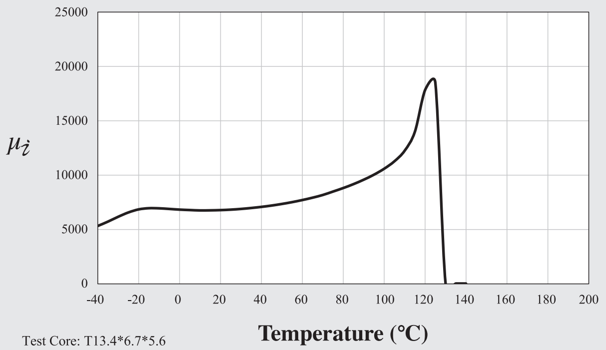
Test Core: T13.4*6.7*5.6

Saturation Flux Density V.S. Magnetic Field



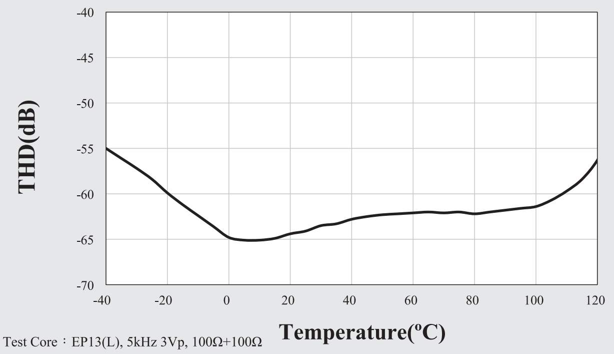
Test Core: T13.4*6.7*5.6

Initial Permeability V.S. Temperature



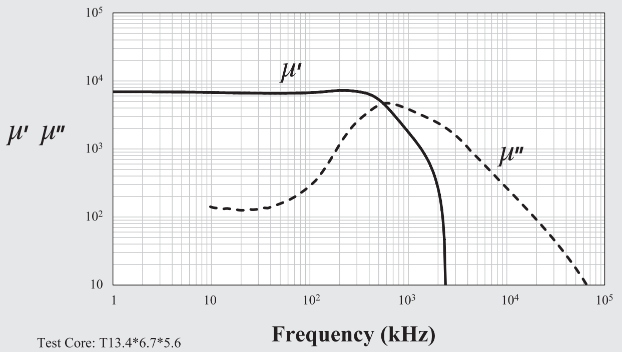
Test Core: T13.4*6.7*5.6

THD V.S. Temperature



Test Core：EP13(L), 5kHz 3Vp, 100Ω+100Ω

Complex Permeability V.S. Frequency



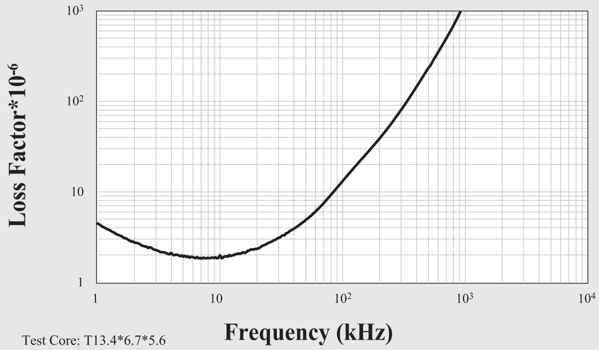
Test Core: T13.4*6.7*5.6

	Symbol	Unit	Measuring Conditions			Low THD Material
			Freq.	Flux den.	Temp.	A101
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	10000 ± 30%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 10
			100kHz		25°C	< 90
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	400
					100°C	220
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	175
					100°C	125
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	0 ~ 20°C	-1 ~ 1
					20 ~ 70°C	-1 ~ 1
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.2
Disaccommodation Factor	D_F	10^{-6}	10kHz	< 0.25 mT	25°C	< 2
Curie Temperature	Tc	°C				≥ 130
Resistivity	ρ	Ωm				0.15
Density	d	g/cm³				4.90

Remark: Best THD performance for 10,000μ_i materials.

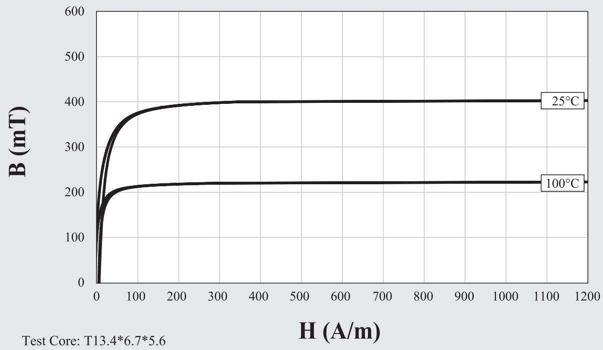
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



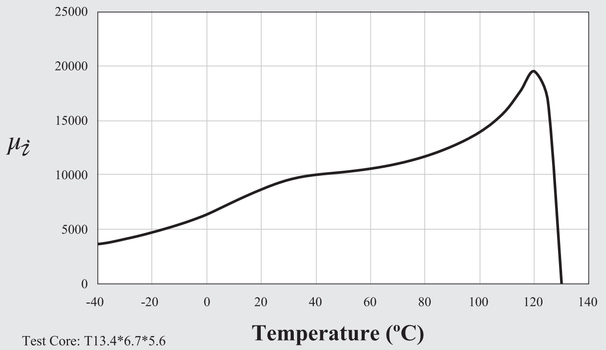
Test Core: T13.4*6.7*5.6

Saturation Flux Density V.S. Magnetic Field



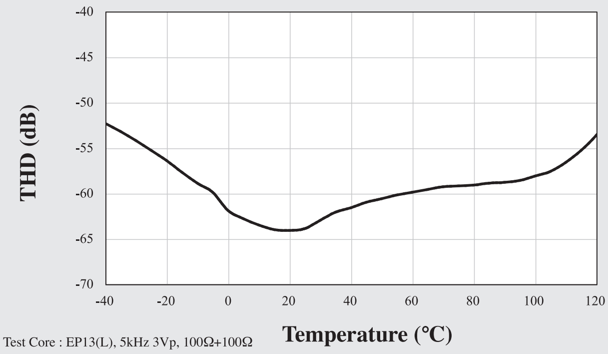
Test Core: T13.4*6.7*5.6

Initial Permeability V.S. Temperature



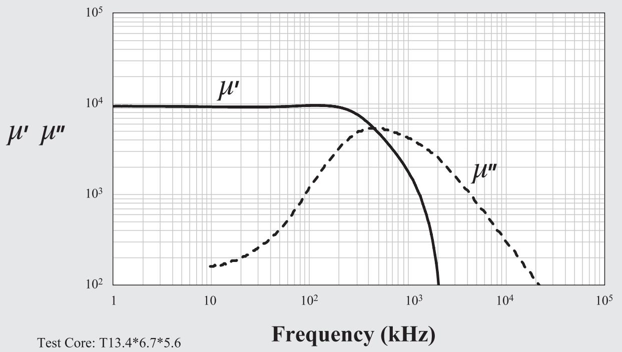
Test Core: T13.4*6.7*5.6

THD V.S. Temperature



Test Core : EP13(L), 5kHz 3Vp, 100Ω+100Ω

Complex Permeability V.S. Frequency

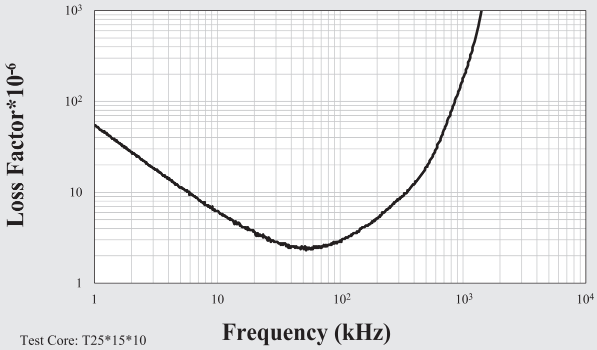


Test Core: T13.4*6.7*5.6

	Symbol	Unit	Measuring Conditions			Low η_B Material
			Freq.	Flux den.	Temp.	N4
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2500 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 7
			100kHz		25°C	< 3
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	450
					100°C	320
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	180
					100°C	150
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	14
					100°C	9
Temperature Factor of	α_F	10^{-6}/°C	10kHz	< 0.25 mT	5 ~ 25°C	< 1.3
Permeability					25 ~ 55°C	< 1.3
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.6
Curie Temperature	Tc	°C				≥ 170
Resistivity	ρ	Ωm				7.50
Density	d	g/cm³				4.70

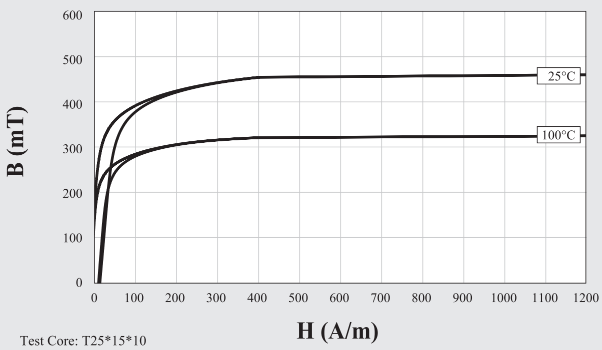
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



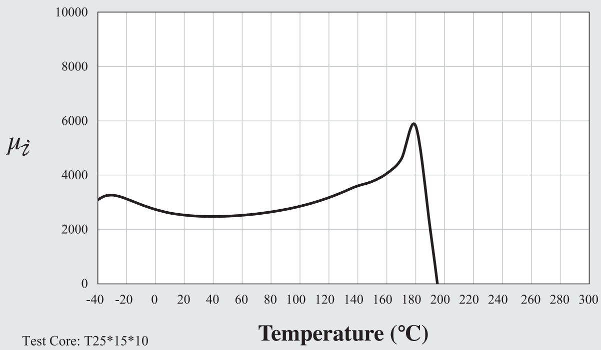
Test Core: T25*15*10

Saturation Flux Density V.S. Magnetic Field



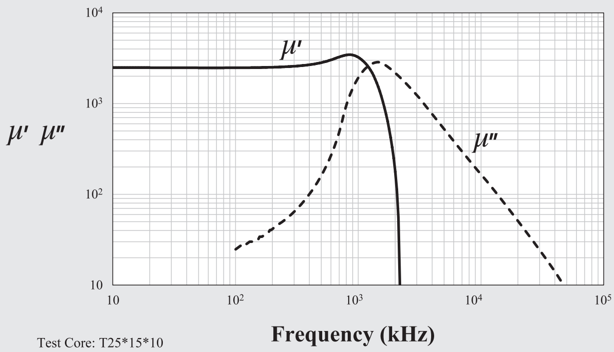
Test Core: T25*15*10

Initial Permeability V.S. Temperature



Test Core: T25*15*10

Complex Permeability V.S. Frequency

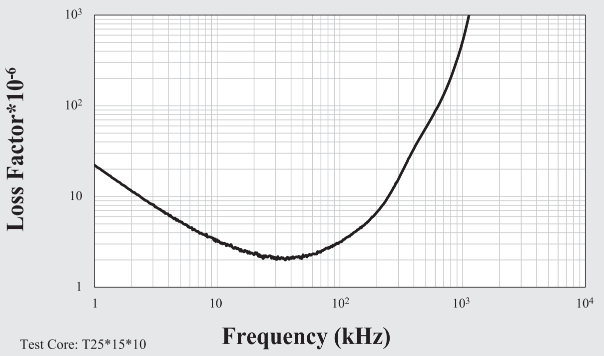


Test Core: T25*15*10

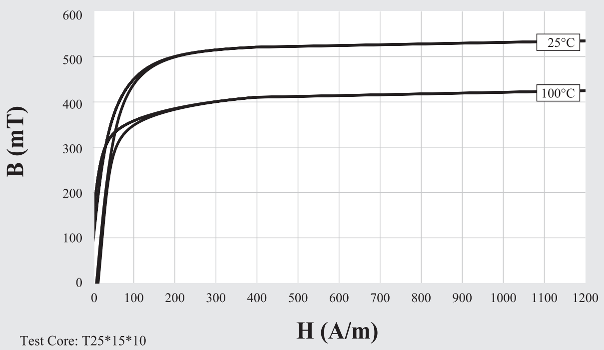
	Symbol	Unit	Measuring Conditions			Low η_B Material
			Freq.	Flux den.	Temp.	N42
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	3800 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 3.5
			100kHz		25°C	< 3.5
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	530
					100°C	425
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	100
					100°C	125
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	9
					100°C	13
Temperature Factor of	α_F	10^{-6}/°C	10kHz	< 0.25 mT	5 ~ 25°C	7 ~ 9
Permeability					25 ~ 55°C	< -4 ~ -2
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.3
Curie Temperature	Tc	°C				≥ 250
Resistivity	ρ	Ωm				5.00
Density	d	g/cm³				4.90

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

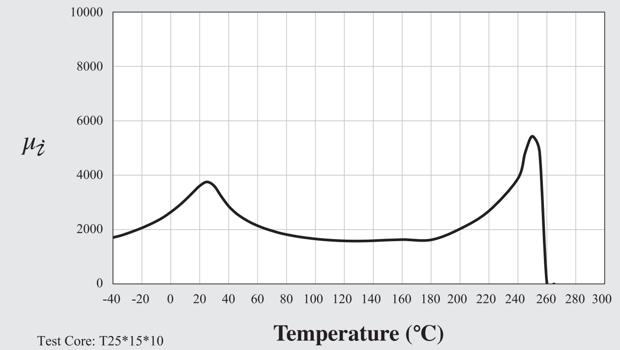
Loss Factor V.S. Frequency



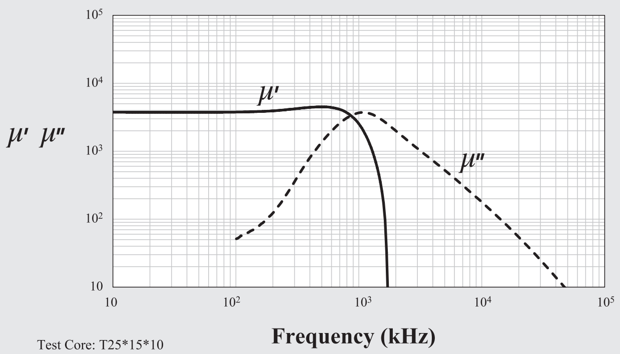
Saturation Flux Density V.S. Magnetic Field



Initial Permeability V.S. Temperature



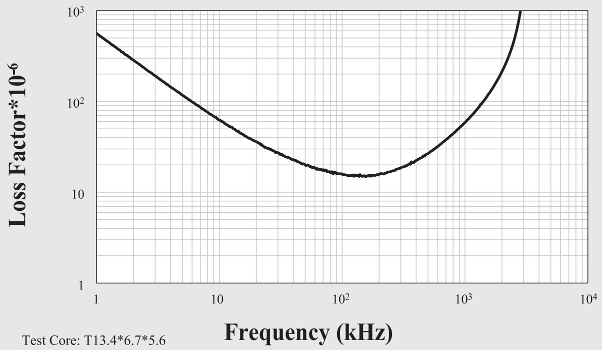
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			Low η_B Material
			Freq.	Flux den.	Temp.	N43
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	750 ± 25%
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10kHz	< 0.25mT	25°C	< 60
			100kHz		25°C	< 15
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	490
					100°C	400
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	400
					100°C	325
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	25
					100°C	21
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	5 ~ 25°C	< 2.2
					25 ~ 55°C	< 1.8
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 2.5 (100kHz)
Curie Temperature	Tc	°C				≥ 250
Resistivity	ρ	Ωm				2.00
Density	d	g/cm³				4.70

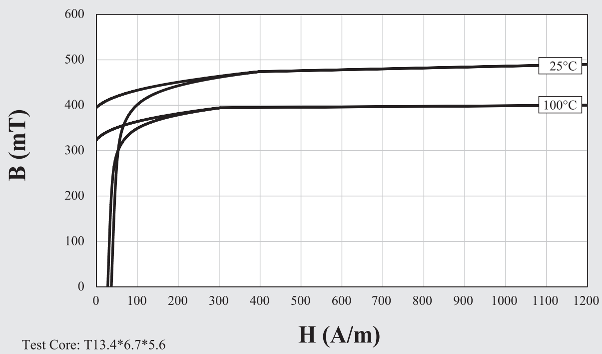
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



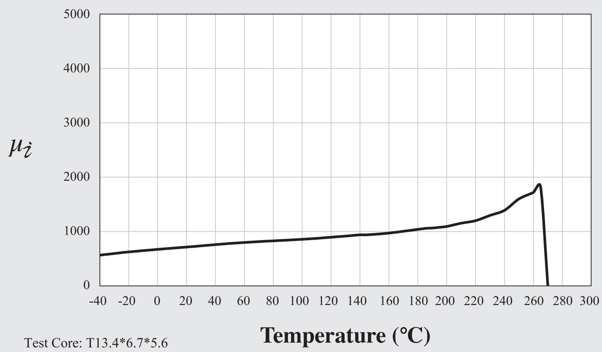
Test Core: T13.4*6.7*5.6

Saturation Flux Density V.S. Magnetic Field



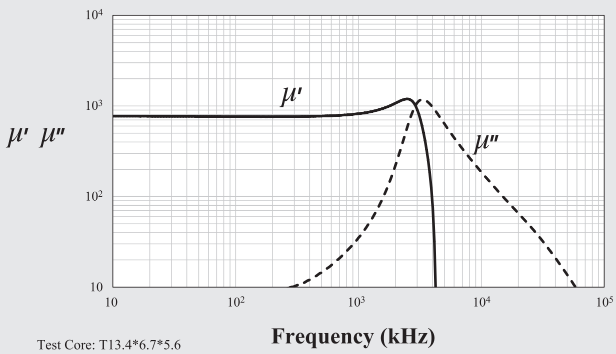
Test Core: T13.4*6.7*5.6

Initial Permeability V.S. Temperature



Test Core: T13.4*6.7*5.6

Complex Permeability V.S. Frequency

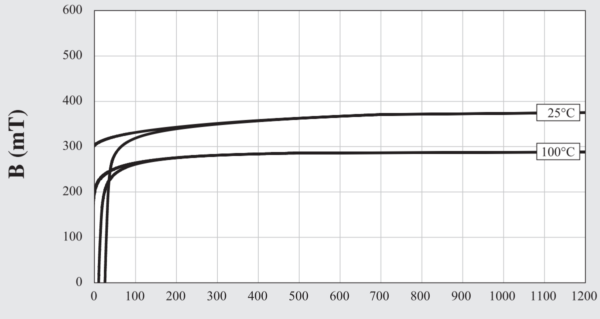


Test Core: T13.4*6.7*5.6

	Symbol	Unit	Measuring Conditions			EMI Filter Material
			Freq.	Flux den.	Temp.	N5
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2000 ± 25%
Relative Loss Factor	tanδ/μ_i	10^{-6}	10kHz	< 0.25mT	25°C	< 1.24
			100kHz		25°C	< 23
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	370
					100°C	285
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	240
					100°C	140
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	-
					100°C	-
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	5 ~ 25°C	< 1.1
					25 ~ 55°C	< 5.8
Hysteresis Material Constant	η_B	10^{-6}/mT	10kHz	1.5-3.0mT	25°C	< 0.36
Curie Temperature	Tc	°C				≥ 130
Resistivity	ρ	Ωm				140
Density	d	g/cm³				4.95

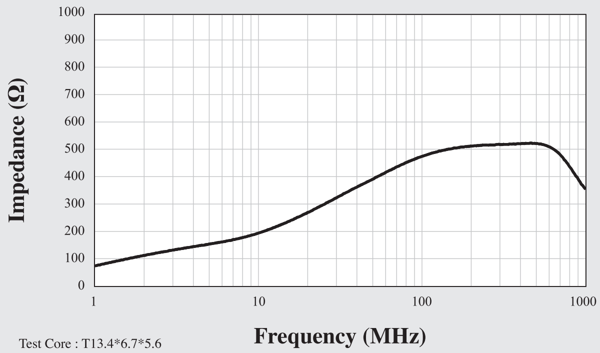
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Saturation Flux Density V.S. Magnetic Field



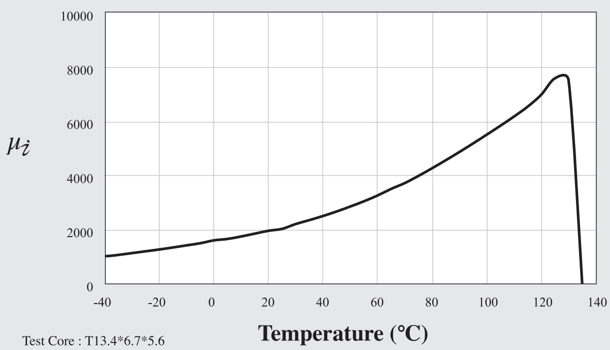
Test Core : T13.4*6.7*5.6

Impedance V.S. Frequency



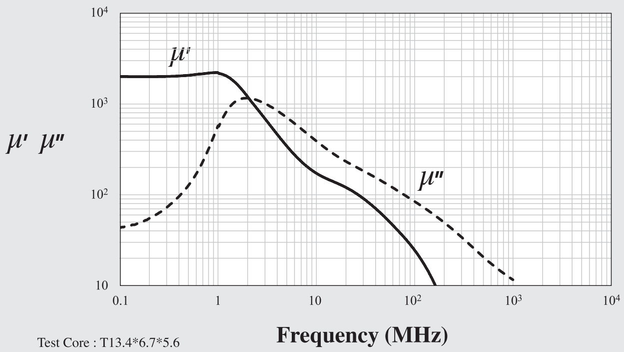
Test Core : T13.4*6.7*5.6

Initial Permeability V.S. Temperature



Test Core : T13.4*6.7*5.6

Complex Permeability V.S. Frequency

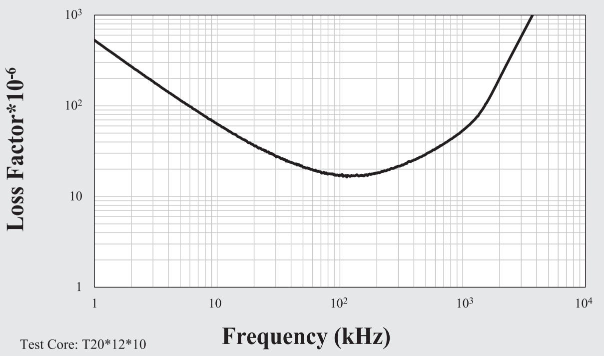


Test Core : T13.4*6.7*5.6

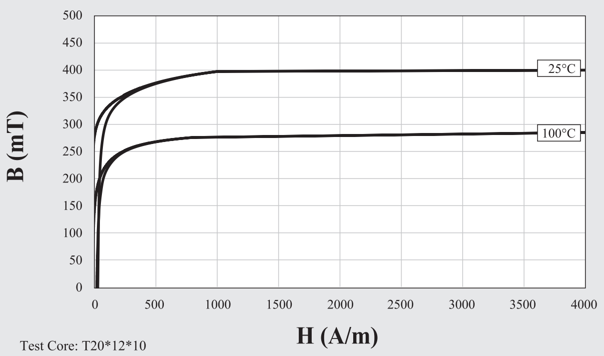
	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	K081
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	800 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	400
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	280
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	21
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	17
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	8
Curie Temperature	Tc	°C				≥ 190
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

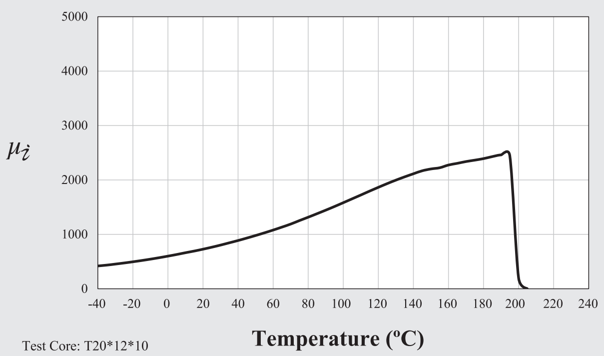
Loss Factor V.S. Frequency



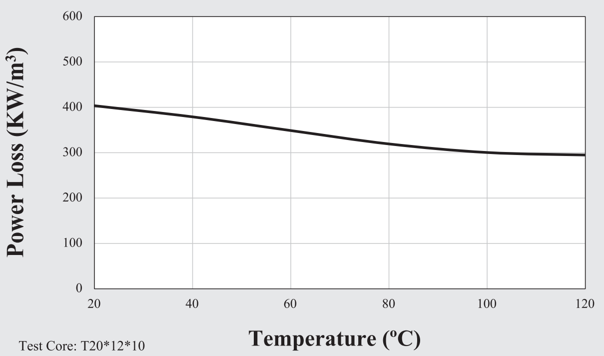
Saturation Flux Density V.S. Magnetic Field



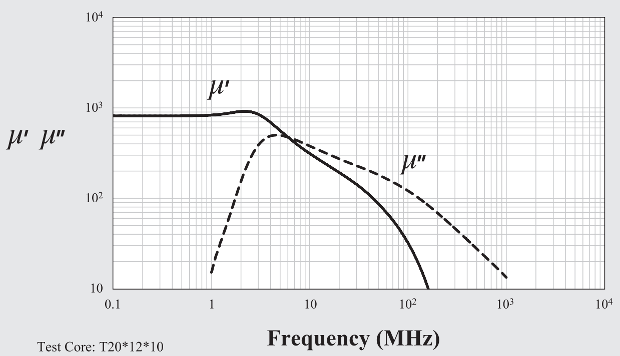
Initial Permeability V.S. Temperature



Power Loss V.S. Temperature



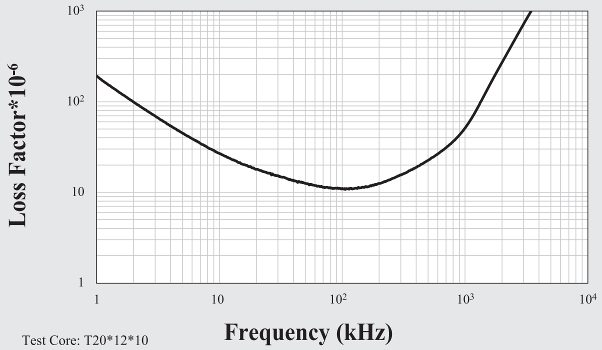
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	K10
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1000 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	355
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	250
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	19
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	11
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	8
Curie Temperature	Tc	°C				≥ 160
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

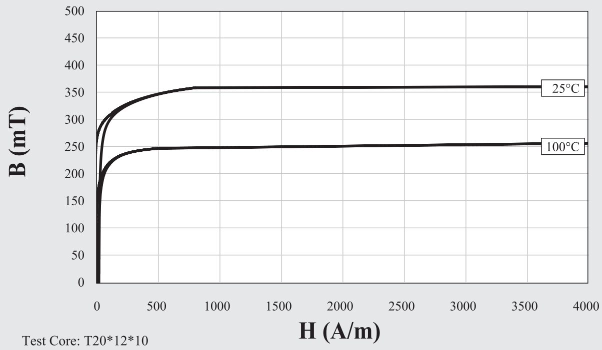
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



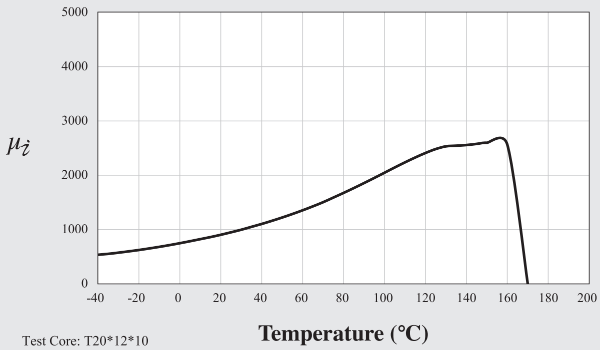
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



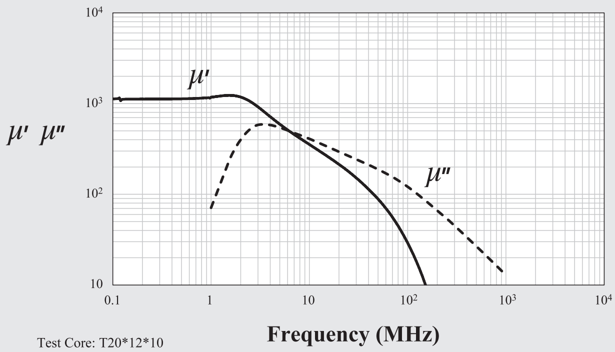
Test Core: T20*12*10

Initial Permeability V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

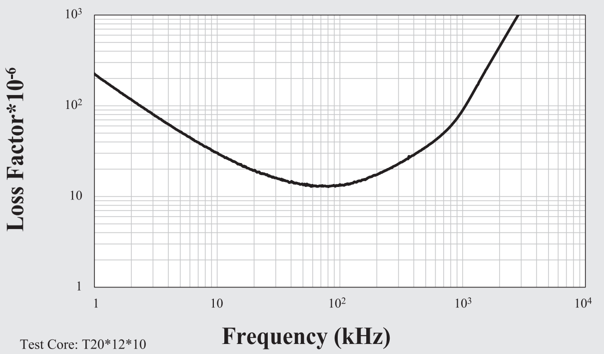


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	K12
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1200 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	355
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	250
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	12
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	13
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	11
Curie Temperature	Tc	°C				≥ 160
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

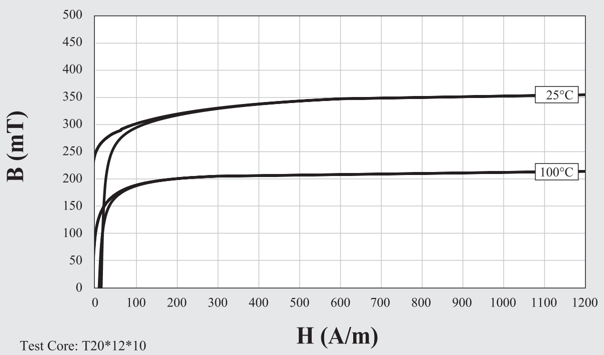
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



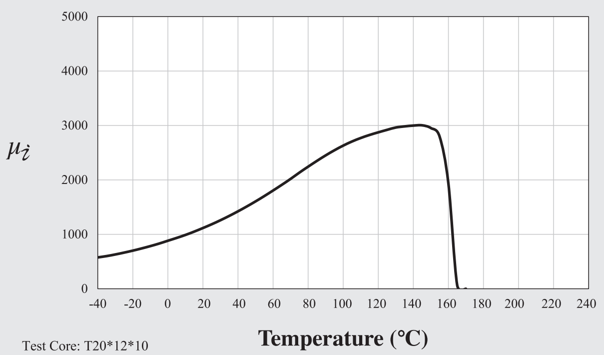
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



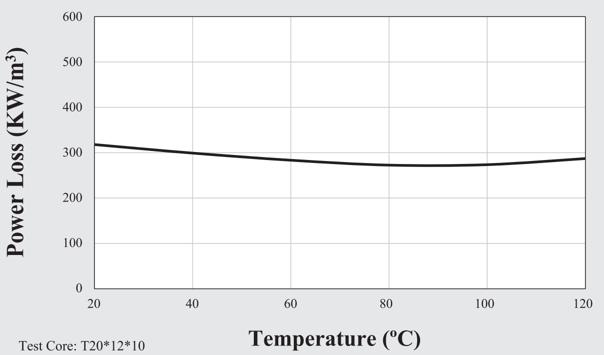
Test Core: T20*12*10

Initial Permeability V.S. Temperature



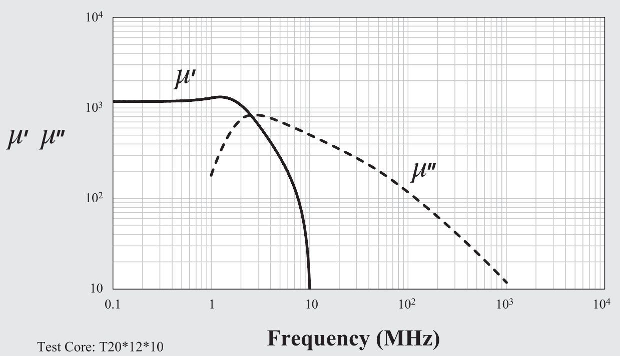
Test Core: T20*12*10

Power Loss V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

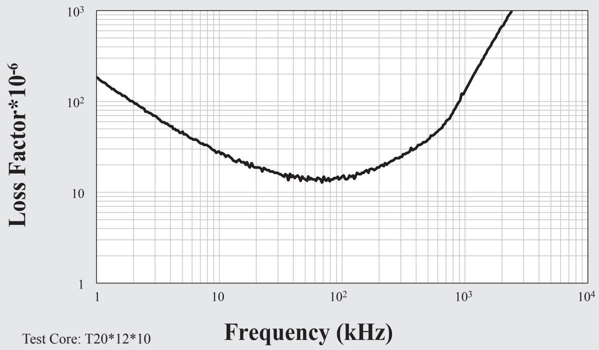


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	K13
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1300 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	340
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	190
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	16
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	15
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	8
Curie Temperature	Tc	°C				≥ 150
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

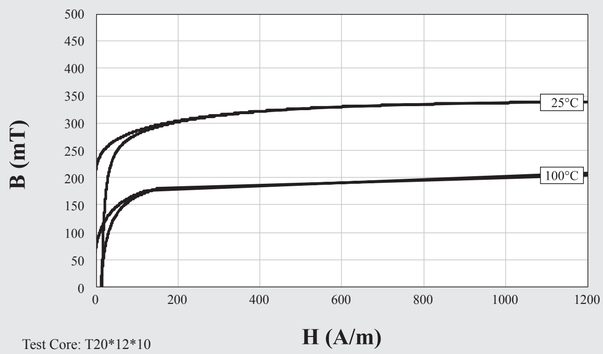
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



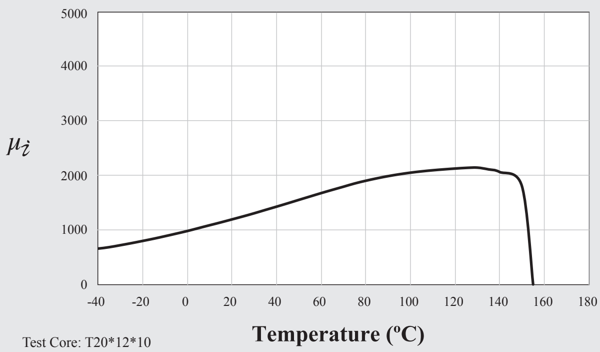
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



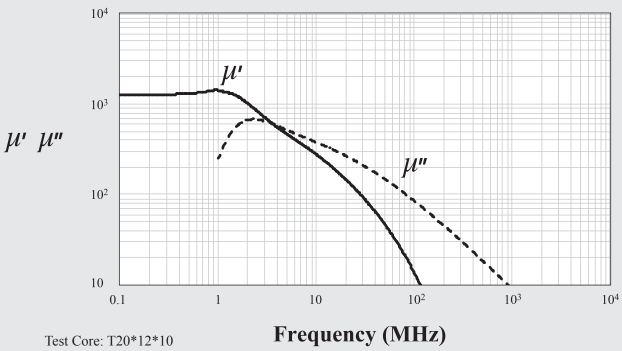
Test Core: T20*12*10

Initial Permeability V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

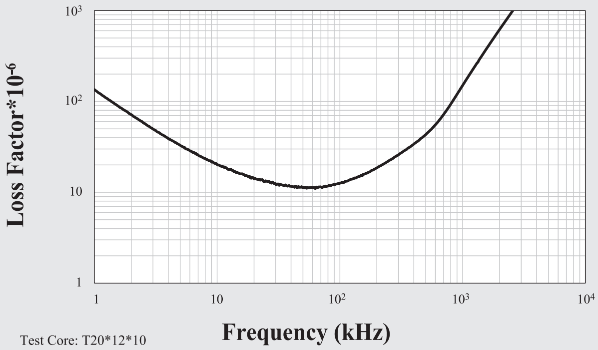


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	K15
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1500 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	330
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	200
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	11
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	11
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	6
Curie Temperature	Tc	°C				≥ 130
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

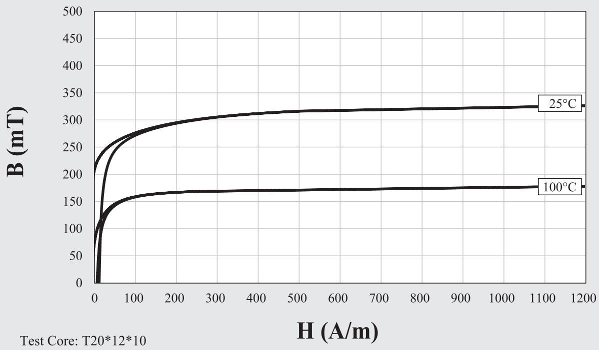
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



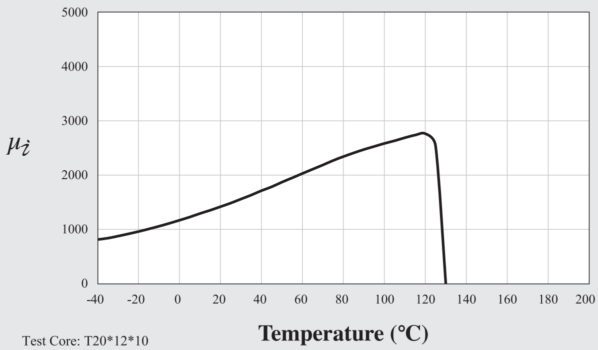
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



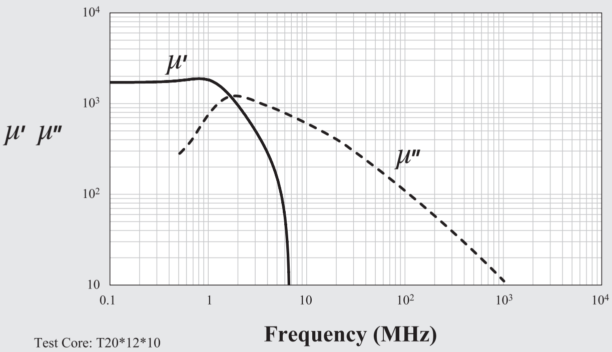
Test Core: T20*12*10

Initial Permeability V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

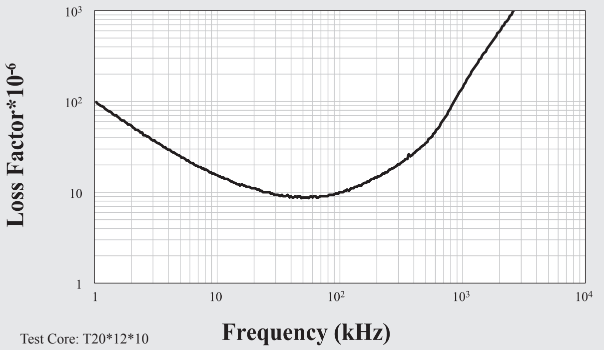


Test Core: T20*12*10

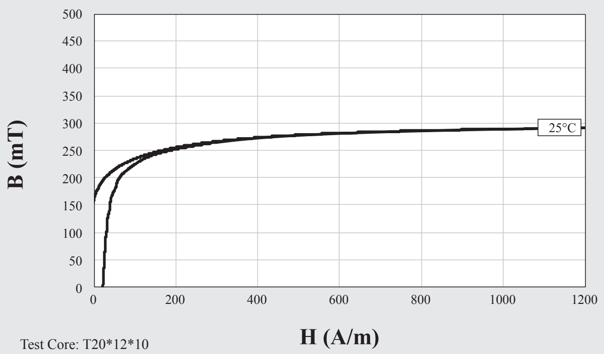
	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	K151
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1500 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	290
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	150
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	20
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	10
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	4
Curie Temperature	Tc	°C				≥ 110
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

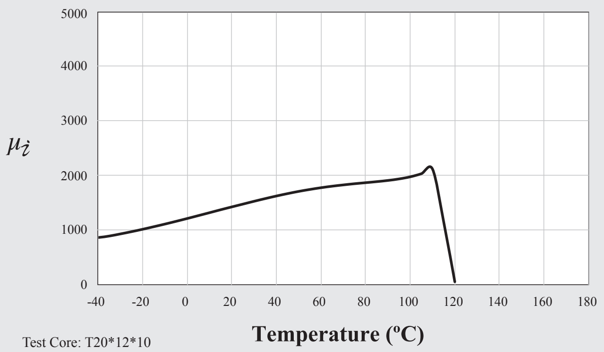
Loss Factor V.S. Frequency



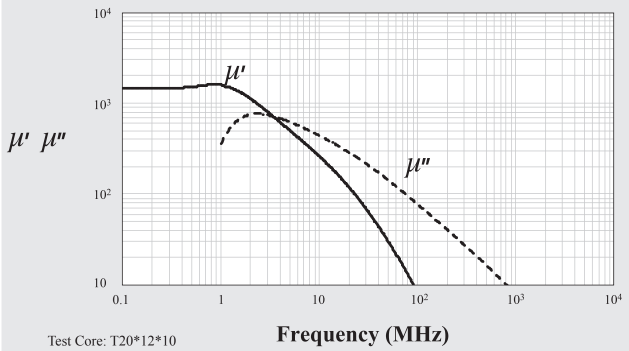
Saturation Flux Density V.S. Magnetic Field



Initial Permeability V.S. Temperature



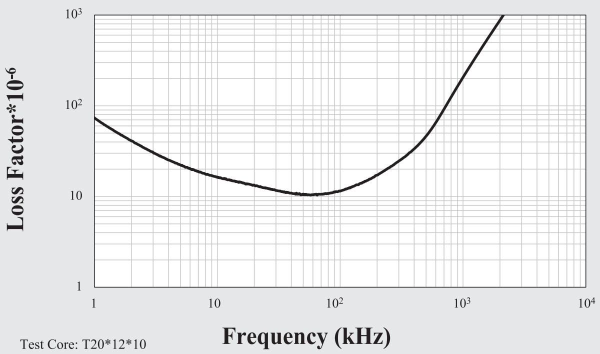
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	K20
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2000 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	300
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	150
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	11
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	11
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	3
Curie Temperature	Tc	°C				≥ 100
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

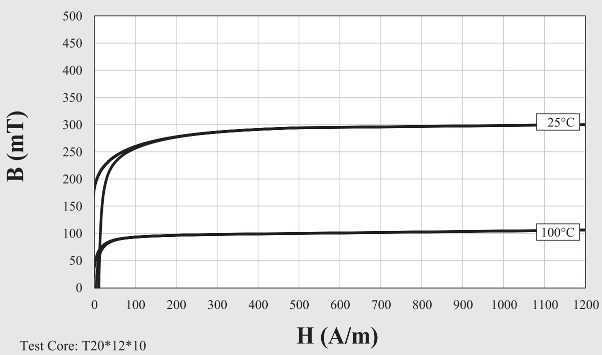
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



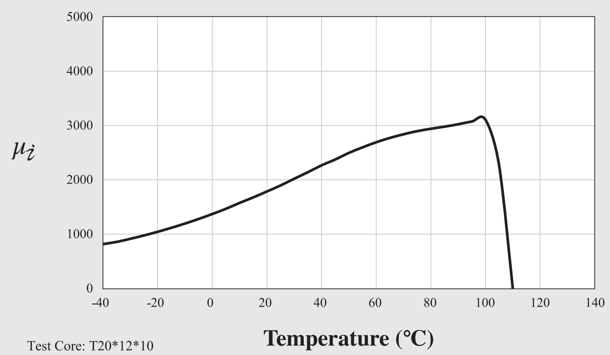
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



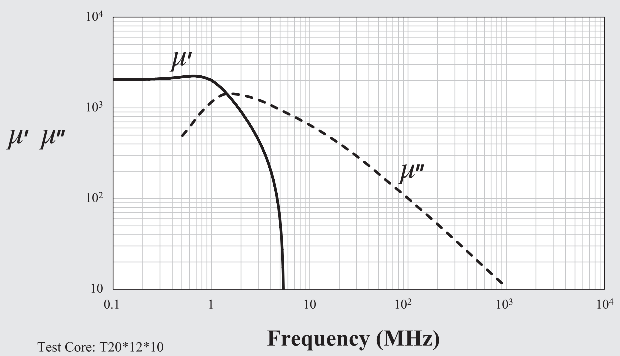
Test Core: T20*12*10

Initial Permeability V.S. Temperature



Test Core: T20*12*10

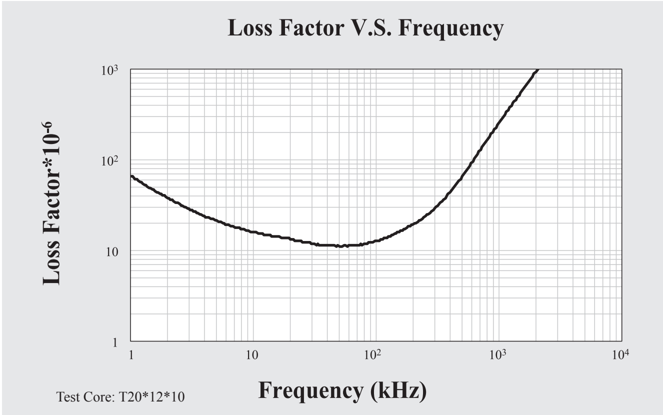
Complex Permeability V.S. Frequency

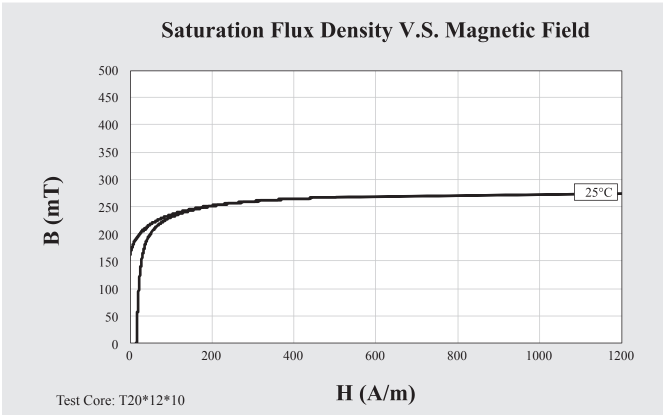


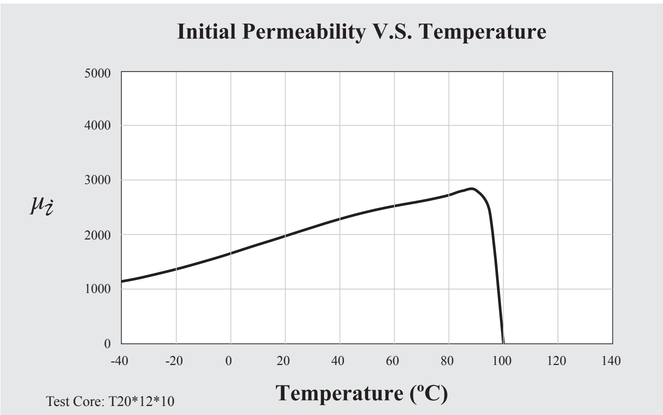
Test Core: T20*12*10

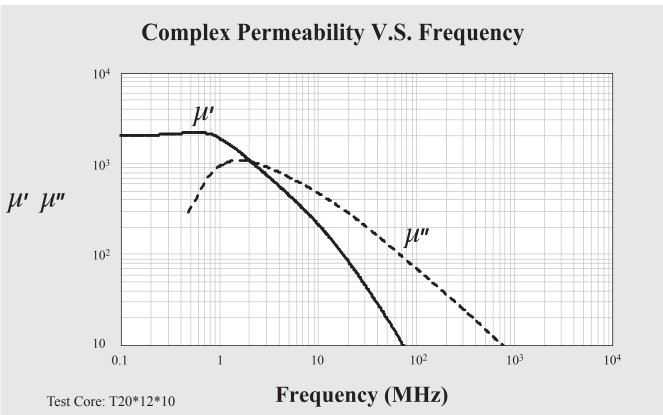
	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	K25
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2500 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	275
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	170
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	14
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	15
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	3
Curie Temperature	Tc	°C				≥ 90
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.





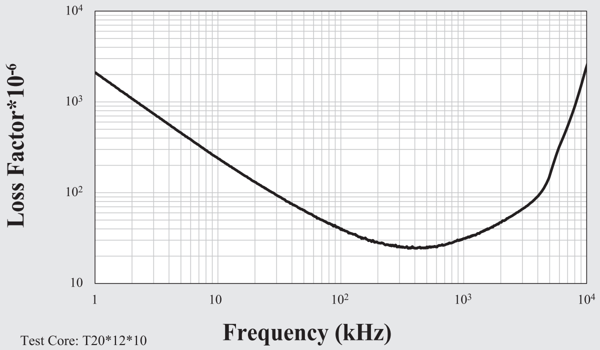




	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	D1C
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	350 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	360
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	255
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	31
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	1MHz	< 0.25mT	25°C	30
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 50
Curie Temperature	Tc	°C				≥ 160
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

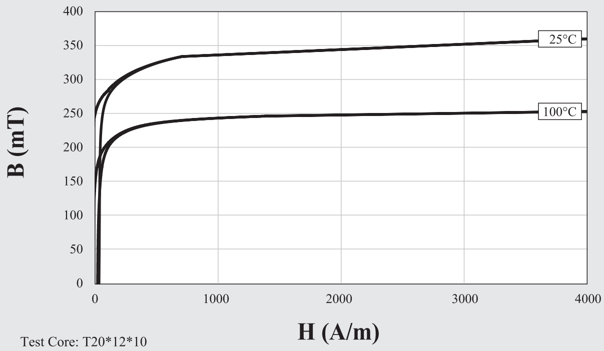
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



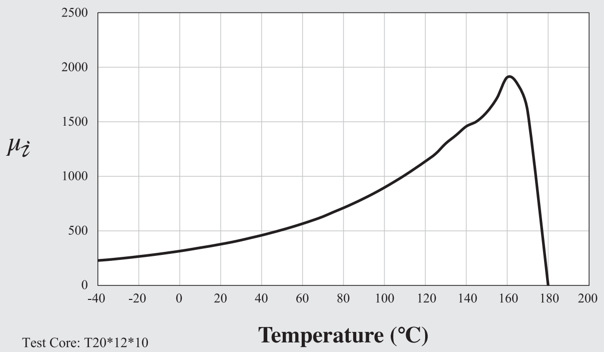
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



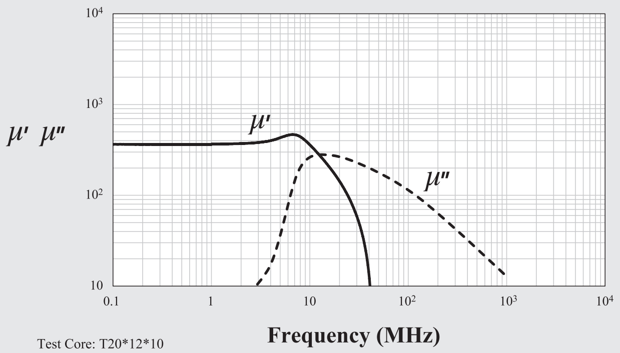
Test Core: T20*12*10

Initial Permeability V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

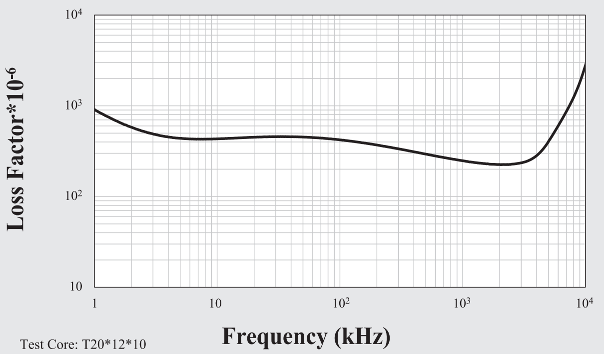


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	D25
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	500 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	390
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	260
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	58
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	1MHz	< 0.25mT	25°C	248
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 35
Curie Temperature	Tc	°C				≥ 180
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

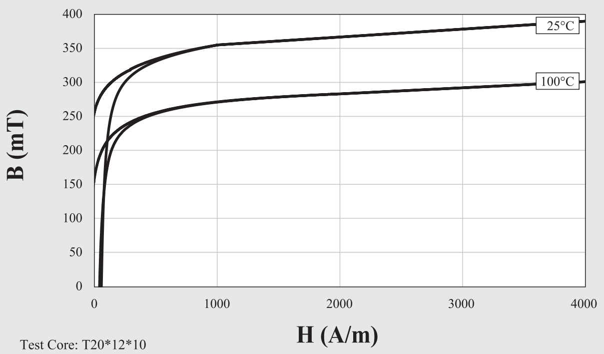
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



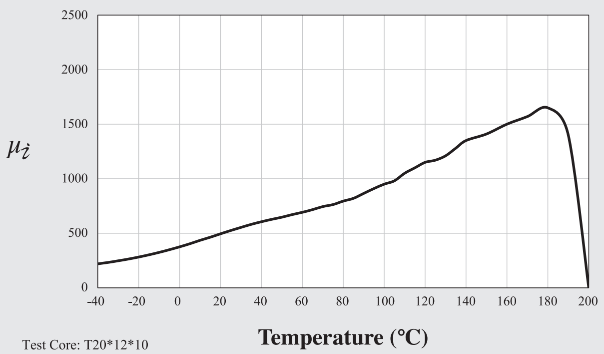
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



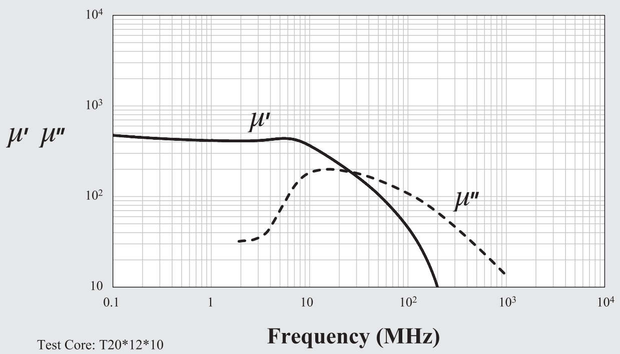
Test Core: T20*12*10

Initial Permeability V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

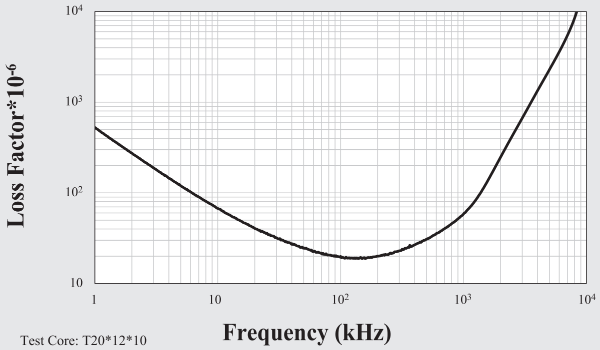


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	D27
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	700 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	365
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	235
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	20
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	0.1MHz	< 0.25mT	25°C	20
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 7
Curie Temperature	Tc	°C				≥ 150
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				4.80

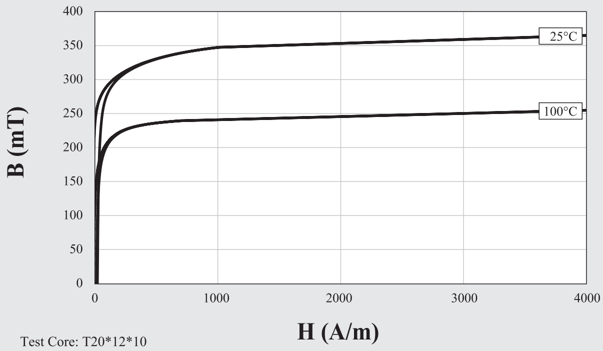
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



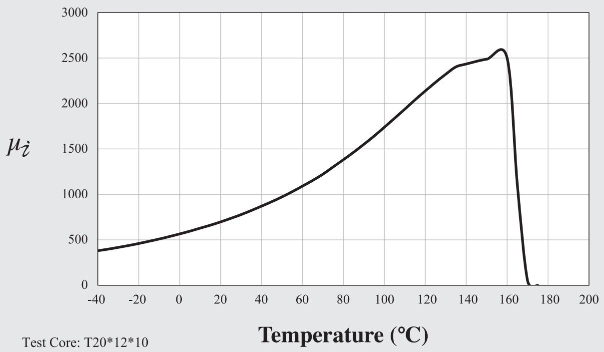
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



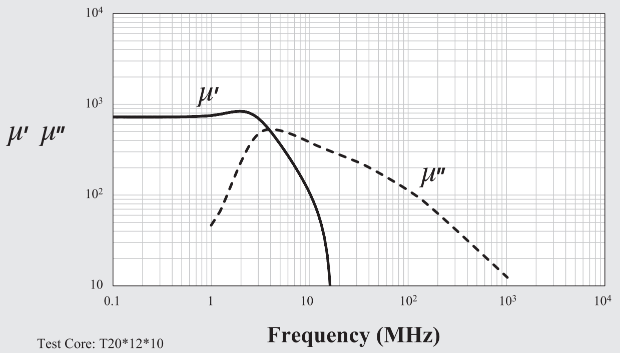
Test Core: T20*12*10

Initial Permeability V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

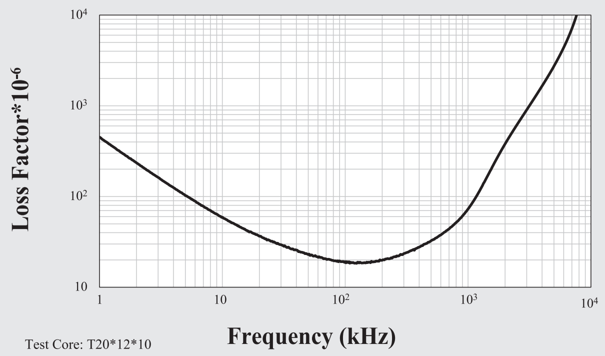


Test Core: T20*12*10

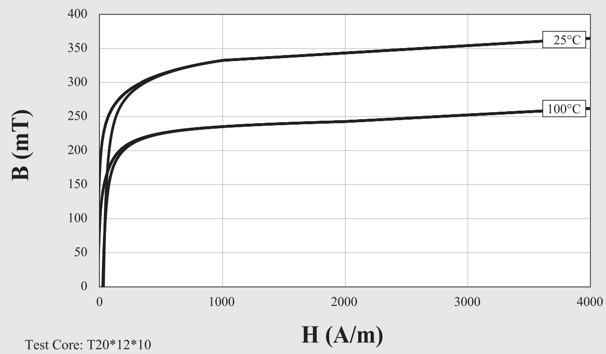
	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	D28
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	800 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	365
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	180
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	26
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	0.1MHz	< 0.25mT	25°C	20
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 5
					-50 ~ 80°C	≤ 1.5
Curie Temperature	Tc	°C				≥ 150
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

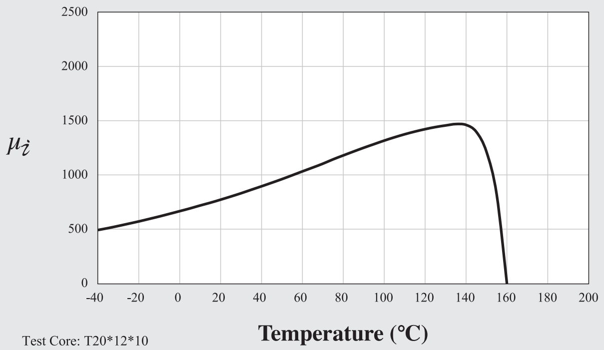
Loss Factor V.S. Frequency



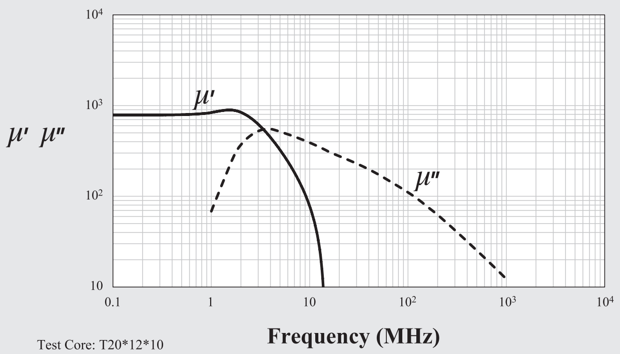
Saturation Flux Density V.S. Magnetic Field



Initial Permeability V.S. Temperature



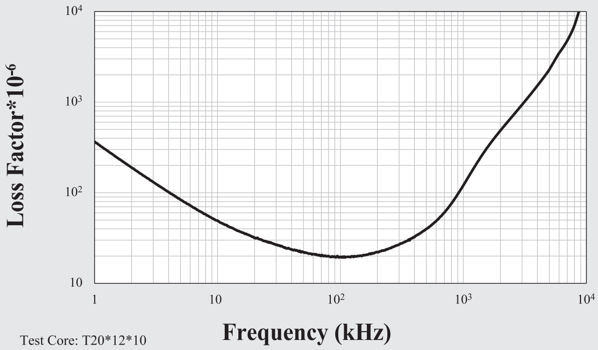
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	D30
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1000 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	340
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	115
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	28
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	0.1MHz	< 0.25mT	25°C	35
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 6
Curie Temperature	Tc	°C				≥ 140
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

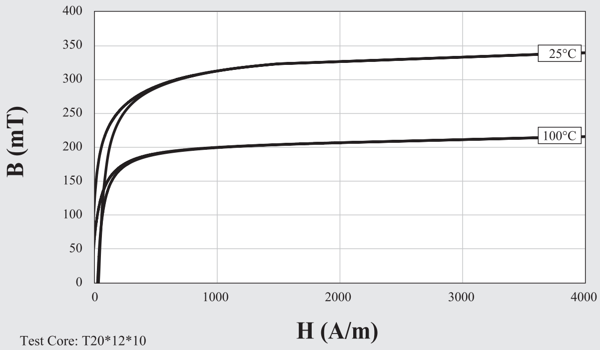
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



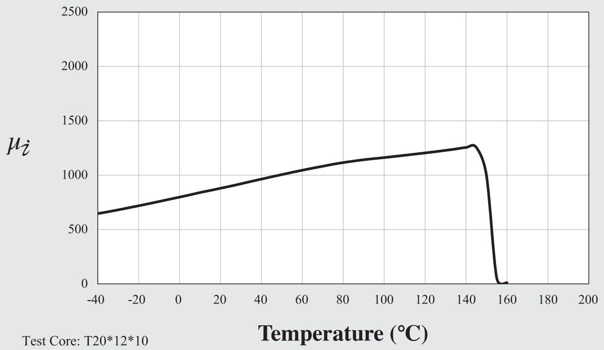
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



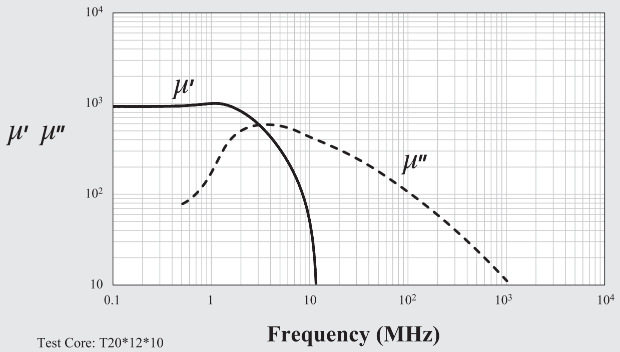
Test Core: T20*12*10

Initial Permeability V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

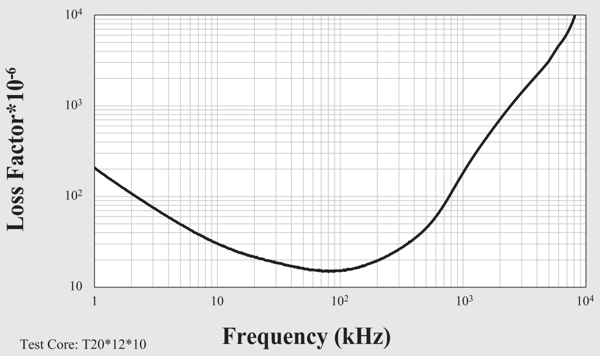


Test Core: T20*12*10

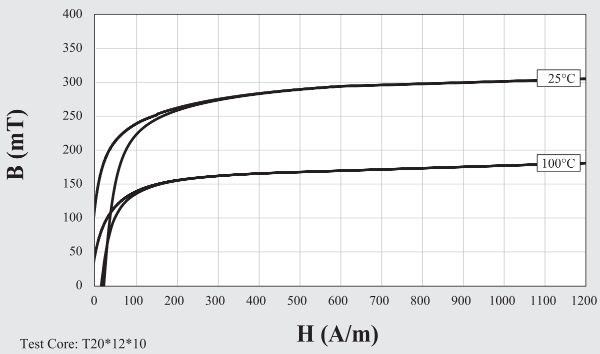
	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	D35
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1100 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	305
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	140
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	22
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	0.1MHz	< 0.25mT	25°C	20
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 2
Curie Temperature	Tc	°C				≥ 120
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

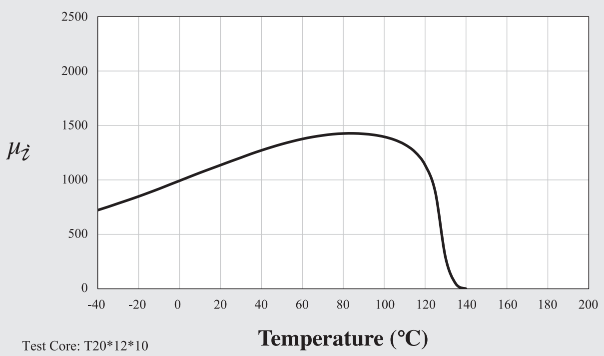
Loss Factor V.S. Frequency



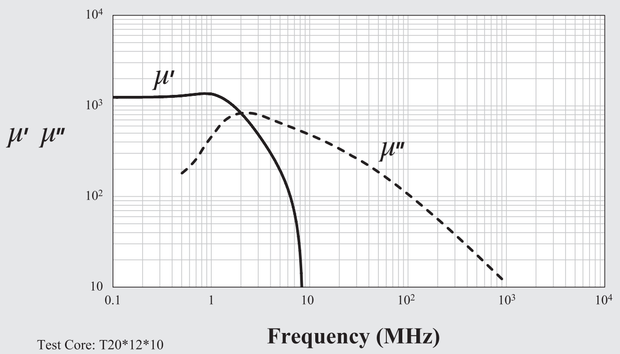
Saturation Flux Density V.S. Magnetic Field



Initial Permeability V.S. Temperature



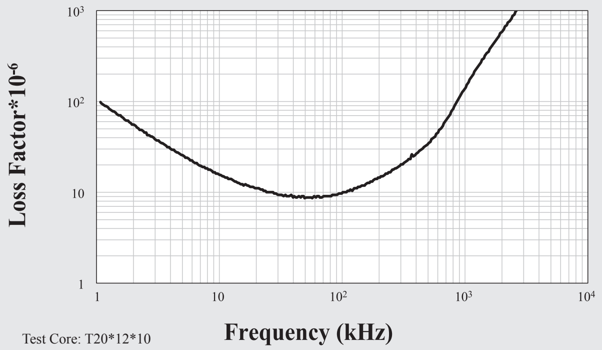
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	D37
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	1500 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	290
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	150
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	20
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	0.1MHz	< 0.25mT	25°C	10
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 4
Curie Temperature	Tc	°C				≥ 110
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

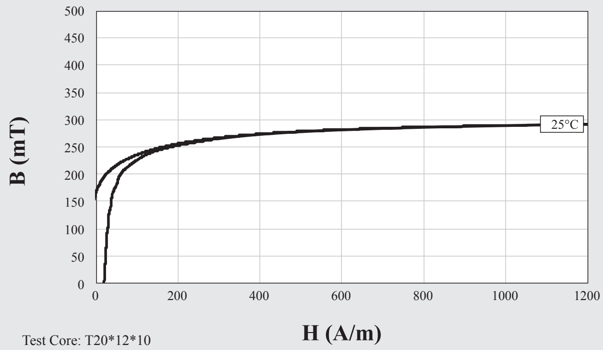
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



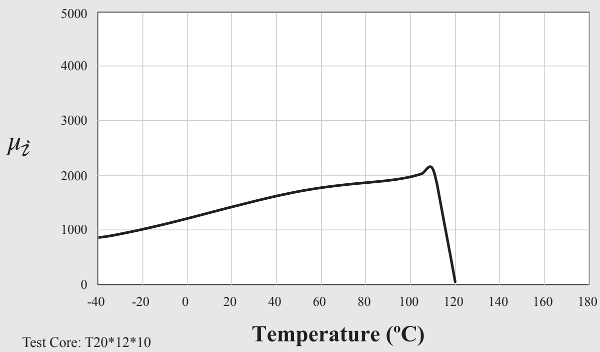
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



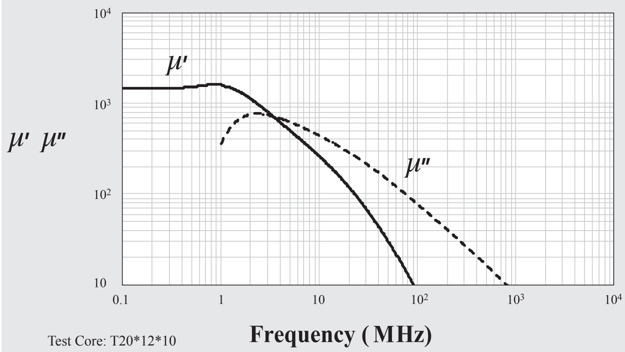
Test Core: T20*12*10

Initial Permeability V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

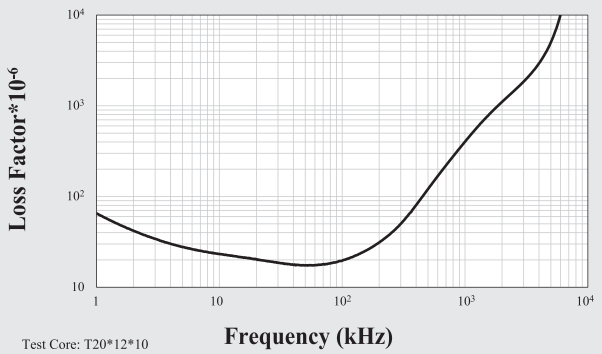


Test Core: T20*12*10

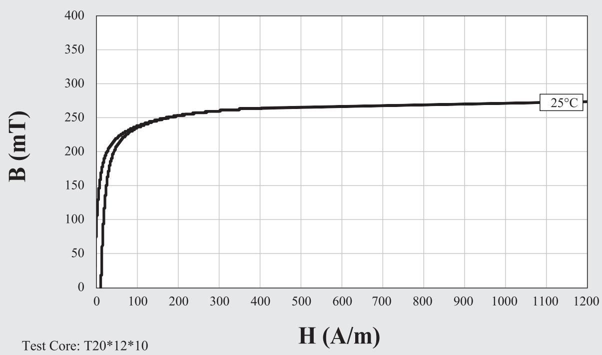
	Symbol	Unit	Measuring Conditions			Automotive EMI-Suppression Material
			Freq.	Flux den.	Temp.	D40
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	2000 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 1200A/m	25°C	275
Remanence	Br	mT	10kHz	H = 1200A/m	25°C	115
Coercivity	Hc	A/m	10kHz	H = 1200A/m	25°C	8
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	0.1MHz	< 0.25mT	25°C	18
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 20
Curie Temperature	Tc	°C				≥ 90
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

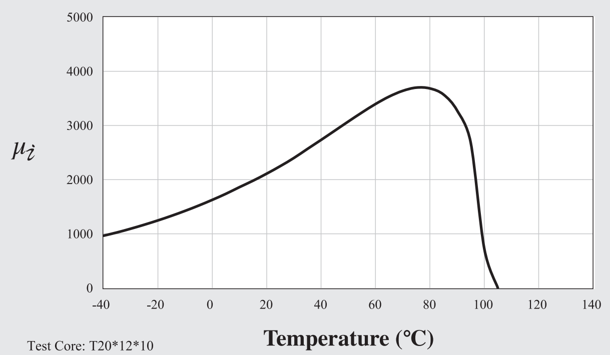
Loss Factor V.S. Frequency



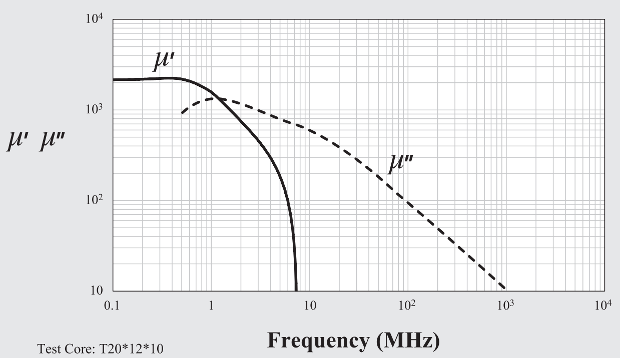
Saturation Flux Density V.S. Magnetic Field



Initial Permeability V.S. Temperature



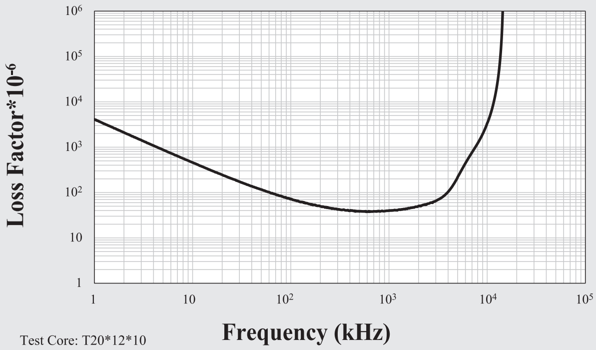
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			Conventional High Bs Material
			Freq.	Flux den.	Temp.	A30
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	300 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	435
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	300
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	68
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	1MHz	< 0.25mT	25°C	40
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 25
Curie Temperature	Tc	°C				≥ 250
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

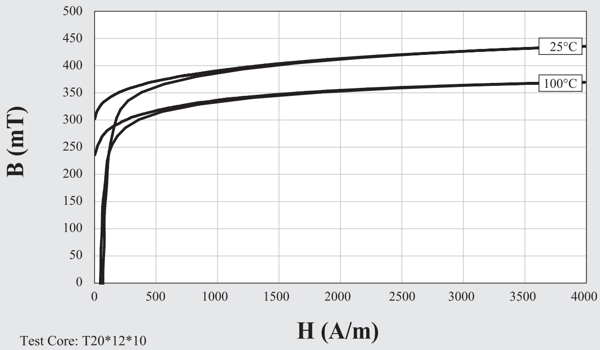
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



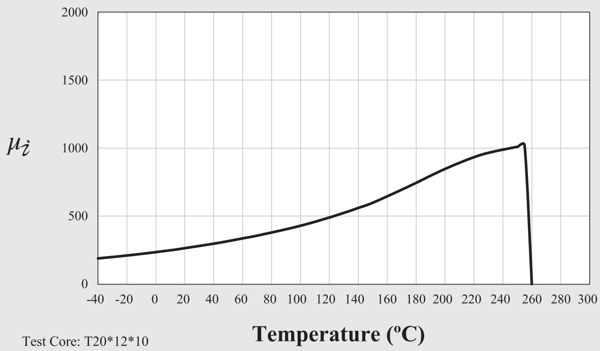
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



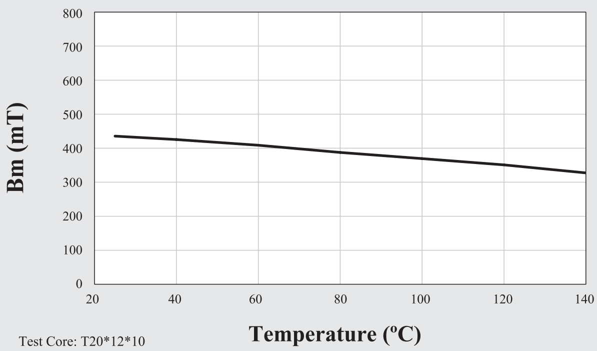
Test Core: T20*12*10

Initial Permeability V.S. Temperature



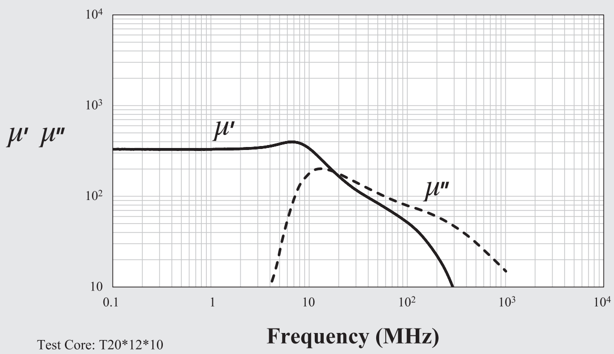
Test Core: T20*12*10

Saturation Flux Density V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

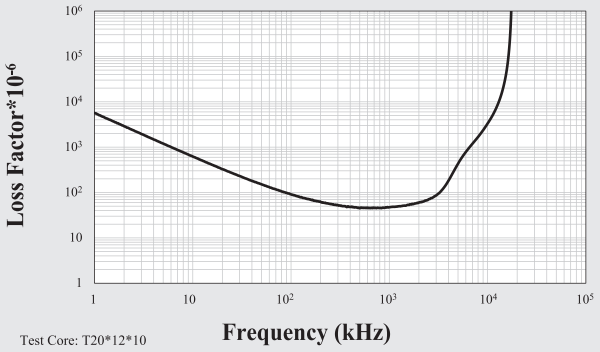


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Conventional High Bs Material
			Freq.	Flux den.	Temp.	A31
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	300 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	435
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	180
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	52
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	0.4MHz	< 0.25mT	25°C	50
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 25
Curie Temperature	Tc	°C				≥ 250
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

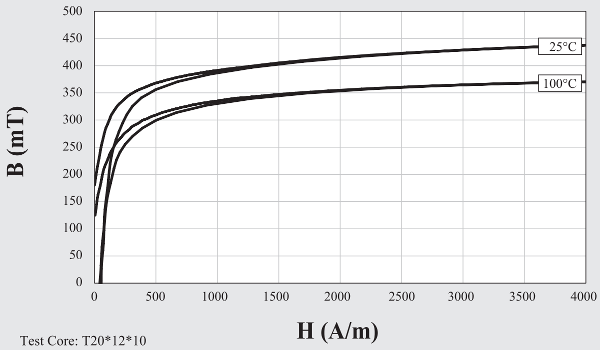
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



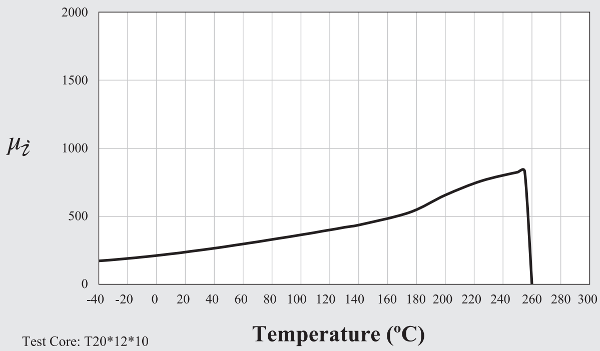
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



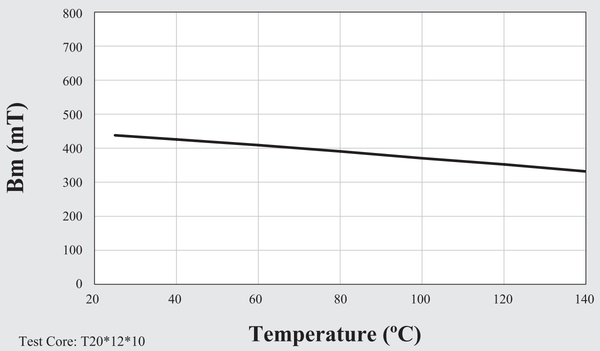
Test Core: T20*12*10

Initial Permeability V.S. Temperature



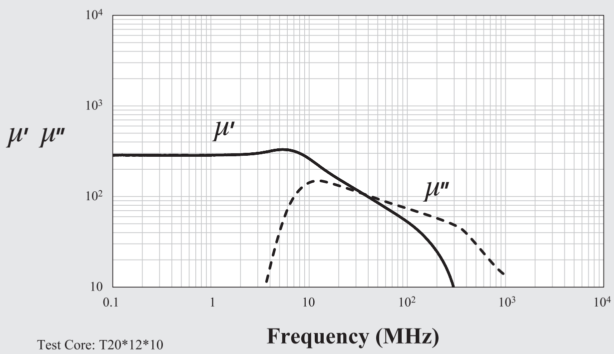
Test Core: T20*12*10

Saturation Flux Density V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

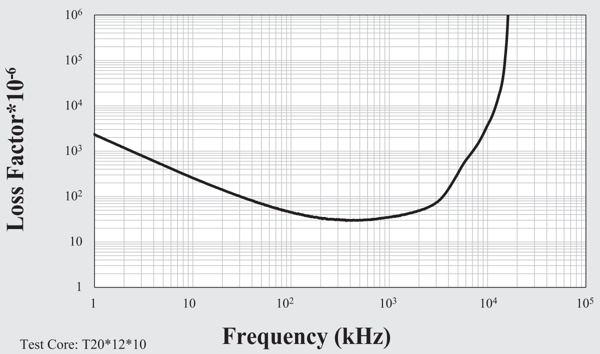


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Conventional High Bs Material
			Freq.	Flux den.	Temp.	A40
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	400 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	430
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	320
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	62
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	1MHz	< 0.25mT	25°C	35
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	≤ 20
Curie Temperature	Tc	°C				≥ 250
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

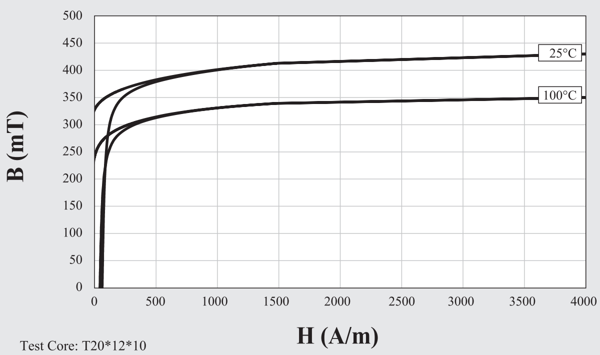
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



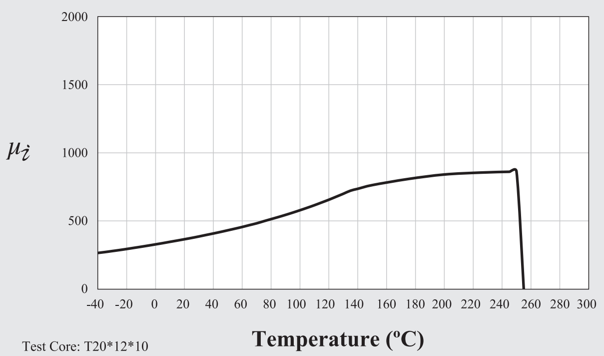
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



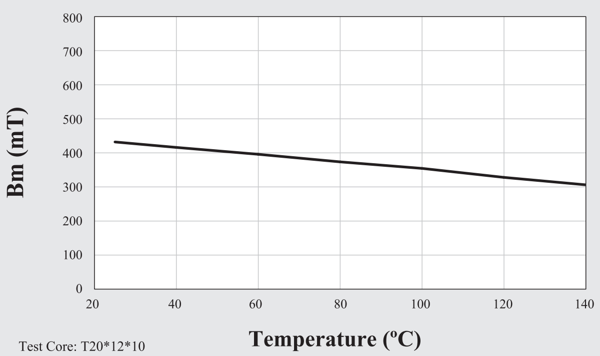
Test Core: T20*12*10

Initial Permeability V.S. Temperature



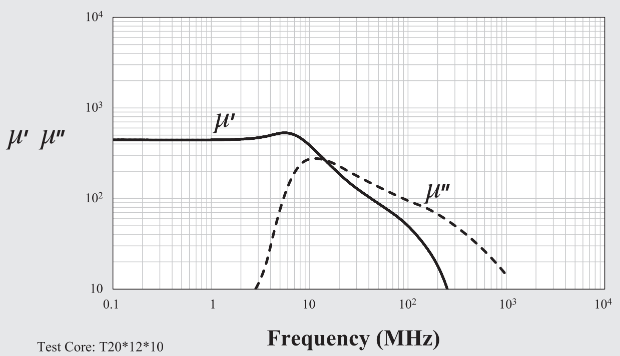
Test Core: T20*12*10

Saturation Flux Density V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

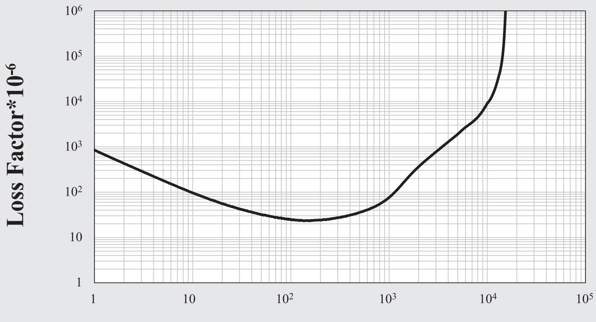


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Conventional High Bs Material
			Freq.	Flux den.	Temp.	A50
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	500 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	330
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	125
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	56
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	0.1MHz	< 0.25mT	25°C	30
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 80°C	1 ~ 5
Curie Temperature	Tc	°C				≥ 150
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.00

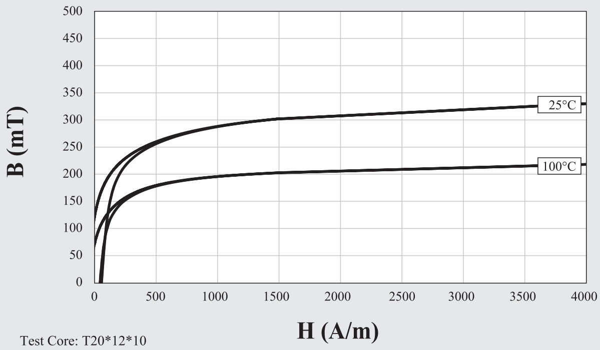
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



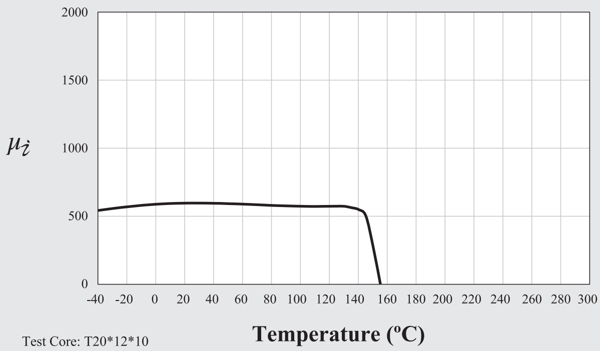
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



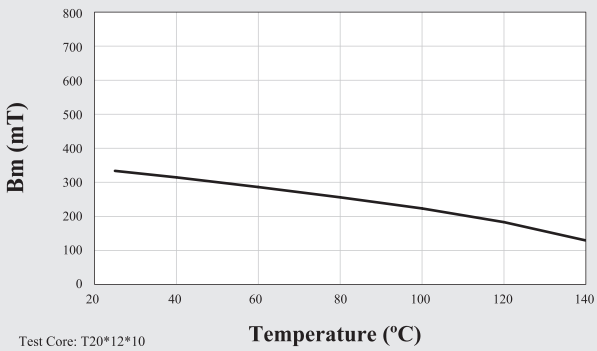
Test Core: T20*12*10

Initial Permeability V.S. Temperature



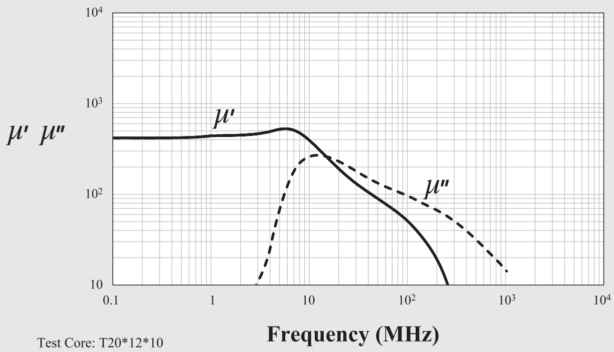
Test Core: T20*12*10

Saturation Flux Density V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

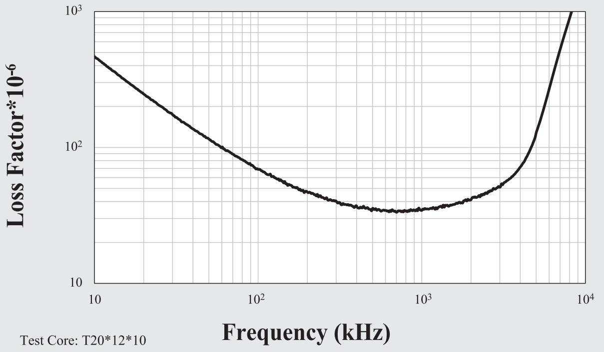


Test Core: T20*12*10

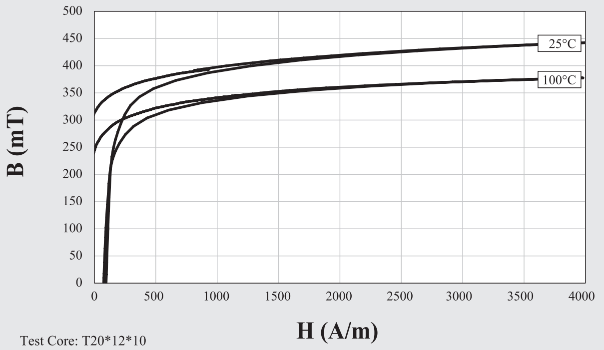
	Symbol	Unit	Measuring Conditions			Automotive High Bs Material
			Freq.	Flux den.	Temp.	B25
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	250 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	445
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	320
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	95
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	70
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	12
Curie Temperature	Tc	°C				≥ 250
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.20

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

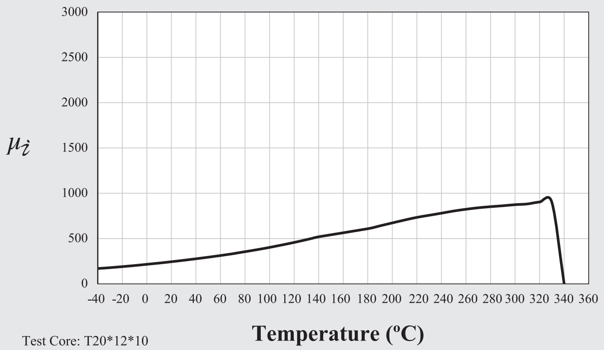
Loss Factor V.S. Frequency



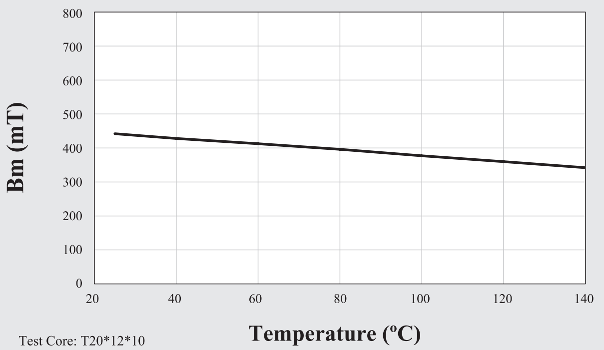
Saturation Flux Density V.S. Magnetic Field



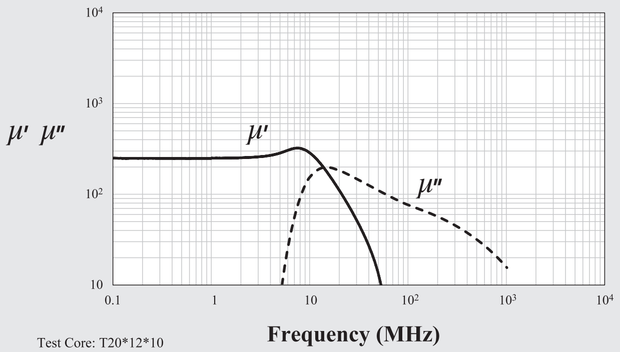
Initial Permeability V.S. Temperature



Saturation Flux Density V.S. Temperature



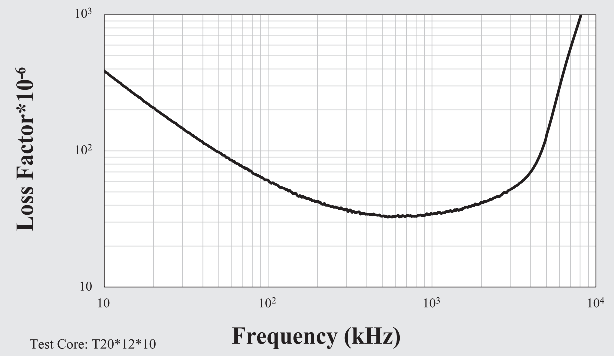
Complex Permeability V.S. Frequency



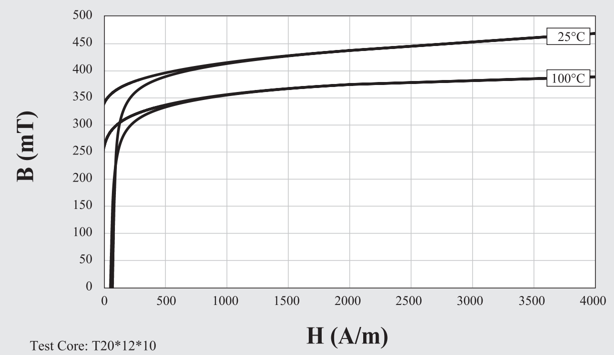
	Symbol	Unit	Measuring Conditions			Automotive High Bs Material
			Freq.	Flux den.	Temp.	B30
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	300 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	470
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	250
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	80
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	60
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	16
Curie Temperature	Tc	°C				≥ 300
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.20

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

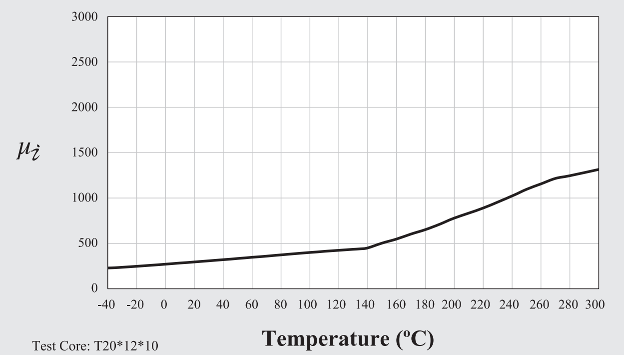
Loss Factor V.S. Frequency



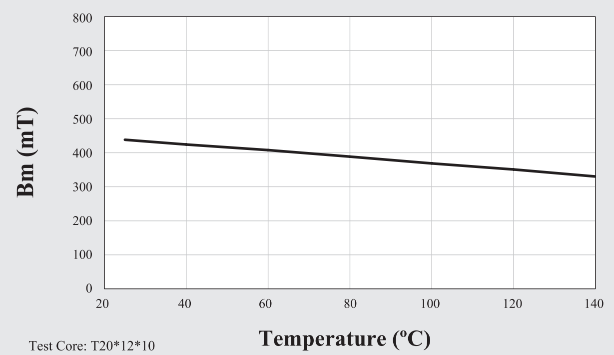
Saturation Flux Density V.S. Magnetic Field



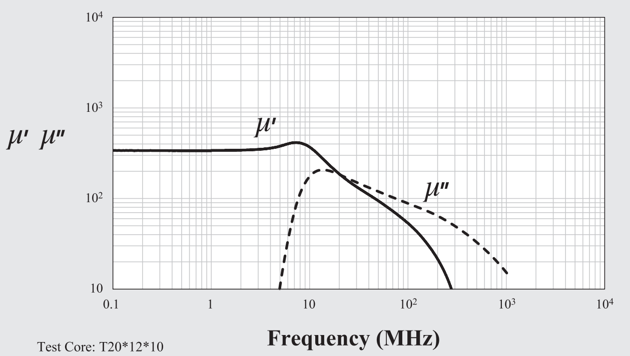
Initial Permeability V.S. Temperature



Saturation Flux Density V.S. Temperature



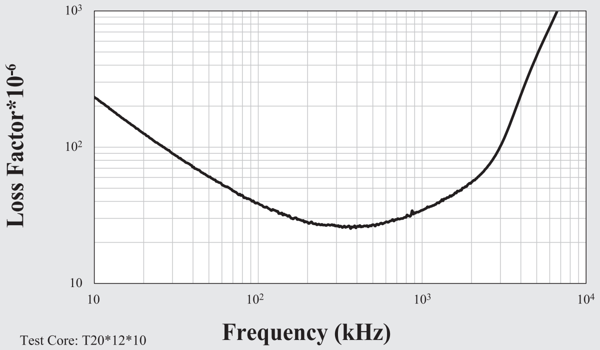
Complex Permeability V.S. Frequency



	Symbol	Unit	Measuring Conditions			Automotive High Bs Material
			Freq.	Flux den.	Temp.	B40
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	400 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	430
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	300
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	45
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	40
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	10
Curie Temperature	Tc	°C				≥ 240
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.20

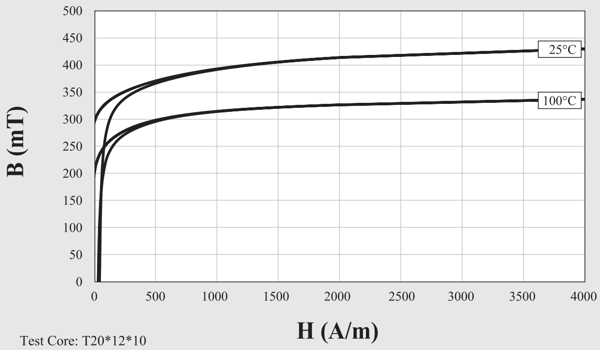
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



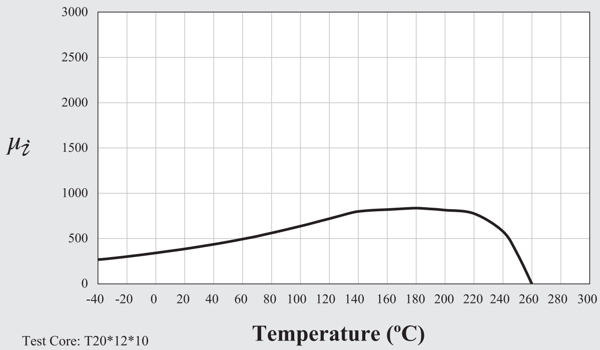
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



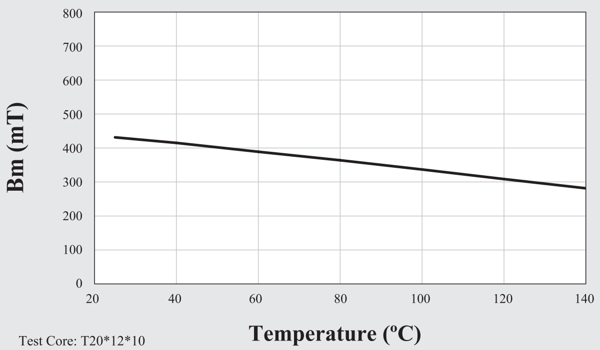
Test Core: T20*12*10

Initial Permeability V.S. Temperature



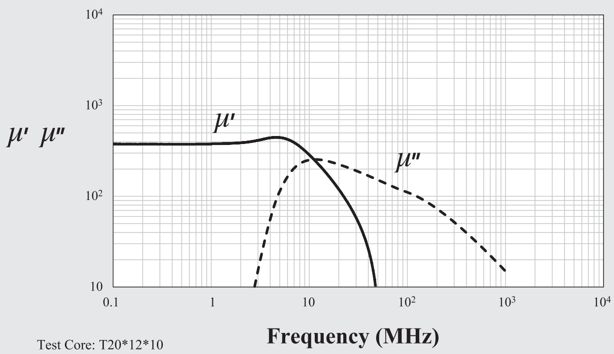
Test Core: T20*12*10

Saturation Flux Density V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

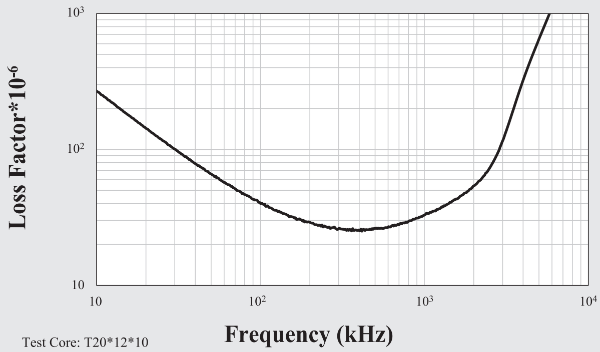


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Automotive High Bs Material
			Freq.	Flux den.	Temp.	B45
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	450 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	450
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	270
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	49
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	40
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	15
Curie Temperature	Tc	°C				≥ 240
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.20

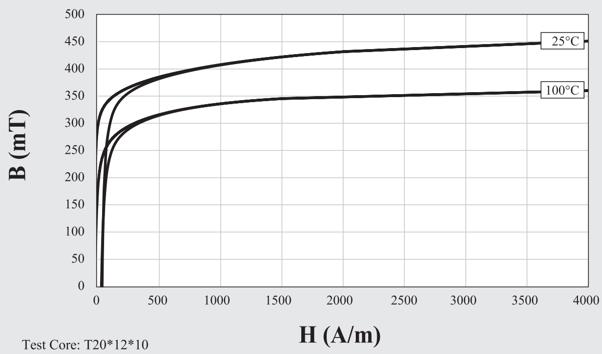
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



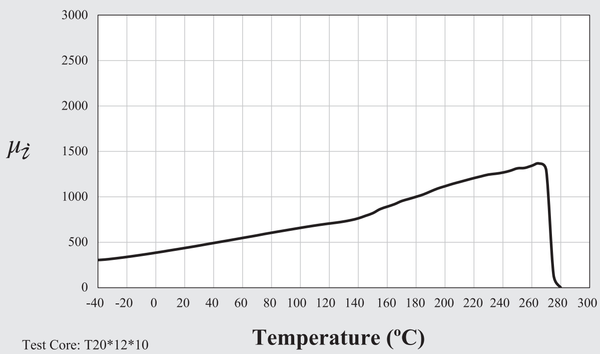
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



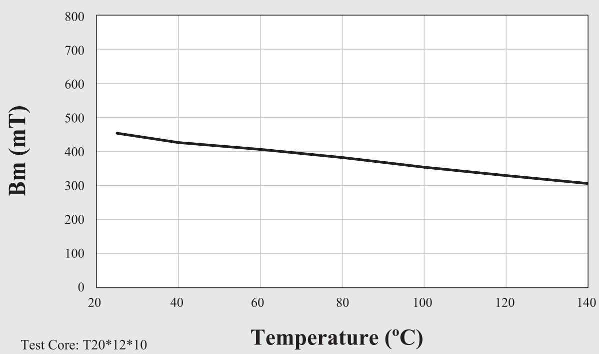
Test Core: T20*12*10

Initial Permeability V.S. Temperature



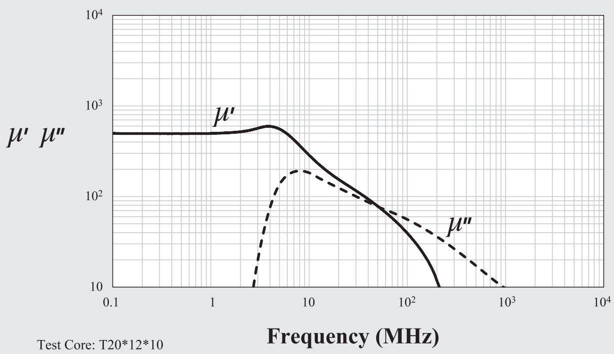
Test Core: T20*12*10

Saturation Flux Density V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

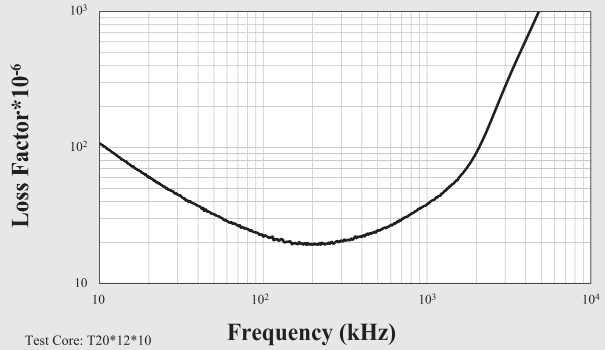


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Automotive High Bs Material
			Freq.	Flux den.	Temp.	B60
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	600 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	430
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	300
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	40
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	25
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	12
Curie Temperature	Tc	°C				≥ 210
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.20

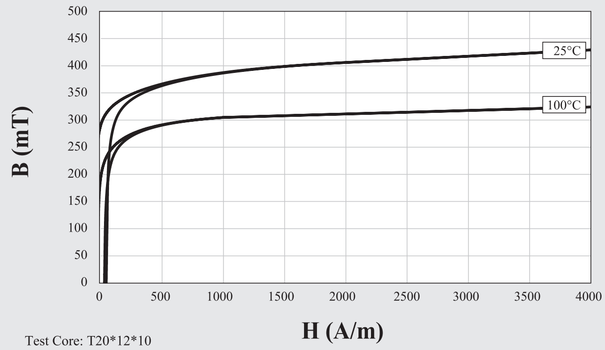
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



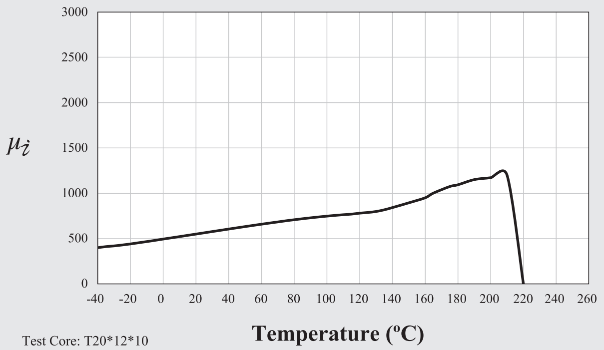
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



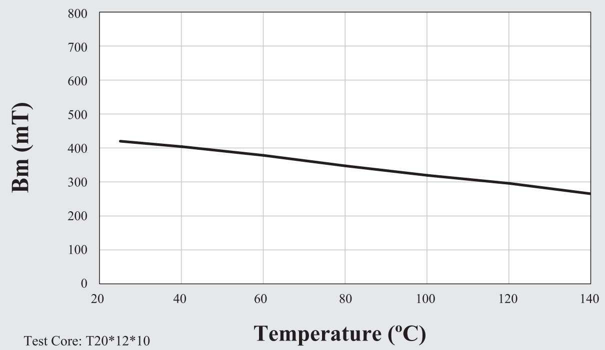
Test Core: T20*12*10

Initial Permeability V.S. Temperature



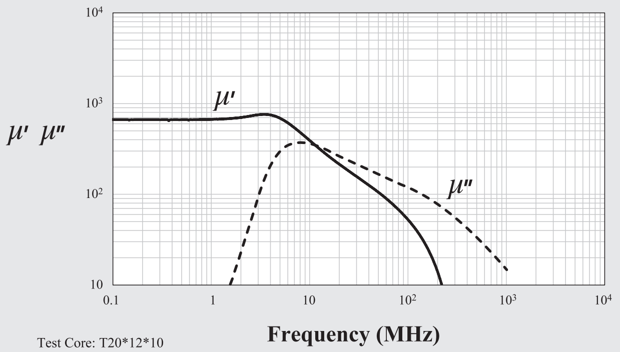
Test Core: T20*12*10

Saturation Flux Density V.S. Temperature



Test Core: T20*12*10

Complex Permeability V.S. Frequency

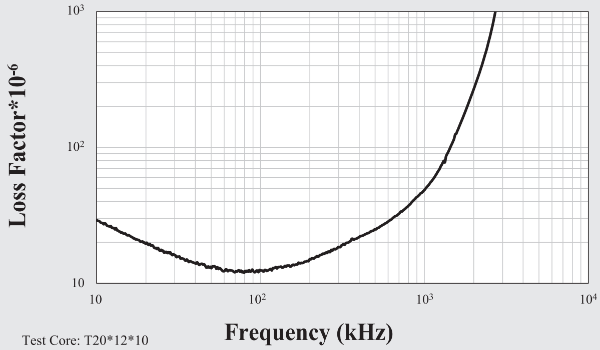


Test Core: T20*12*10

	Symbol	Unit	Measuring Conditions			Automotive High Bs Material
			Freq.	Flux den.	Temp.	B90
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	900 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	390
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	250
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	38
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	13
Temperature Factor of Permeability	α_F	10^{-6}/°C	10kHz	< 0.25 mT	20 ~ 60°C	8
Curie Temperature	Tc	°C				≥ 180
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.20

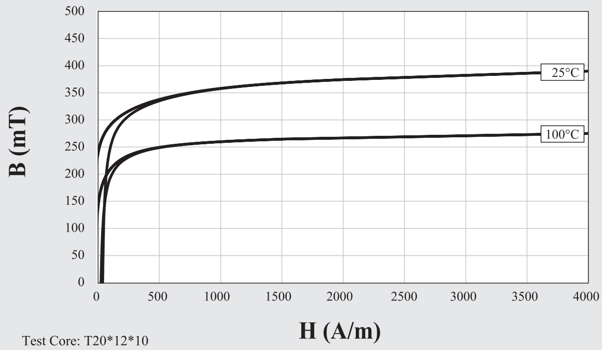
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



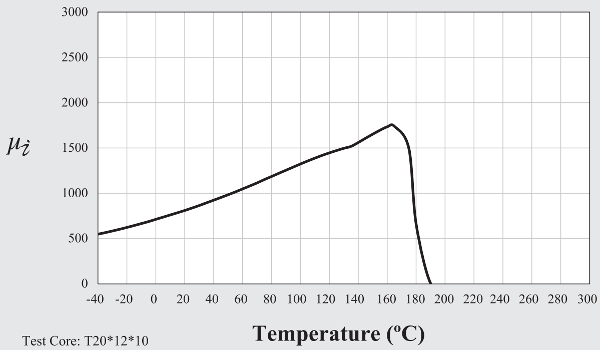
Test Core: T20*12*10

Saturation Flux Density V.S. Magnetic Field



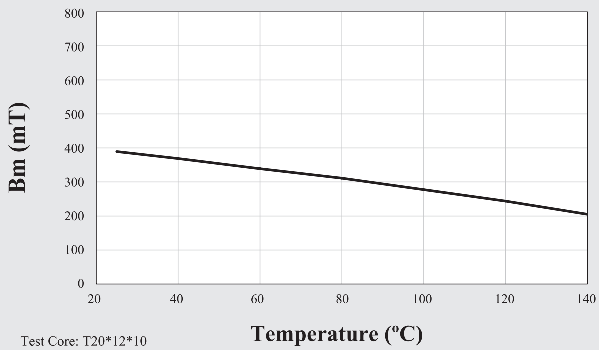
Test Core: T20*12*10

Initial Permeability V.S. Temperature



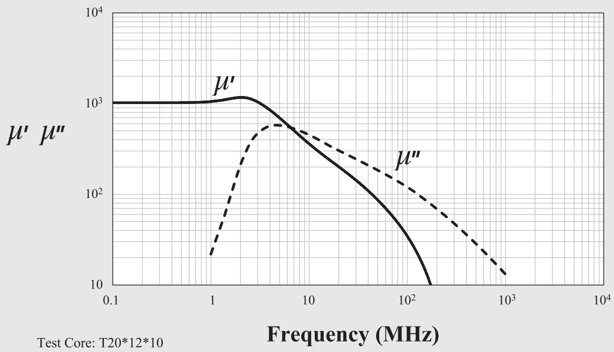
Test Core: T20*12*10

Saturation Flux Density V.S. Temperature



Test Core: T20*12*10

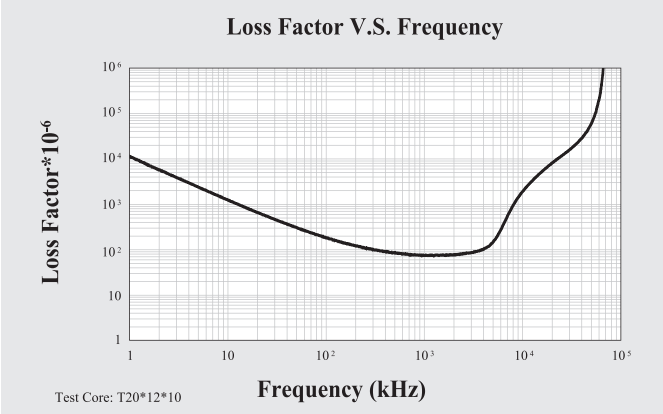
Complex Permeability V.S. Frequency

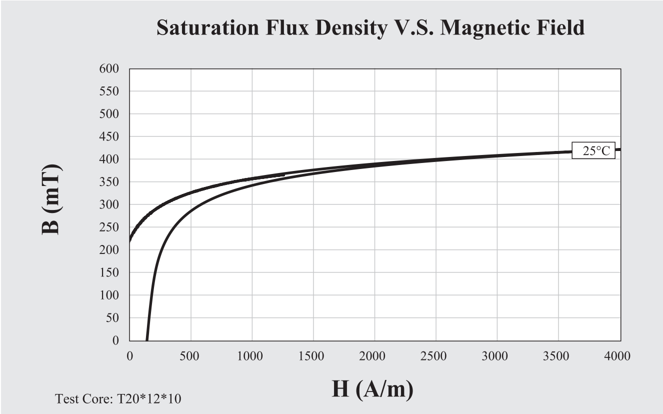


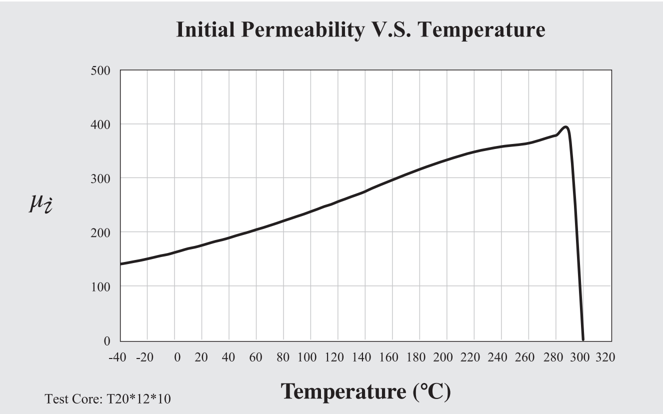
Test Core: T20*12*10

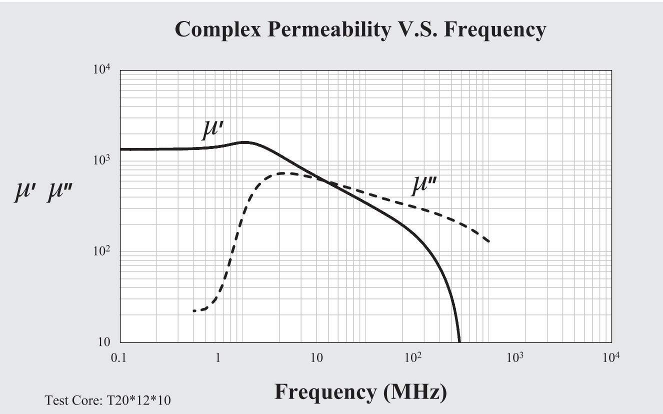
	Symbol	Unit	Measuring Conditions			Low Permeability Material
			Freq.	Flux den.	Temp.	L1
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	150 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	410
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	170
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	105
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	100kHz	< 0.25mT	25°C	180
Curie Temperature	Tc	°C				≥ 250
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.





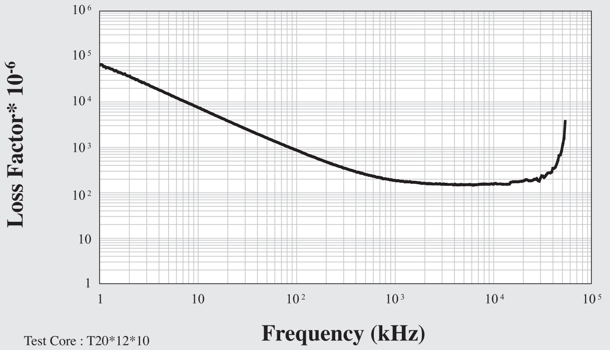




	Symbol	Unit	Measuring Conditions			Low Permeability Material
			Freq.	Flux den.	Temp.	L2
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	60 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	420
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	275
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	140
Relative Loss Factor	$\tan\delta/\mu_i$	10^{-6}	10MHz	< 0.25mT	25°C	150
Curie Temperature	Tc	°C				≥ 250
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm^3				5.10

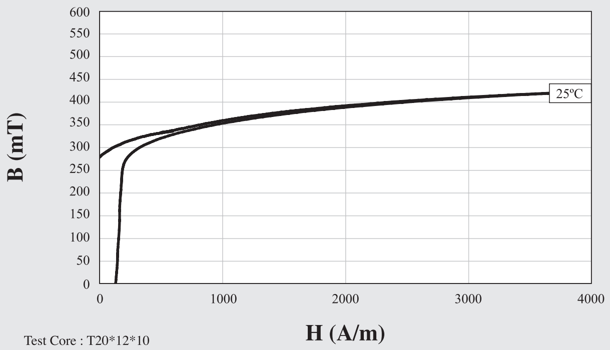
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



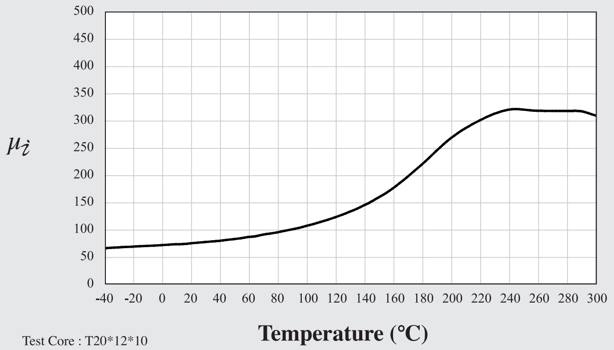
Test Core : T20*12*10

Saturation Flux Density V.S. Magnetic Field



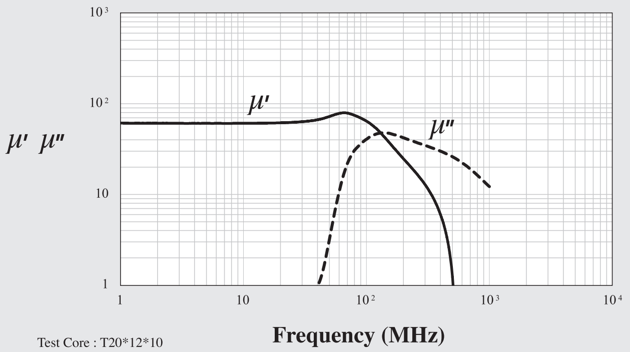
Test Core : T20*12*10

Initial Permeability V.S. Temperature



Test Core : T20*12*10

Complex Permeability V.S. Frequency

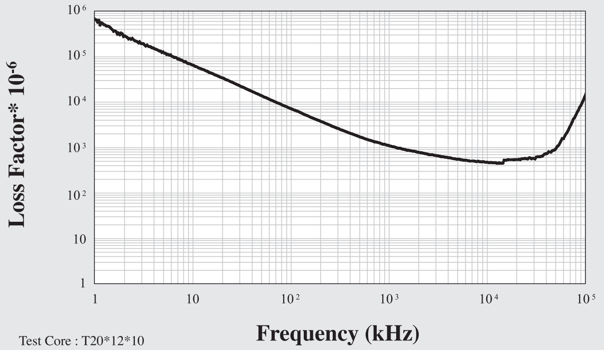


Test Core : T20*12*10

	Symbol	Unit	Measuring Conditions			Low Permeability Material
			Freq.	Flux den.	Temp.	L3
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	20 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 8000A/m	25°C	305
Remanence	Br	mT	10kHz	H = 8000A/m	25°C	120
Coercivity	Hc	A/m	10kHz	H = 8000A/m	25°C	600
Relative Loss Factor	tanδ/μ_i	10^{-6}	10MHz	< 0.25mT	25°C	445
Curie Temperature	Tc	°C				≥ 300
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

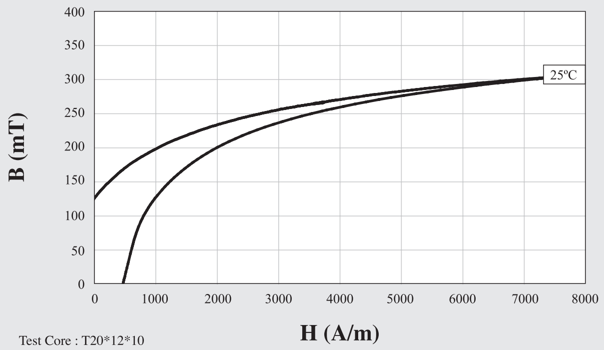
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



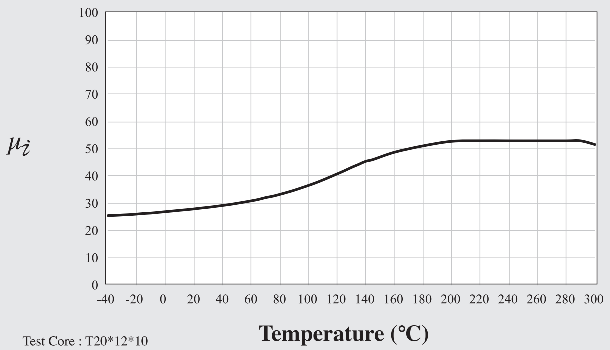
Test Core : T20*12*10

Saturation Flux Density V.S. Magnetic Field



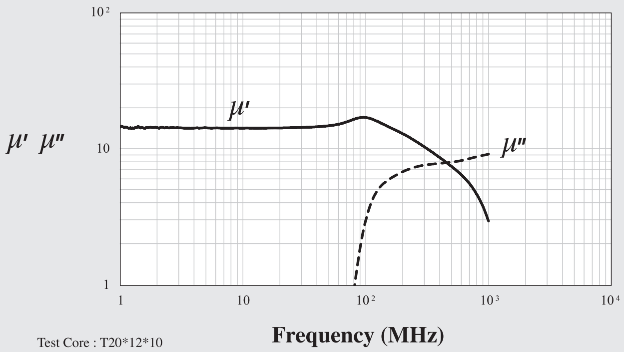
Test Core : T20*12*10

Initial Permeability V.S. Temperature



Test Core : T20*12*10

Complex Permeability V.S. Frequency

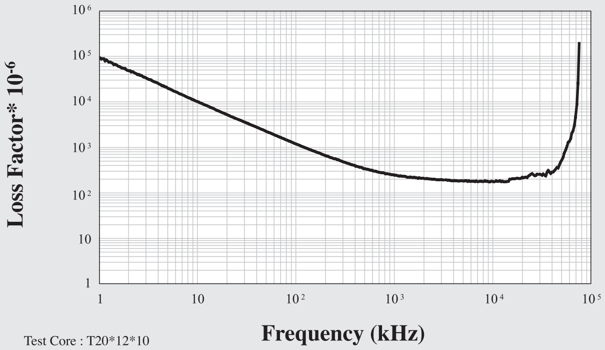


Test Core : T20*12*10

	Symbol	Unit	Measuring Conditions			Low Permeability Material
			Freq.	Flux den.	Temp.	L4
Initial Permeability	μ_i		≤ 10kHz	0.25mT	25°C	50 ± 25%
Saturation Flux Density	Bs	mT	10kHz	H = 4000A/m	25°C	395
Remanence	Br	mT	10kHz	H = 4000A/m	25°C	255
Coercivity	Hc	A/m	10kHz	H = 4000A/m	25°C	200
Relative Loss Factor	tanδ/μ_i	10^{-6}	10MHz	< 0.25mT	25°C	170
Curie Temperature	Tc	°C				≥ 300
Resistivity	ρ	Ωm				> 10^6
Density	d	g/cm³				5.10

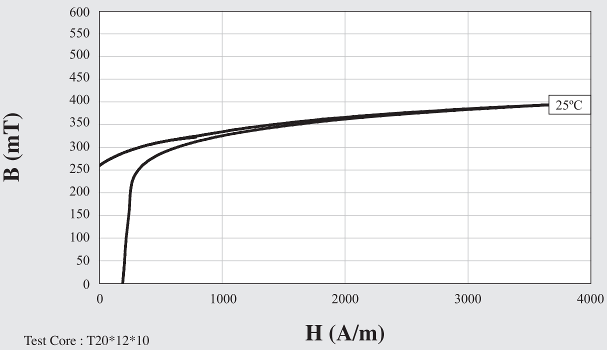
Note: Material characteristics are typical for a toroid core.
Product specification will differ from these data due to the influence of geometry and size.

Loss Factor V.S. Frequency



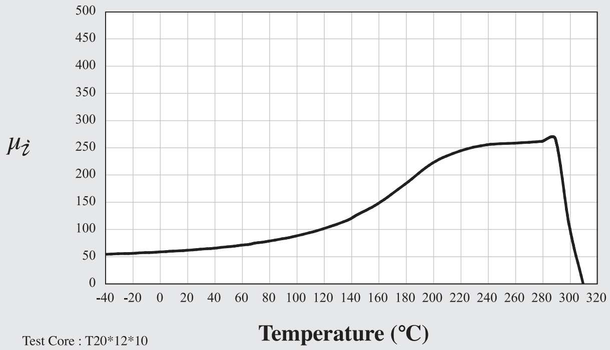
Test Core : T20*12*10

Saturation Flux Density V.S. Magnetic Field



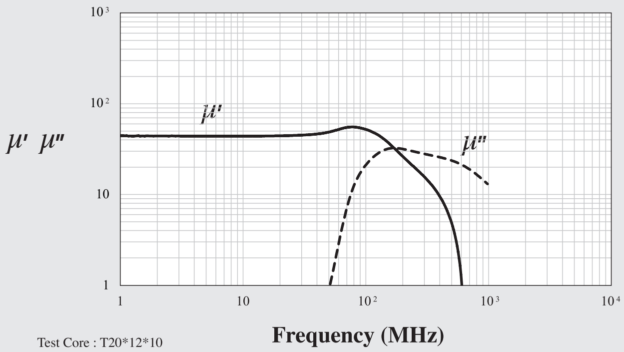
Test Core : T20*12*10

Initial Permeability V.S. Temperature



Test Core : T20*12*10

Complex Permeability V.S. Frequency



Test Core : T20*12*10