

# Magnetic Properties of Ferrite Materials

Property	Unit	Symbol	68	67	61	52*	51	44
Initial Permeability @ B <10 gauss		$\mu_i$	20	40	125	250	350	500
Flux Density @ Field Strength	gauss	B	2700	2300	2350	4200	3200	3000
	mT		270	230	235	420	320	300
	oersted	H	40	20	15	10	10	10
	A/m		3200	1600	1200	800	800	800
Residual Flux Density	gauss	Br	1000	800	1200	2900	1200	1100
	mT		100	80	120	290	120	110
Coercive Force	oersted	Hc	7.0	3.5	1.8	0.6	0.6	0.45
	A/m		560	280	144	48	48	36
Loss Factor @ Frequency	10 <sup>-6</sup> MHz	tan $\delta/\mu_i$	500	150	30	45	40	125
			100	50	1.0	1.0	1.0	1.0
Temperature Coefficient of Initial Permeability (20-70°C)	%/°C		0.10	0.05	0.10	1.0	0.8	0.75
Curie Temperature	°C	Tc	>500	>475	>300	>250	>170	>160
Resistivity	$\Omega$ cm	$\rho$	1x10 <sup>7</sup>	1x10 <sup>7</sup>	1x10 <sup>8</sup>	1x10 <sup>9</sup>	1x10 <sup>9</sup>	1x10 <sup>9</sup>
Power Loss Density 25kHz - 2000 G - 100°C 100kHz - 1000 G - 100°C 500kHz - 500 G - 100°C	mW cm <sup>3</sup>	P	---	---	---	---	---	---
			---	---	---	---	---	---
			---	---	---	---	---	---
Recommended Frequency Range	MHz							
Application Areas	Low flux density devices. EMI suppression. Power magnetics. Special square loop ferrite.		<400	<300	<100	---	---	---
			---	---	>200	<500	>200	20 - 250
			---	---	---	---	---	---
			---	---	---	---	---	---
See this page for additional material data.			7	8	9	10	11	12

42 Material, specifically developed for absorber applications in anechoic chambers, is listed on page 93.

\* New Fair-Rite material, added in this edition of the catalog.

Additional ferrite mechanical and thermal characteristics are tabulated on page 132.

# Magnetic Properties of Ferrite Materials

46*	33	85	43	79*	31	77	78	73	75	76
500	600	600	800	1400	1500	2000	2300	2500	5000	10000
3000	2800	4200	2900	4700	3400	4900	4800	3900	4300	4000
300	280	420	290	470	340	490	480	390	430	400
10	5	10	10	5	5	5	5	5	5	5
800	400	800	800	400	400	400	400	400	400	400
1900	1200	3700	1300	1700	2500	1800	1500	1500	1400	1800
190	120	370	130	170	250	180	150	150	140	180
0.40	0.60	0.50	0.45	0.40	0.35	0.30	0.20	0.24	0.16	0.12
32	48	40	36	32	28	24	16	19.2	13	9.6
60	25	30	250	4.0	20	15	4.5	10	15	15
0.1	0.2	0.1	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.025
---	0.10	---	1.25	0.6	1.6	0.7	1.0	0.65	0.6	0.5
>140	>150	>200	>130	>225	>130	>200	>200	>160	>140	>120
1x10 <sup>8</sup>	1x10 <sup>2</sup>	2x10 <sup>2</sup>	1x10 <sup>5</sup>	2x10 <sup>2</sup>	3x10 <sup>3</sup>	1x10 <sup>2</sup>	2x10 <sup>2</sup>	1x10 <sup>2</sup>	3x10 <sup>2</sup>	50
---	---	---	---	---	---	200	75	---	140	---
---	---	---	---	---	---	---	85	---	---	---
---	---	---	---	80	---	---	---	---	---	---
---	<3	---	<10	---	---	<3	<2.5	---	<0.75	<0.5
20 - 250	---	---	20 - 250	---	<500	---	---	<30	---	---
---	---	---	---	<0.75	---	<0.1	<0.5	---	<0.1	---
---	---	<0.15	---	---	---	---	---	---	---	---
13	14	15	16	18/19	17	20/21	22/23	24	25	26



# Fair-Rite Products Corp.

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- [www.fair-rite.com](http://www.fair-rite.com)
- E-Mail: [ferrites@fair-rite.com](mailto:ferrites@fair-rite.com)

# 68 Material

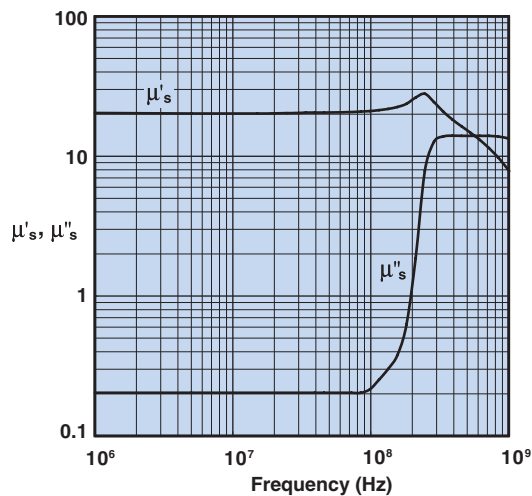
Our highest frequency NiZn ferrite intended for broadband transformers, antennas and HF high Q inductor applications up to 100 MHz. This material is only supplied to customer-specific requirements and close consultation with our application staff is suggested.

*Strong magnetic fields or excessive mechanical stresses may result in irreversible changes in permeability and losses.*

### 68 Material Specifications:

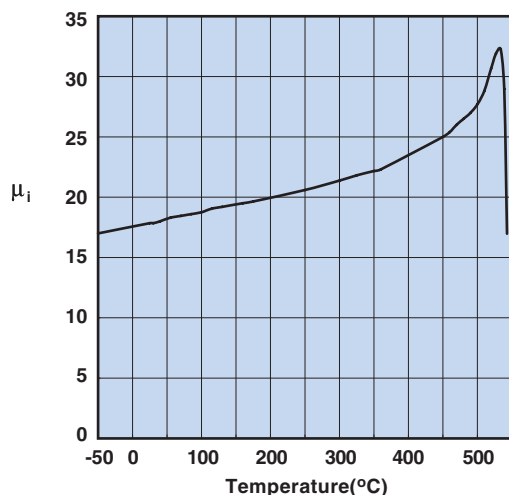
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	20
Flux Density @ Field Strength	gauss oersted	B H	2700 40
Residual Flux Density	gauss	$B_r$	1000
Coercive Force	oersted	$H_c$	7.0
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	500 100
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.10
Curie Temperature	°C	$T_c$	>500
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^7$

### Complex Permeability vs. Frequency



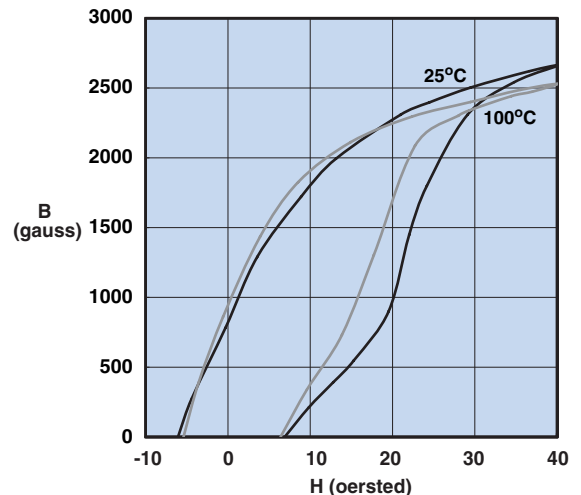
Measured on an 18/10/6mm toroid using the HP 4284A and the HP 4291A.

### Initial Permeability vs. Temperature



Measured on an 18/10/6mm toroid at 100kHz.

### Hysteresis Loop



Measured on an 18/10/6mm toroid at 10kHz.

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# 67 Material

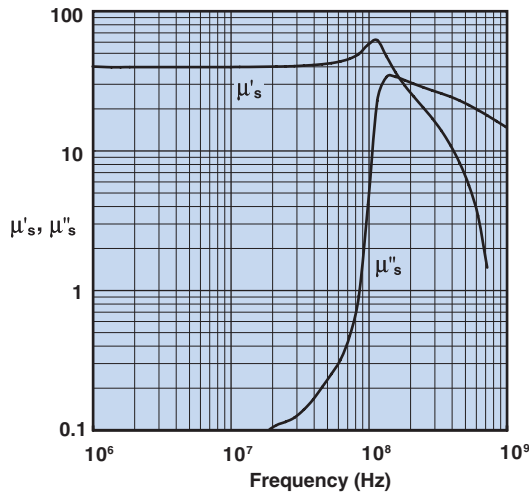
A high frequency NiZn ferrite for the design of broadband transformers, antennas and HF, high Q inductor applications up to 50 MHz. Toroids, multi-aperture cores and antenna/RFID rods are available in this material.

*Strong magnetic fields or excessive mechanical stresses may result in irreversible changes in permeability and losses.*

## 67 Material Specifications:

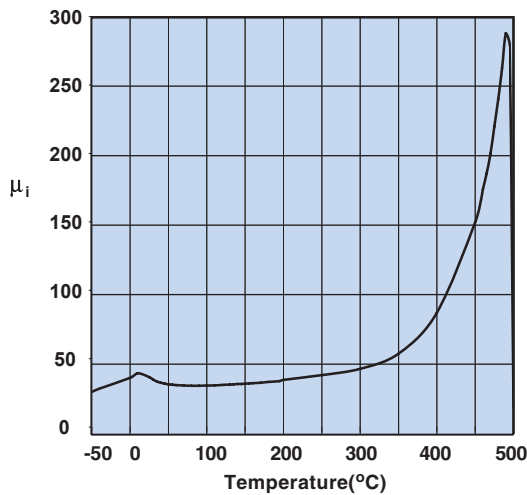
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	40
Flux Density @ Field Strength	gauss oersted	B H	2300 20
Residual Flux Density	gauss	$B_r$	800
Coercive Force	oersted	$H_c$	3.5
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	150 50
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.05
Curie Temperature	°C	$T_c$	>475
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^7$

### Complex Permeability vs. Frequency



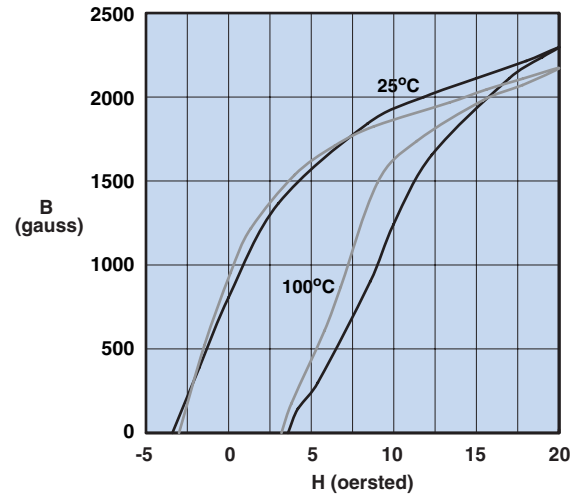
Measured on an 19/10/6mm toroid using the HP 4284A and the HP 4291A.

### Initial Permeability vs. Temperature



Measured on a 19/10/6mm toroid at 100kHz.

### Hysteresis Loop



Measured on a 19/10/6mm toroid at 10kHz.

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# 61 Material

A high frequency NiZn ferrite developed for a range of inductive applications up to 25 MHz. This material is also used in EMI applications for suppression of noise frequencies above 200 MHz.

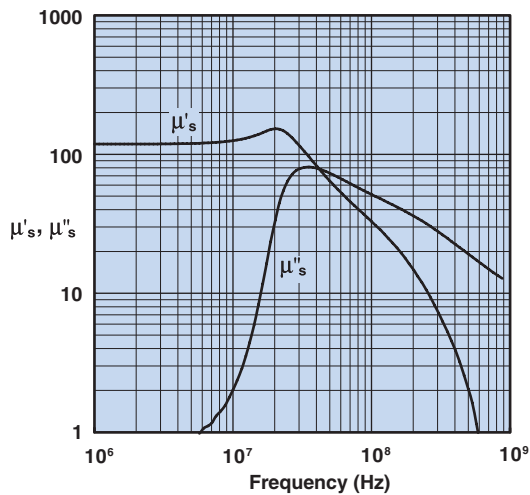
EMI suppression beads, beads on leads, SM beads, wound beads, multi-aperture cores, round cable EMI suppression cores, round cable snap-its, rods, antenna/RFID rods, and toroids are all available in 61 material.

*Strong magnetic fields or excessive mechanical stresses may result in irreversible changes in permeability and losses.*

## 61 Material Specifications:

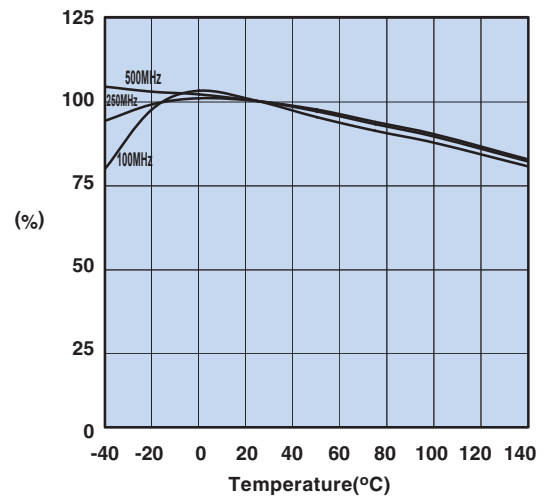
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	125
Flux Density @ Field Strength	gauss oersted	B H	2350 15
Residual Flux Density	gauss	$B_r$	1200
Coercive Force	oersted	$H_c$	1.8
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	30 1.0
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.10
Curie Temperature	°C	$T_c$	>300
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^8$

Complex Permeability vs. Frequency



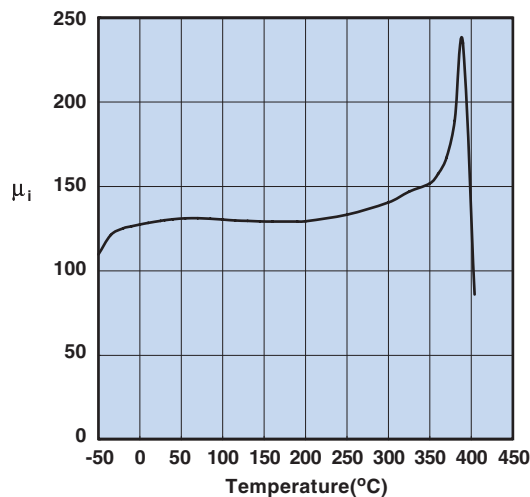
Measured on a 19/10/6mm toroid using the HP 4284A and the HP 4291A.

Percent of Original Impedance vs. Temperature



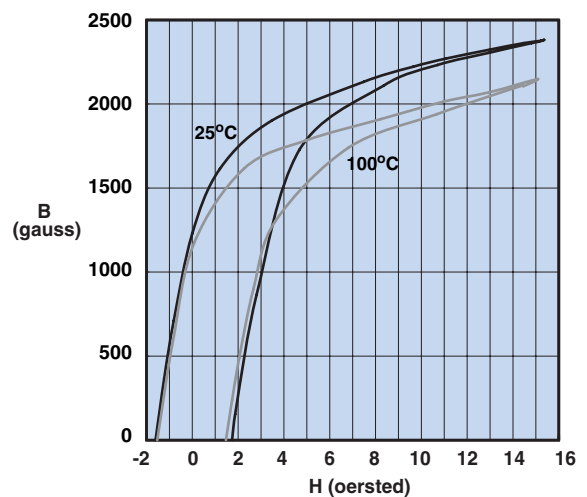
Measured on a 2661000301 using the HP4291A.

Initial Permeability vs. Temperature



Measured on a 19/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on a 19/10/6mm toroid at 10kHz.

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# 52 Material

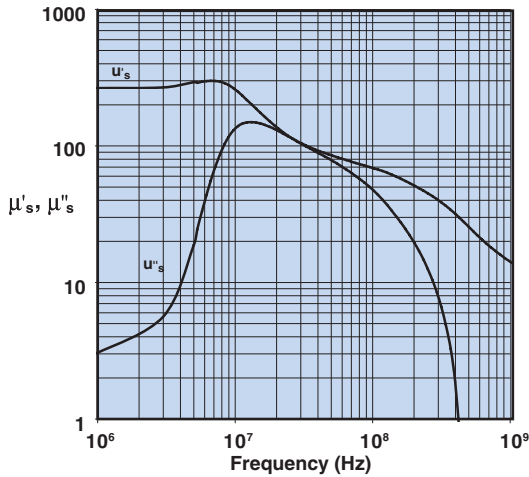
A new high frequency NiZn ferrite material, that combines a high saturation flux density and a high Curie temperature.

SM beads, PC beads and a range of rod cores are available in this material.

## 52 Material Specifications:

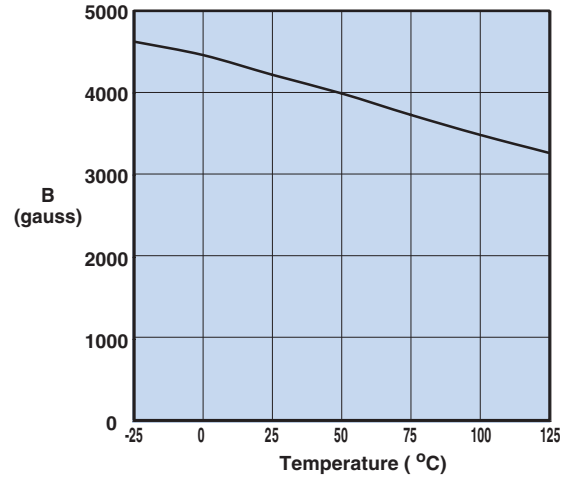
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	250
Flux Density @ Field Strength	gauss oersted	B H	4200 10
Residual Flux Density	gauss	$B_r$	2900
Coercive Force	oersted	$H_c$	0.60
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	45 1.0
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		1.0
Curie Temperature	°C	$T_c$	>250
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^9$

Complex Permeability vs. Frequency



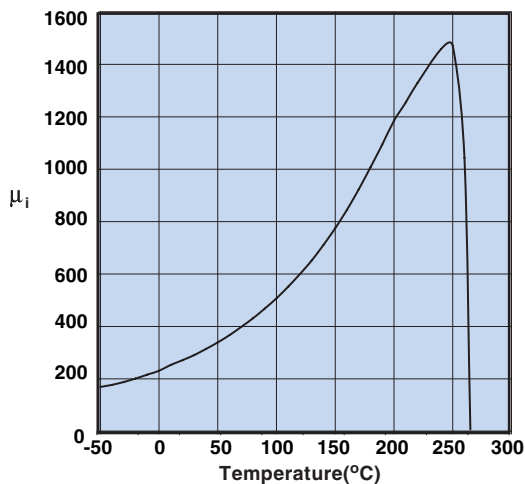
Measured on a 17/10/6mm toroid using the HP 4284A and the HP 4291A.

Flux Density vs. Temperature



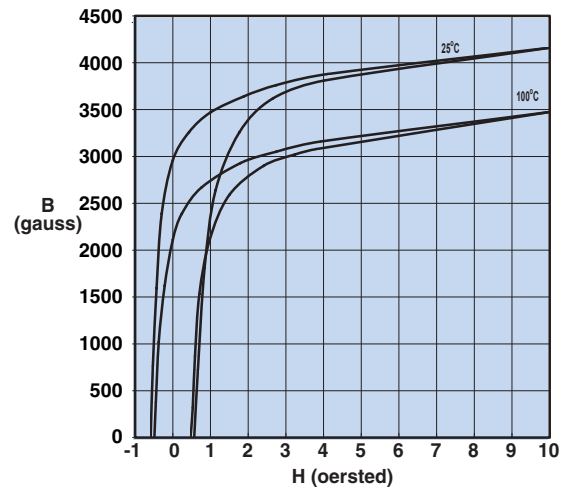
Measured on a 17/10/6mm toroid at 10kHz.

Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.

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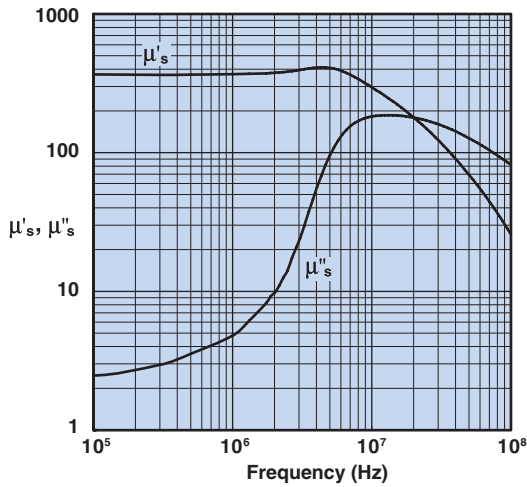
# 51 Material

A NiZn ferrite developed for low loss inductive designs for frequencies up to 5.0 MHz.

### 51 Material Specifications:

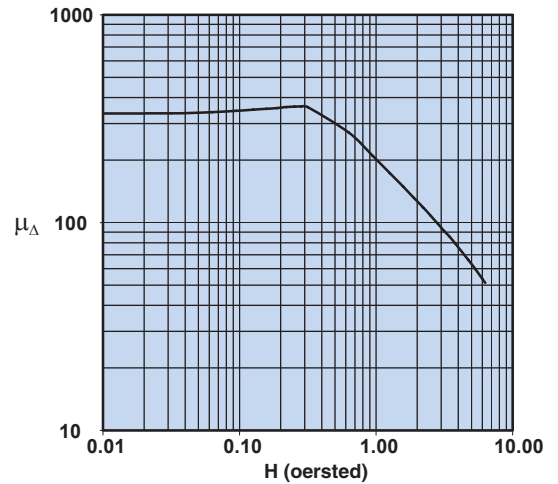
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	350
Flux Density @ Field Strength	gauss oersted	B H	3200 10
Residual Flux Density	gauss	$B_r$	1200
Coercive Force	oersted	$H_c$	0.60
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	40 1.0
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.8
Curie Temperature	°C	$T_c$	>170
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^9$

Complex Permeability vs. Frequency

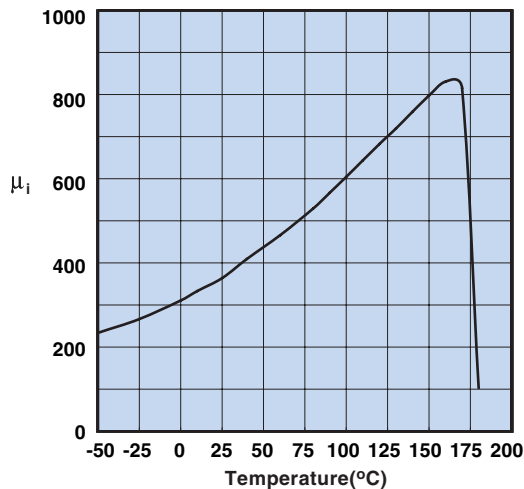


Measured on a 17/10/6mm toroid using the HP 4284A and the HP 4291A.

Incremental Permeability vs. H

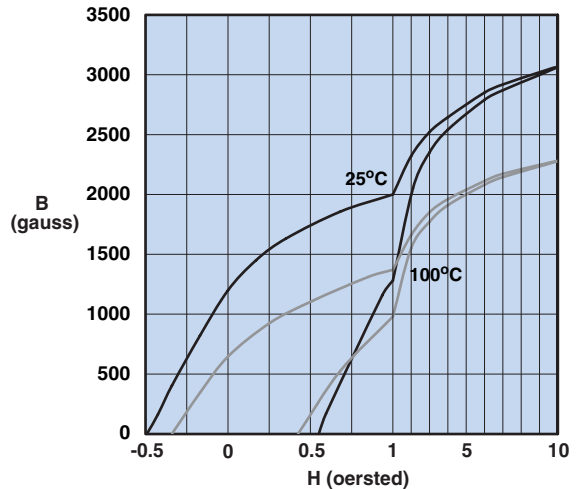


Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.

# 44 Material

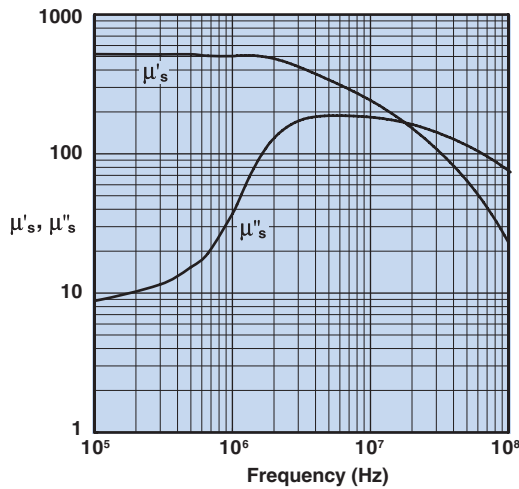
A NiZn ferrite developed to combine a high suppression performance, from 30 MHz to 500 MHz, with a very high dc resistivity.

SM beads, PC beads, wound beads, split round cable EMI suppression cores, round cable snap-its, and connector EMI suppression plates are all available in 44 material.

### 44 Material Specifications:

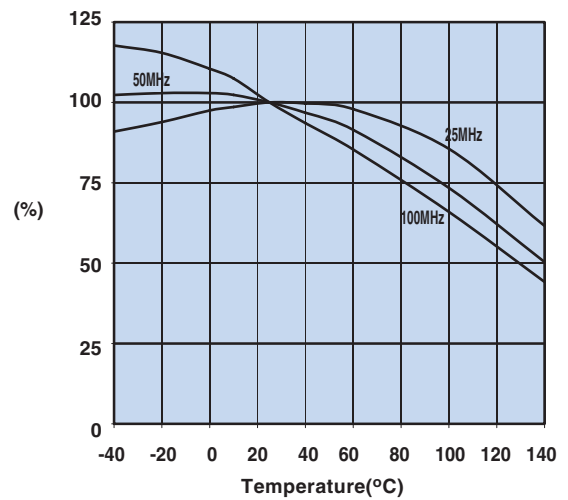
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	500
Flux Density @ Field Strength	gauss oersted	B H	3000 10
Residual Flux Density	gauss	$B_r$	1100
Coercive Force	oersted	$H_c$	0.45
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	125 1.0
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.75
Curie Temperature	°C	$T_c$	>160
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^9$

Complex Permeability vs. Frequency



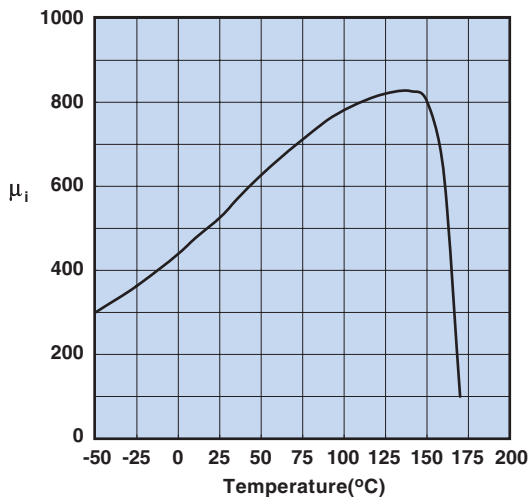
Measured on a 17/10/6mm toroid using the HP 4284A and the HP 4291A.

Percent of Original Impedance vs. Temperature



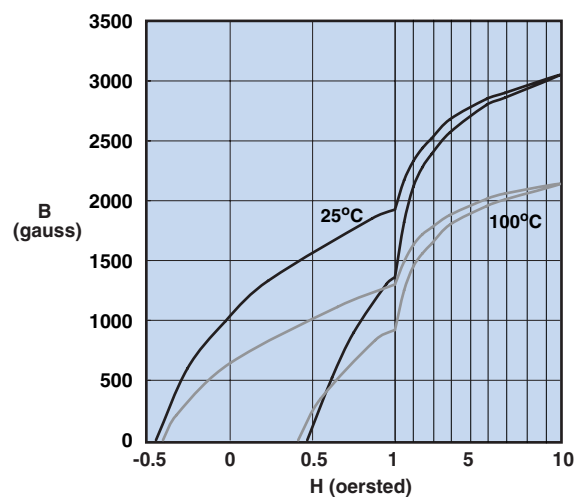
Measured on a 2644000301 using the HP4291A.

Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.

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# 46 Material

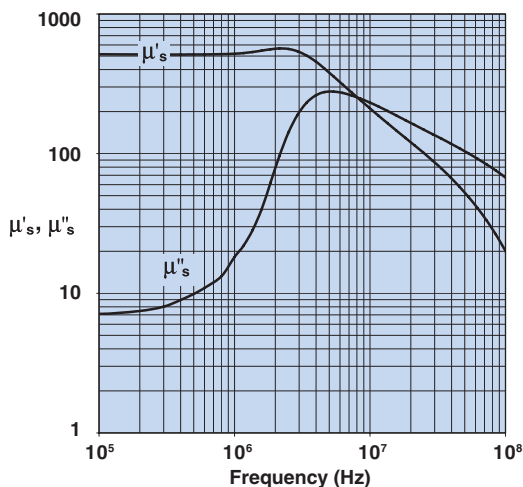
Our latest material development is a MgZn ferrite intended for suppression applications. This material does not use nickel in its composition, hence it avoids potential environmental issues as well as reduces the cost of the material component of suppression parts. The suppression performance of this 46 material is similar to our widely used 43 material.

The new Fair-Rite grade 46 will initially be supplied in the larger sizes of the round cable EMI suppression and snap-it cores.

### 46 Material Specifications:

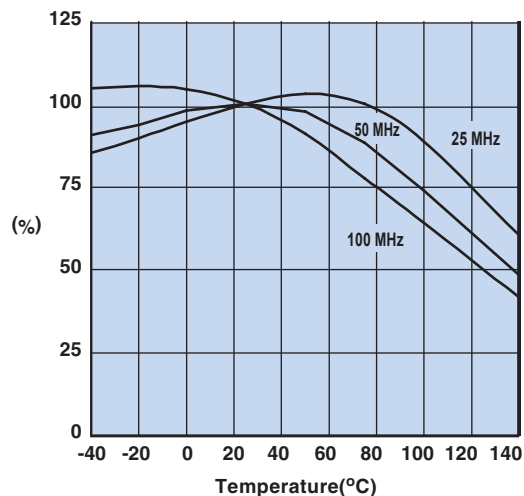
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	500
Flux Density @ Field Strength	gauss oersted	B H	3000 10
Residual Flux Density	gauss	$B_r$	1900
Coercive Force	oersted	$H_c$	0.40
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	60 0.1
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		-----
Curie Temperature	°C	$T_c$	>140
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^8$

Complex Permeability vs. Frequency



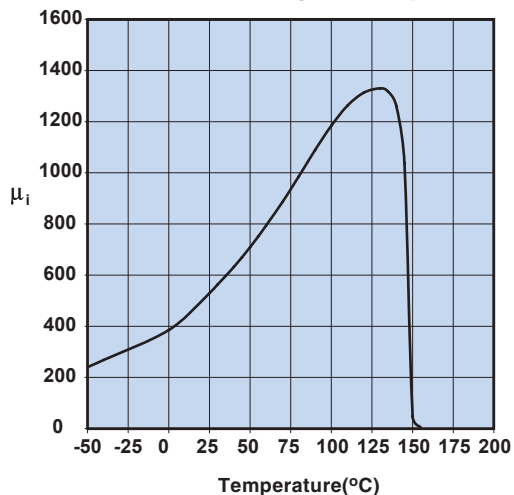
Measured on a 17/10/6mm toroid using the HP 4284A and the HP 4291A.

Percent of Original Impedance vs. Temperature



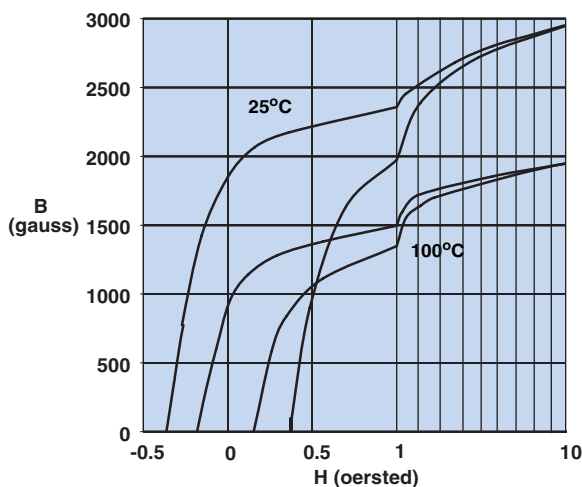
Measured on a 2646000301 using the HP4291A.

Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.

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# 33 Material

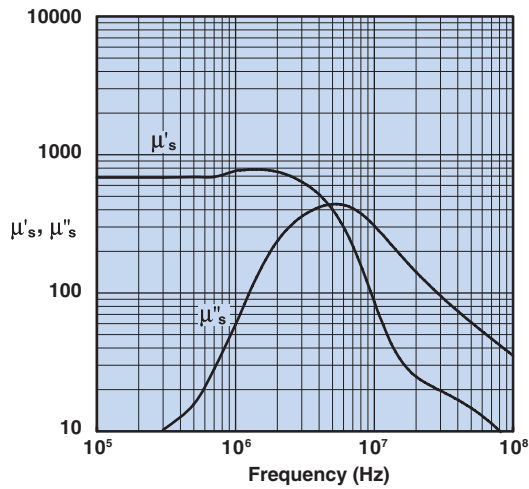
An economical MnZn ferrite designed for use in open circuit applications for frequencies up to 3.0 MHz.

Rods are available in 33 material.

### 33 Material Specifications:

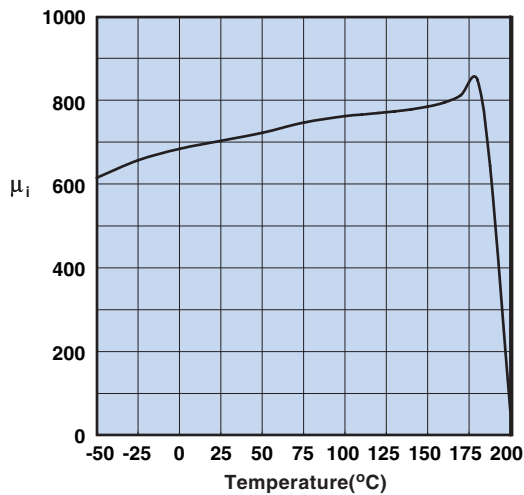
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	600
Flux Density @ Field Strength	gauss oersted	B H	2800 5
Residual Flux Density	gauss	$B_r$	1200
Coercive Force	oersted	$H_c$	0.60
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	25 0.2
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.10
Curie Temperature	°C	$T_c$	>150
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^{-2}$

### Complex Permeability vs. Frequency



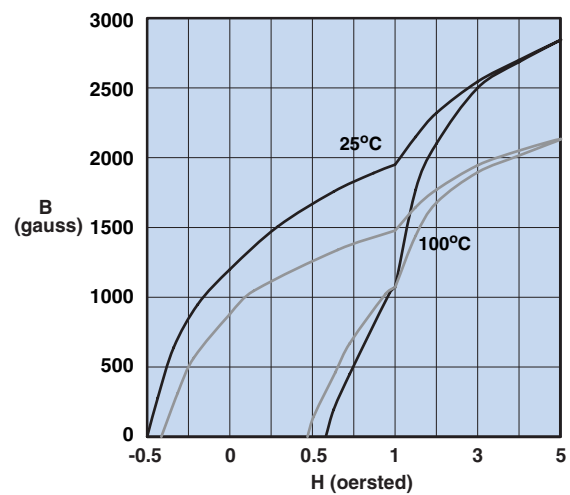
Measured on a 17/10/6mm toroid using the HP 4284A and, the HP 4291A.

### Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 100kHz.

### Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.

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# 85 Material

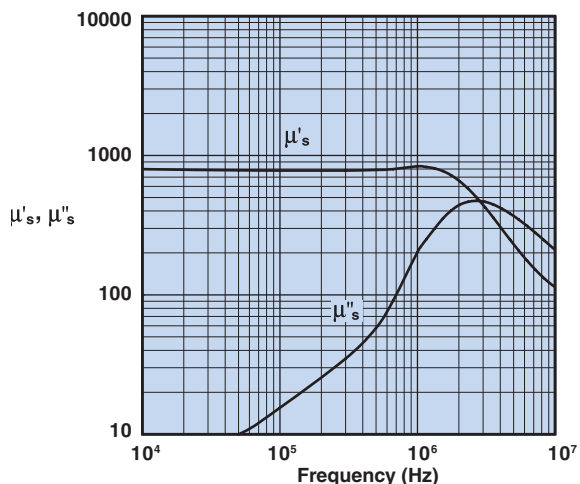
A square hysteresis loop Mn ferrite developed for use in output regulators and magnetic amplifier designs.

Toroids are available in 85 material.

## 85 Material Specifications:

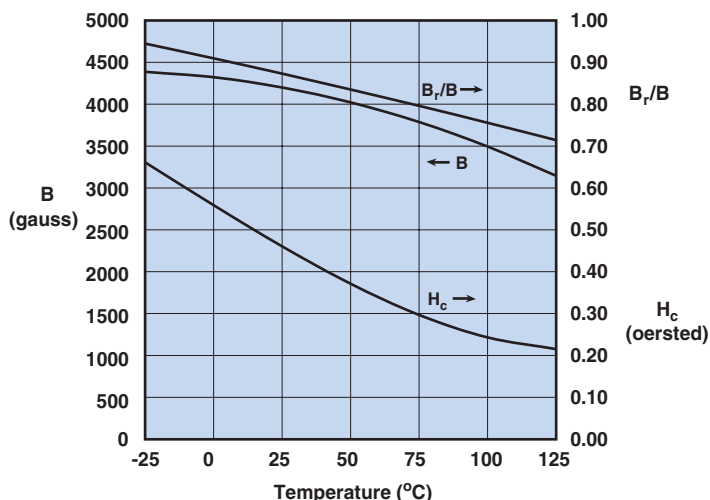
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	900
Flux Density @ Field Strength	gauss oersted	B H	4200 10
Residual Flux Density	gauss	$B_r$	3700
Coercive Force	oersted	$H_c$	0.50
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	30 0.1
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		—
Curie Temperature	°C	$T_c$	>200
Resistivity	$\Omega$ cm	$\rho$	$2 \times 10^2$

Complex Permeability vs. Frequency



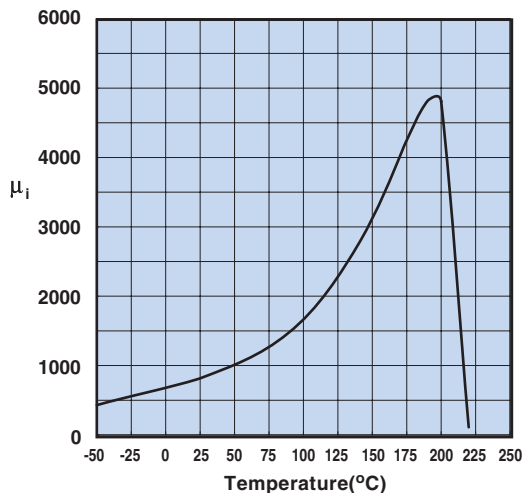
Measured on a 13/8/6mm toroid at 25°C using the HP 4284A and the HP 4291A.

Flux Density, Coercive Force and Squareness Ratio vs. Temperature



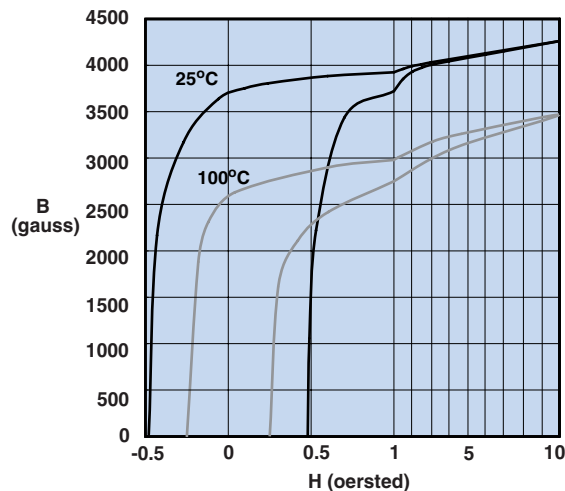
Measured on a 13/8/6mm toroid at 10 kHz. B is measured at H=10 oersted.

Initial Permeability vs. Temperature



Measured on a 13/8/6mm toroid at 100kHz using the HP 4275.

Hysteresis Loop



Measured on a 13/8/6mm toroid at 10 kHz.

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# 43 Material

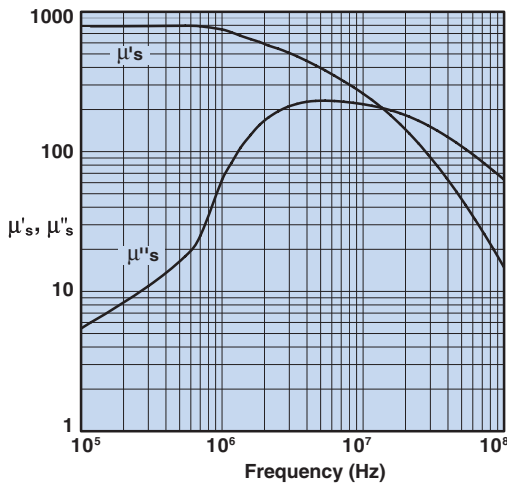
This NiZn is our most popular ferrite for suppression of conducted EMI from 20 MHz to 250 MHz. This material is also used for inductive applications such as high frequency common-mode chokes.

EMI suppression beads, beads on leads, SM beads, multi-aperture cores, round cable EMI suppression cores, split round EMI suppression cores, round cable snap-its, flat cable EMI suppression cores, flat cable snap-its, miscellaneous suppression cores, bobbins, and toroids are all available in 43 material.

### 43 Material Specifications:

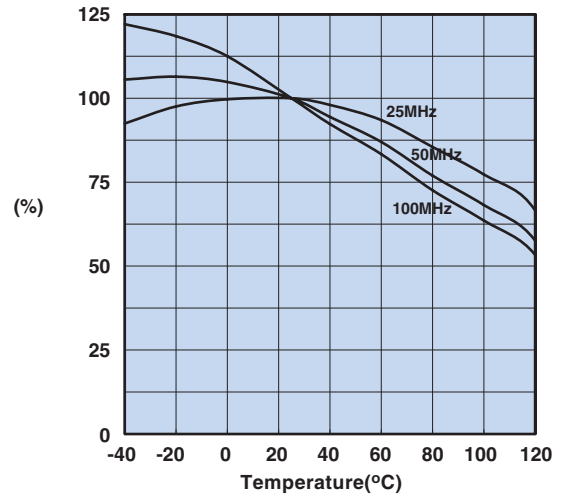
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	800
Flux Density @ Field Strength	gauss oersted	B H	2900 10
Residual Flux Density	gauss	$B_r$	1300
Coercive Force	oersted	$H_c$	0.45
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	250 1.0
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		1.25
Curie Temperature	°C	$T_c$	>130
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^5$

Complex Permeability vs. Frequency



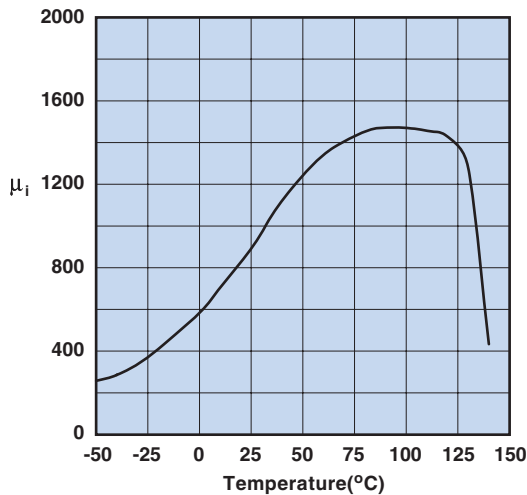
Measured on a 17/10/6mm toroid using the HP 4284A and the HP 4291A.

Percent of Original Impedance vs. Temperature



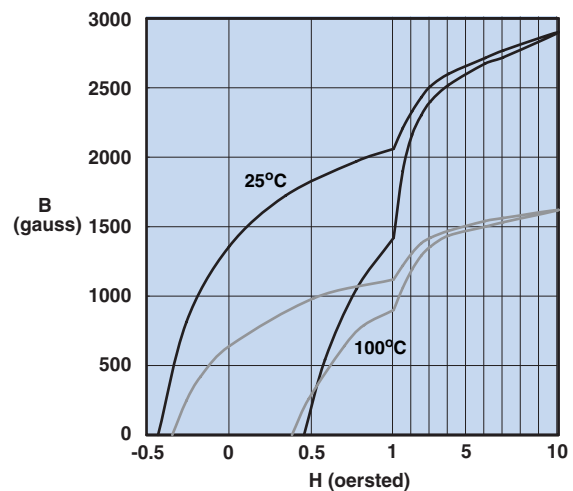
Measured on a 2643000301 using the HP4291A.

Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.

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# 31 Material

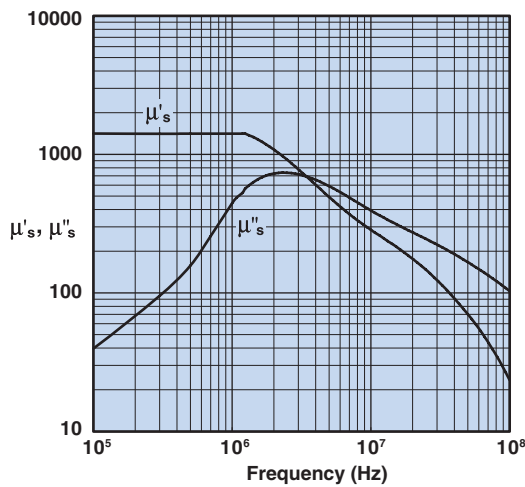
A MnZn ferrite designed specifically for EMI suppression applications from as low as 1 MHz up to 500 MHz. This material does not have the dimensional resonance limitations associated with conventional MnZn ferrite materials.

EMI suppression beads, round cable EMI suppression cores, round cable snap-its, flat cable EMI suppression cores, and flat cable snap-its are all available in 31 material.

### 31 Material Specifications:

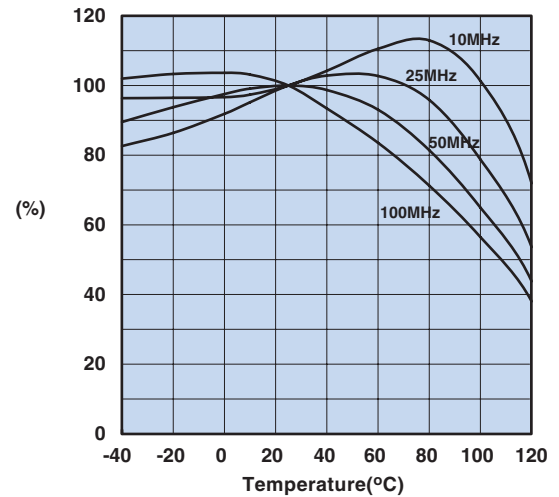
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	1500
Flux Density @ Field Strength	gauss oersted	B H	3400 5
Residual Flux Density	gauss	$B_r$	2500
Coercive Force	oersted	$H_c$	0.35
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	20 0.1
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		1.6
Curie Temperature	°C	$T_c$	>130
Resistivity	$\Omega$ cm	$\rho$	$3 \times 10^9$

Complex Permeability vs. Frequency



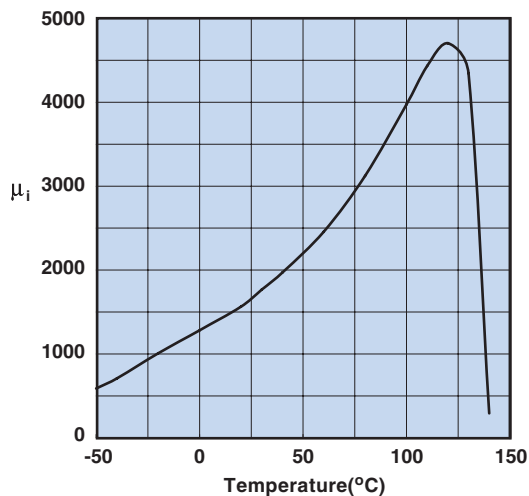
Measured on a 17/10/6mm toroid at 25°C using the HP 4284A and the HP 4291A.

Percent of Original Impedance vs. Temperature



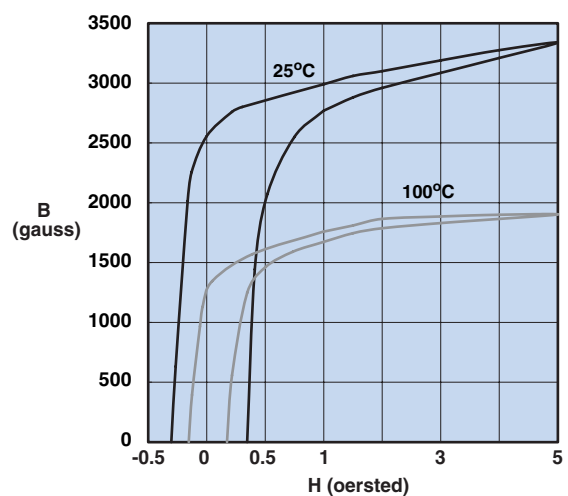
Measured on a 2631000301 using the HP4291A.

Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.

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# 79 Material

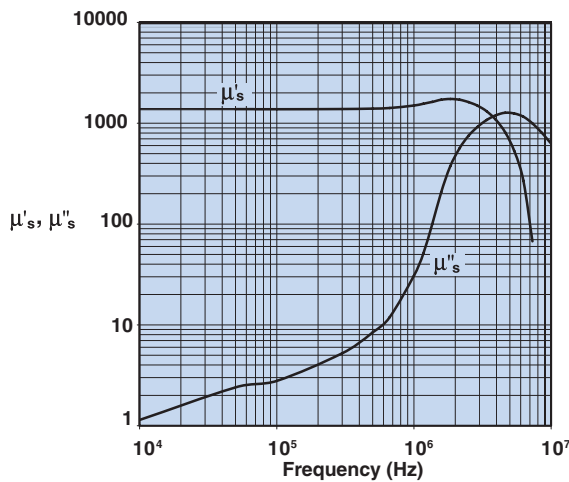
A new high frequency material for power applications up to 750 kHz.

This MnZn power ferrite is available in customer specific core designs.

### 79 Material Specifications:

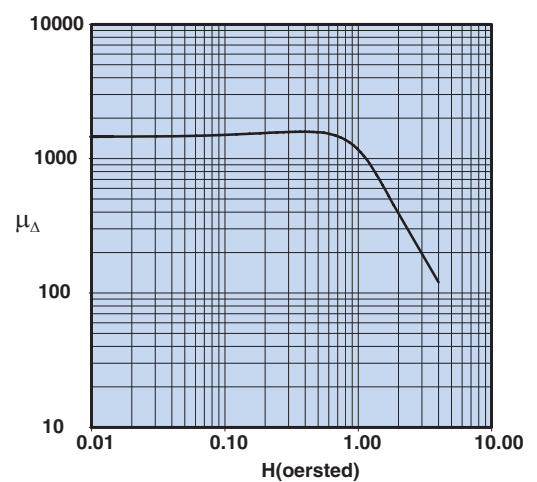
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	1400
Flux Density @ Field Strength	gauss oersted	B H	4700 5
Residual Flux Density	gauss	$B_r$	1700
Coercive Force	oersted	$H_c$	0.40
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	4.0 0.1
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.6
Curie Temperature	°C	$T_c$	>225
Resistivity	$\Omega$ cm	$\rho$	$2 \times 10^2$

Complex Permeability vs. Frequency

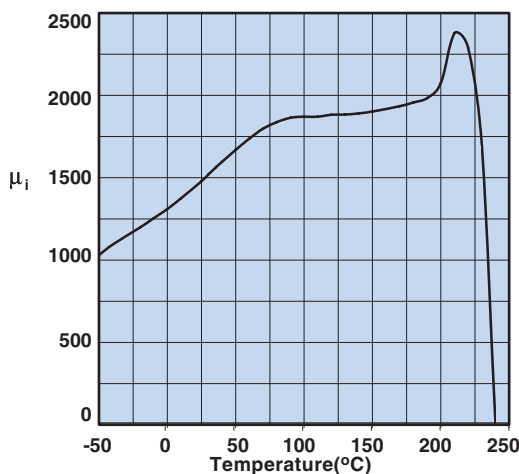


Measured on an 18/10/6mm toroid using the HP 4284A and the HP 4291A.

Incremental Permeability vs. H

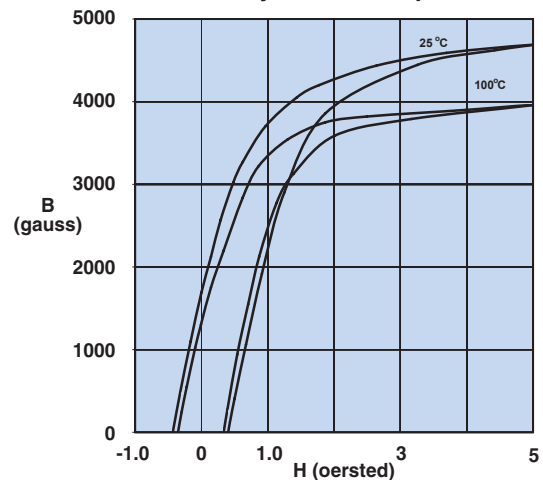


Initial Permeability vs. Temperature



Measured on an 18/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on an 18/10/6mm toroid at 10kHz.

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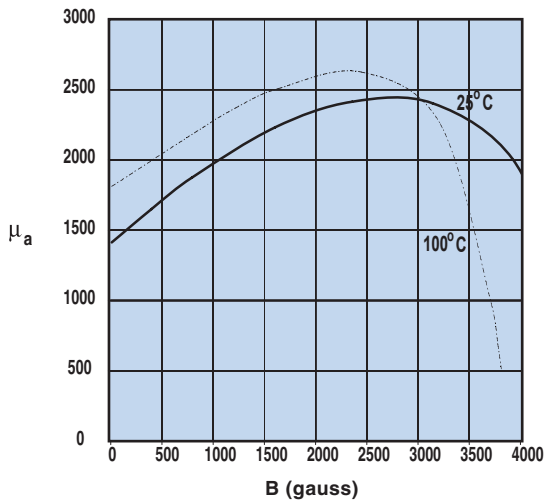
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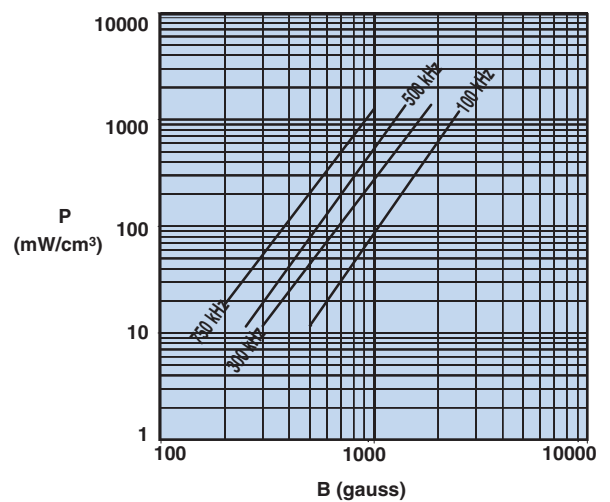
# 79 Material

**Amplitude Permeability vs. Flux Density**



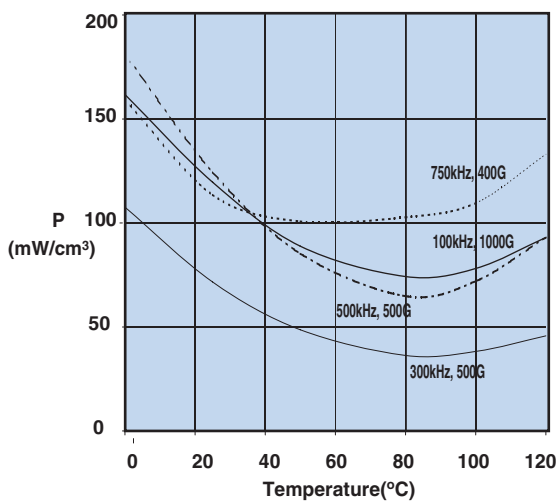
Measured on an 18/10/6mm toroid at 10kHz.

**Power Loss Density vs. Flux Density**



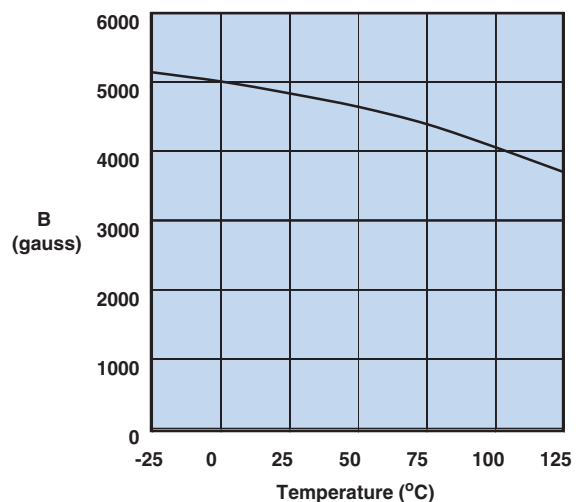
Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW at 100°C

**Power Loss Density vs. Temperature**



Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW.

**Flux Density vs. Temperature**



Measured on an 18/10/6mm toroid at 10kHz and H=5 oersted.

# 77 Material

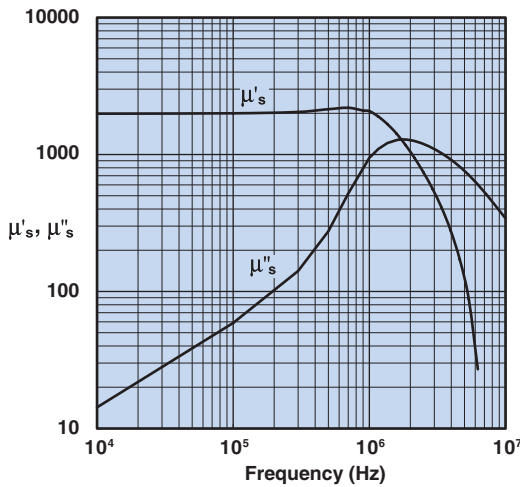
A MnZn ferrite for use in a wide range of high and low flux density inductive designs for frequencies up to 100 kHz.

EP cores, PQ cores, ETD cores, E&I cores, U cores, rods, tack bobbin cores, toroids, and bobbins are all available in 77 material.

## 77 Material Specifications:

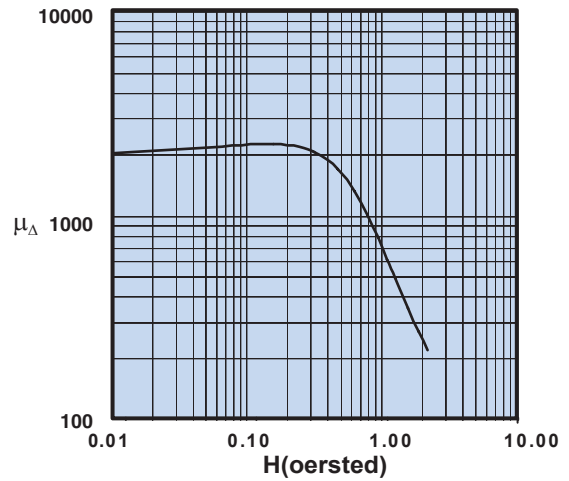
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	2000
Flux Density @ Field Strength	gauss oersted	B H	4900 5
Residual Flux Density	gauss	$B_r$	1800
Coercive Force	oersted	$H_c$	0.30
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	15 0.1
Temperature Coefficient of Initial Permeability (20 - 70°C)	%/°C		0.7
Curie Temperature	°C	$T_c$	>200
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^2$

Complex Permeability vs. Frequency

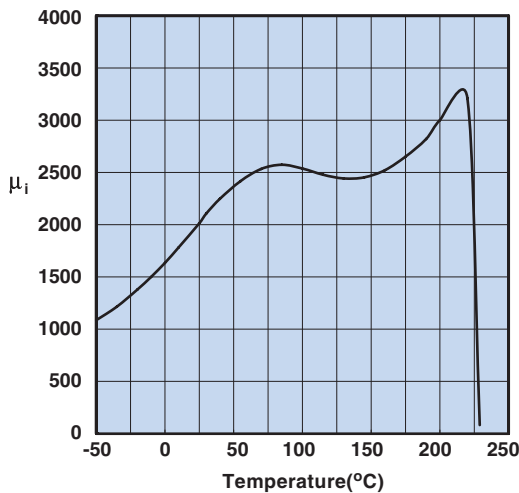


Measured on an 18/10/6mm toroid using the HP 4284A and the HP 4291A.

Incremental Permeability vs. H

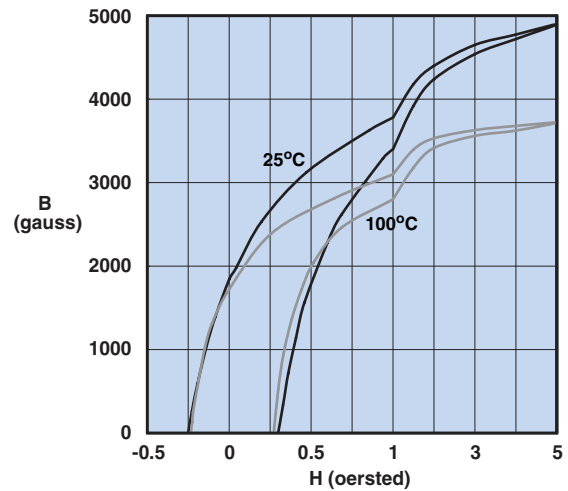


Initial Permeability vs. Temperature



Measured on an 18/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on an 18/10/6mm toroid at 10kHz.

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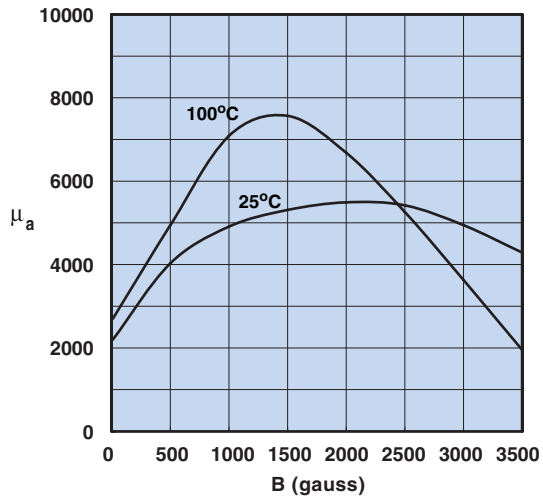
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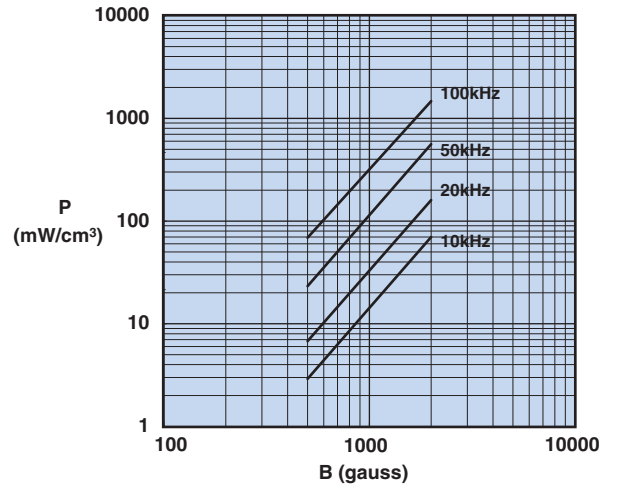
# 77 Material

**Amplitude Permeability vs. Flux Density**



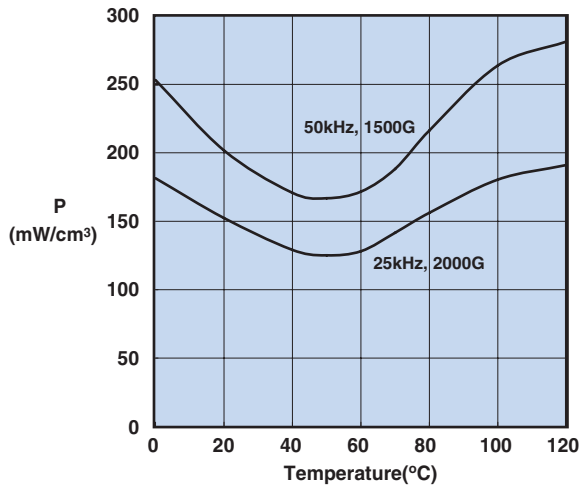
Measured on an 18/10/6mm toroid at 10kHz.

**Power Loss Density vs. Flux Density**



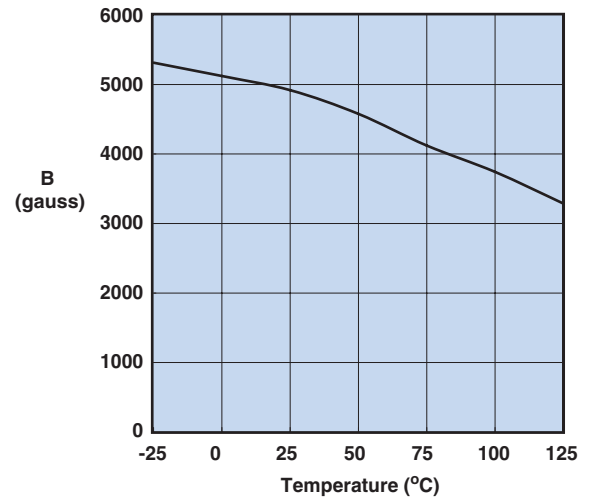
Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW at 100°C

**Power Loss Density vs. Temperature**



Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW.

**Flux Density vs. Temperature**



Measured on an 18/10/6mm toroid at 10kHz and H=5 oersted.

# 78 Material

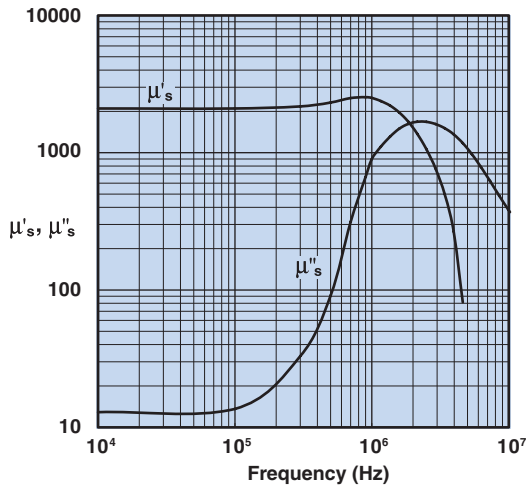
A MnZn ferrite specifically designed for power applications for frequencies up to 200 kHz.

RFID rods, toroids, pot cores, EP cores, PQ cores, ETD cores, and E&I cores are all available in 78 material.

### 78 Material Specifications:

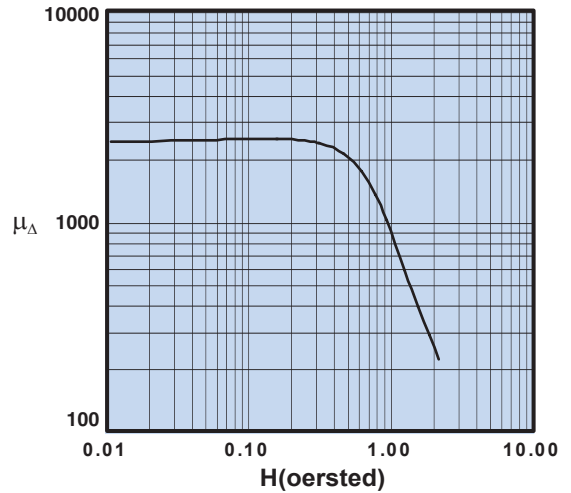
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	2300
Flux Density @ Field Strength	gauss oersted	B H	4800 5
Residual Flux Density	gauss	$B_r$	1500
Coercive Force	oersted	$H_c$	0.20
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	4.5 0.1
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		1.0
Curie Temperature	°C	$T_c$	>200
Resistivity	$\Omega$ cm	$\rho$	$2 \times 10^2$

Complex Permeability vs. Frequency

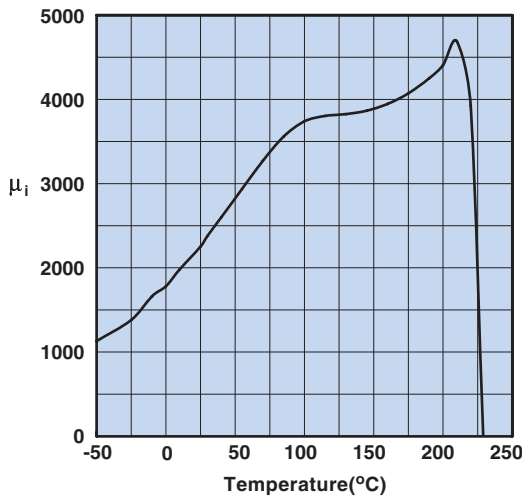


Measured on an 18/10/6mm toroid using the HP 4284A and the HP 4291A.

Incremental Permeability vs. H

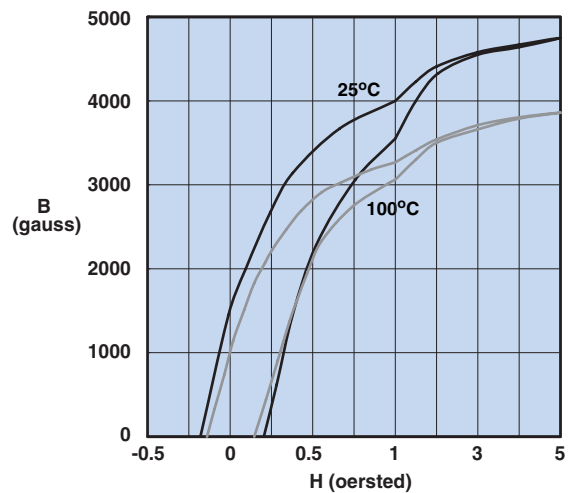


Initial Permeability vs. Temperature



Measured on an 18/10/6mm toroid at 100kHz.

Hysteresis Loop



Measured on an 18/10/6mm toroid at 10kHz.

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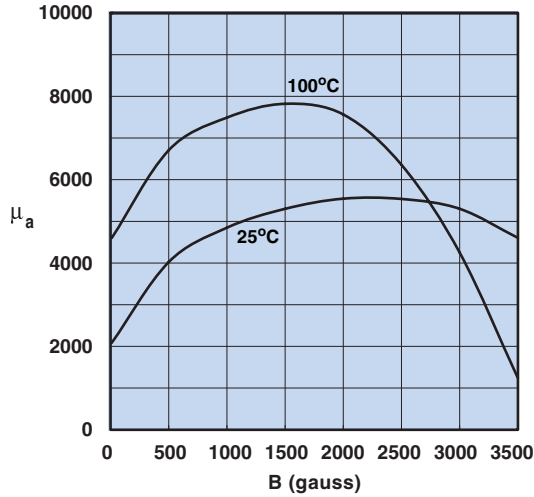
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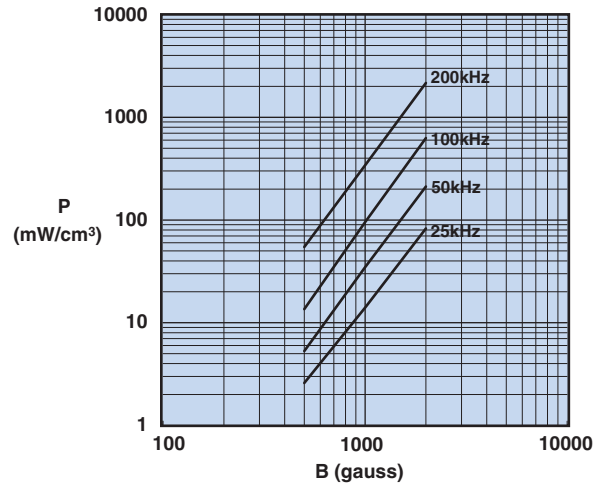
# 78 Material

**Amplitude Permeability vs. Flux Density**



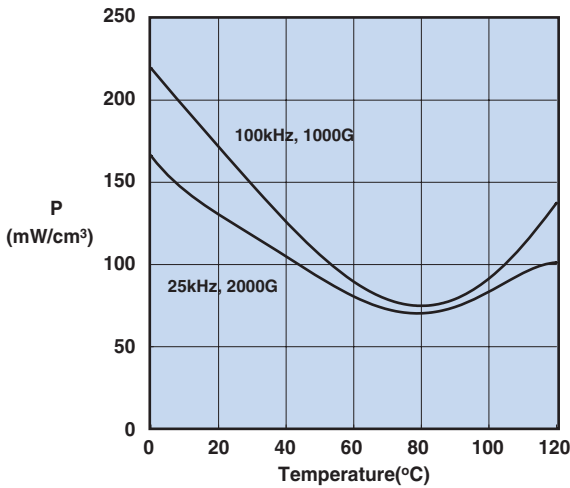
Measured on an 18/10/6mm toroid at 10kHz.

**Power Loss Density vs. Flux Density**



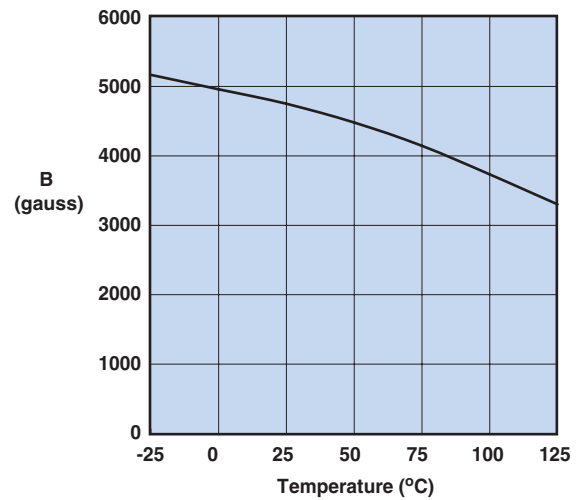
Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW at 100°C

**Power Loss Density vs. Temperature**



Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW.

**Flux Density vs. Temperature**



Measured on an 18/10/6 mm toroid at 10kHz and H=5 oersted.

# 73 Material

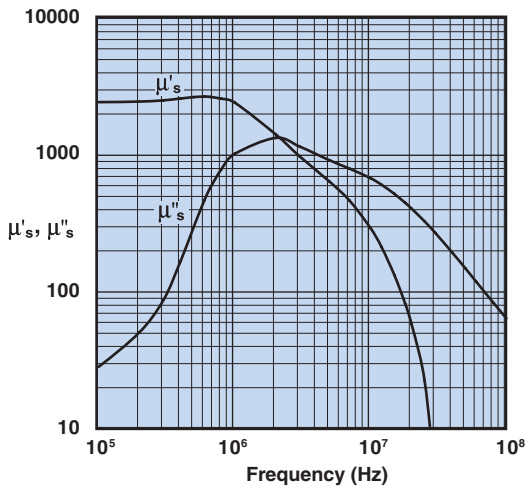
A MnZn ferrite, supplied only in small cores, to suppress conducted EMI frequencies below 30 MHz.

EMI suppression beads, beads on leads, SM beads, and multi-aperture cores are all available in 73 material.

### 73 Material Specifications:

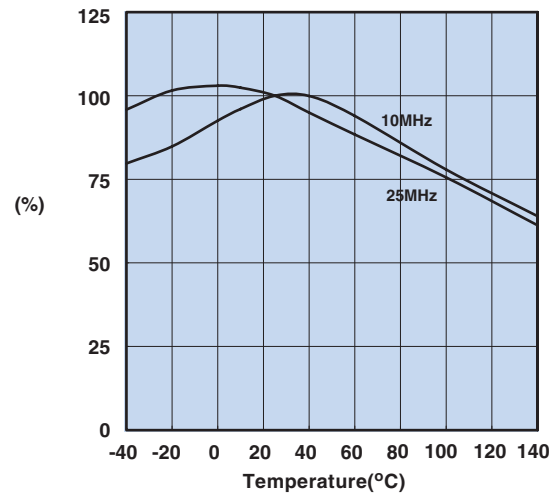
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	2500
Flux Density @ Field Strength	gauss oersted	B H	3900 5
Residual Flux Density	gauss	$B_r$	1500
Coercive Force	oersted	$H_c$	0.24
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	10 0.1
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.65
Curie Temperature	°C	$T_c$	>160
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^2$

Complex Permeability vs. Frequency



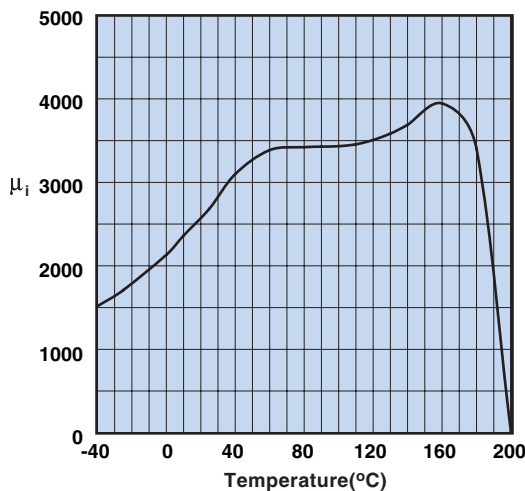
Measured on a 2673000301 bead using the HP 4284A and the HP 4291A.

Percent of Original Impedance vs. Temperature



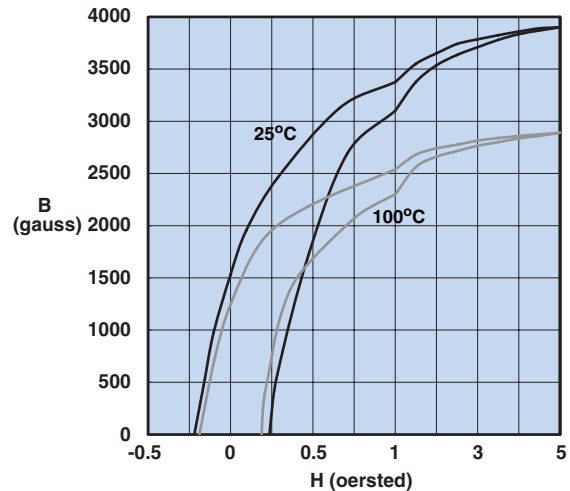
Measured on a 2673000301 using the HP4291A.

Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 10kHz.

Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.

# 75 Material

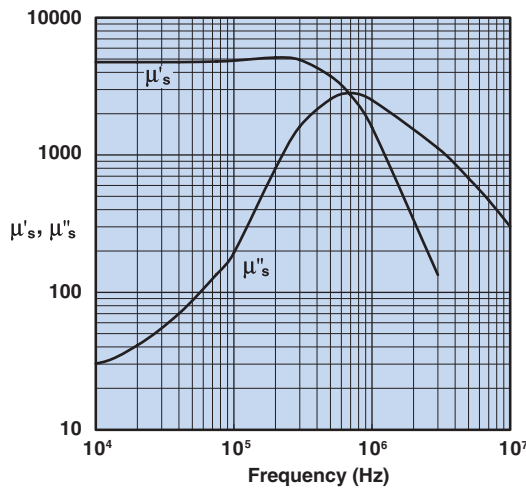
A high permeability MnZn ferrite intended for a range of broadband and pulse transformer applications and common-mode inductor designs.

Toroids, E&I cores, and EP cores are all available in 75 material.

## 75 Material Specifications:

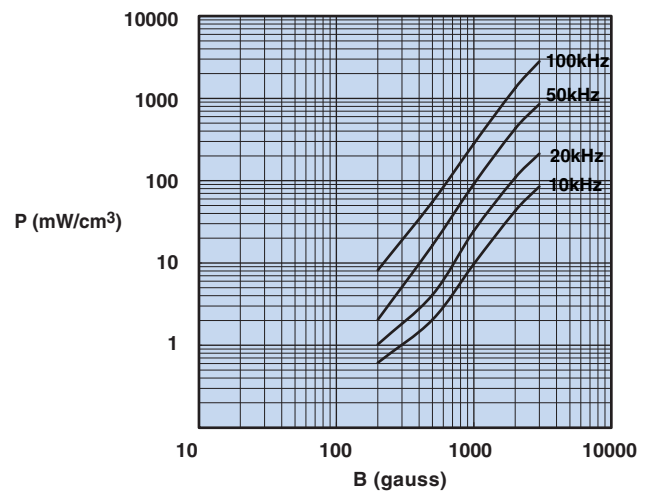
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	5000
Flux Density @ Field Strength	gauss oersted	B H	4300 5
Residual Flux Density	gauss	$B_r$	1400
Coercive Force	oersted	$H_c$	0.16
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	15 0.1
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.6
Curie Temperature	°C	$T_c$	>140
Resistivity	$\Omega$ cm	$\rho$	$3 \times 10^2$

Complex Permeability vs. Frequency



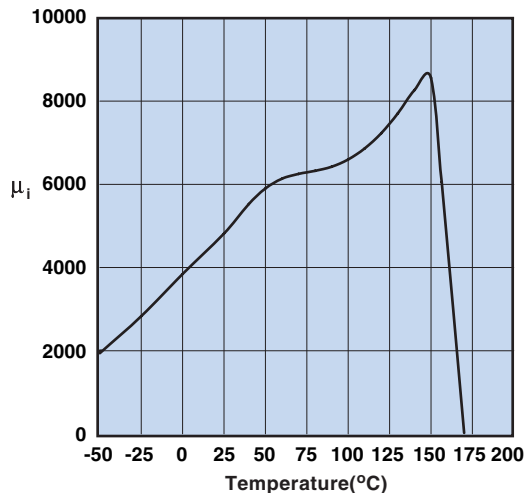
Measured on a 17/10/6mm toroid using the HP 4284A and the HP 4291A.

Power Loss Density vs. Flux Density



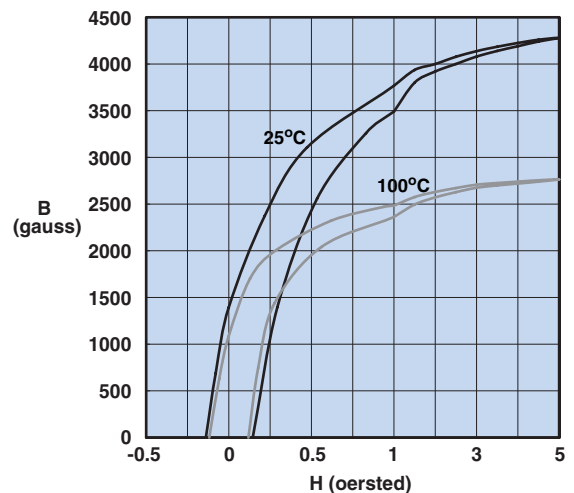
Measured on a 17/10/6mm toroid using the Clarke Hess 258 VAW at 100°C.

Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 10kHz.

Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.

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# 76 Material

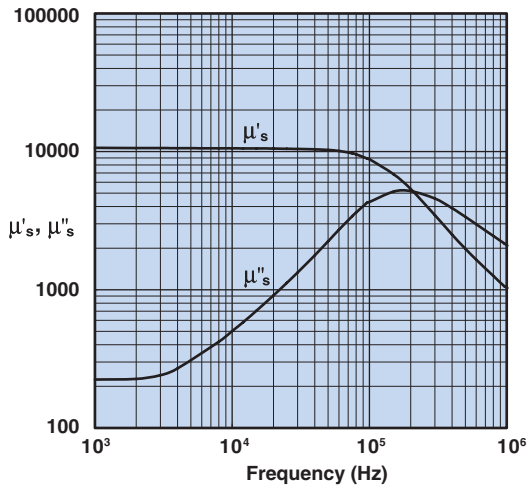
A MnZn ferrite with a 10K permeability and an acceptable Curie temperature for broadband and pulse transformer designs and common-mode choke applications.

Toroids are available in 76 material.

## 76 Material Specifications:

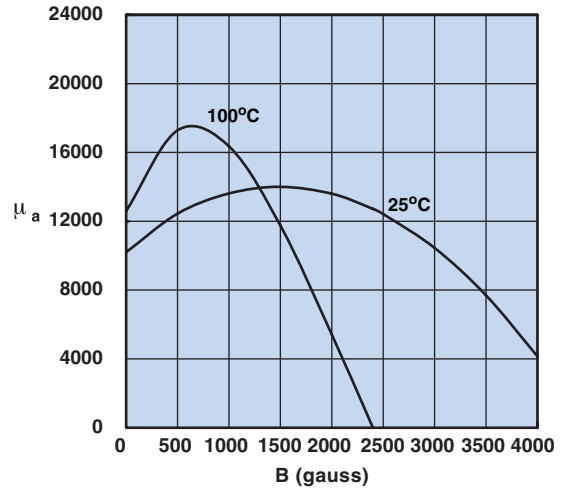
Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	10000
Flux Density @ Field Strength	gauss oersted	B H	4000 5
Residual Flux Density	gauss	$B_r$	1800
Coercive Force	oersted	$H_c$	0.12
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	15 0.025
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.5
Curie Temperature	°C	$T_c$	>120
Resistivity	$\Omega$ cm	$\rho$	50

Complex Permeability vs. Frequency



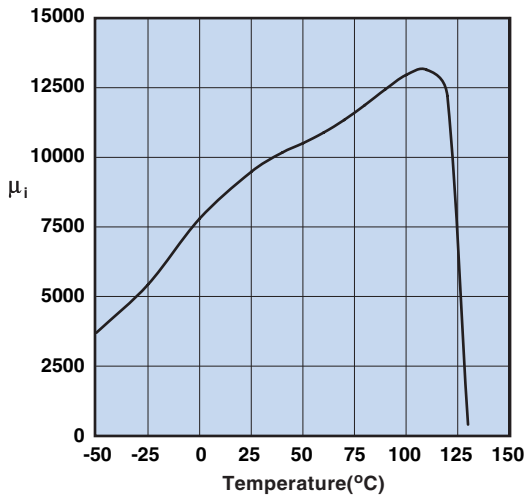
Measured on a 17/10/6mm toroid using the HP 4284A and, the HP 4291A.

Amplitude Permeability vs. Flux Density



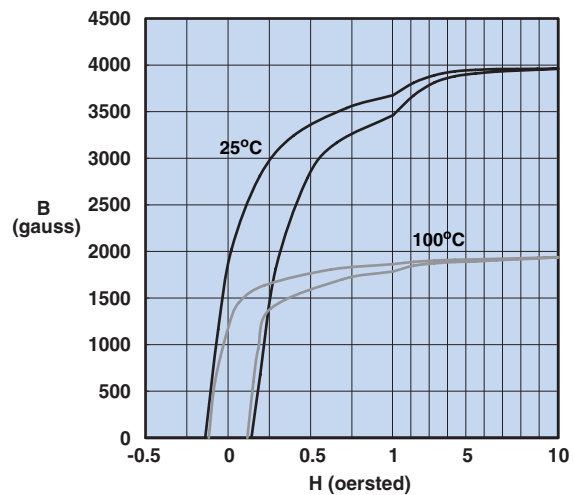
Measured on a 17/10/6mm toroid using the HP 54510A.

Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 10kHz.

Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.