



# Fair-Rite Products Corp. Your Signal Solution®

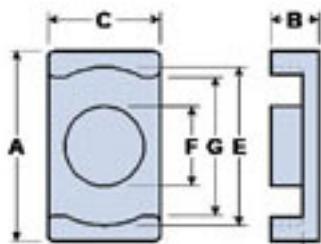
Ferrite Components for the Electronics Industry

Fair-Rite Products Corp. PO Box J, One Commercial Row, Wallkill, NY 12589-0288  
Phone: (888) 324-7748 www.fair-rite.com

Fair-Rite Product's Catalog  
Part Data Sheet, 9598110502  
Printed: 2013-07-03



RoHS  
Material Declaration



**Figure 3 (ER Type 1)**

Part Number: 9598110502

Frequency Range: Dimensions

Description: 98 ER CORE SET

Application: Inductive Components

Where Used: Closed Magnetic Circuit

Part Type: Planar Cores

Generic Name: ER11

## Mechanical Specifications

Weight: 1.000 (g) per Set

## Part Type Information

EE14/7, EE18/8, EE22/11, EE32/13, EE38/16, EE43/19, EE64/21, EI 14/5, EI 18/6, EI 22/7, EI 32/10, E 64/15, ER9.5, ER11, ER14.5

Planar EE cores, and Planar EI cores, with their low profile are suitable for board level installation allowing assembly without the need for plastic coilformers and can also allow windings integrated into multi-level PCBs. Planar ER cores with their low mass and low profile are suitable for Surface Mount installations in low power filter and transformer applications.

-Planar EE, ER and EI cores can be supplied with the center post gapped to a mechanical dimension or an AL value.

-AL value is measured at 1 kHz, B < 10 gauss.

-Weight indicated is per pair or set.



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### Mechanical Specifications

Dim	mm	mm tol	nominal inch	inch misc.
A	10.80	$\pm 0.3$	0.425	-
B	2.45	$\pm 0.15$	0.096	-
C	5.90	$\pm 0.2$	0.232	-
D	1.58	$\pm 0.16$	0.062	-
E	8.85	$\pm 0.3$	0.348	-
F	4.15	$\pm 0.2$	0.163	-
G	7.90	min	0.312	min
H	-	-	-	-
J	-	-	-	-
K	-	-	-	-

### Electrical Specifications

Typical Impedance ( $\Omega$ )	

Electrical Properties	
$A_L$ (nH)	1250 $\pm 25\%$
$A_e$ (cm $^2$ )	0.12600
$\sum I/A$ (cm $^{-1}$ )	11.20
$l_e$ (cm)	1.40
$V_e$ (cm $^3$ )	0.17700
$A_{min}$ (cm $^2$ )	.103

### Land Patterns

V	W ref	X	Y	Z
-	-	-	-	-
-	-	-	-	-

### Winding Information

Turns Tested	Wire Size	1st Wire Length	2nd Wire Length
-	-	-	-

### Reel Information

Tape Width mm	Pitch mm	Parts 7 " Reel	Parts 13 " Reel	Parts 14 " Reel
-	-	-	-	-

### Package Size

Pkg Size
- (-)

### Connector Plate

# Holes	# Rows
-	-

### Legend

+ Test frequency

Preferred parts, the suggested choice for new designs, have shorter lead times and are more readily available.

The column H(Oe) gives for each bead the calculated dc bias field in oersted for 1 turn and 1 ampere direct current. The actual dc H field in the application is this value of H times the actual NI (ampere-turn) product. For the effect of the dc bias on the impedance of the bead material, see figures 18-23 in the application note How to choose Ferrite Components for EMI Suppression.

A 1/2 turn is defined as a single pass through a hole.

$\sum I/A$  - Core Constant

$A_e$  - Effective Cross-Sectional Area

$A_L$  - Inductance Factor ( $\frac{L}{N^2}$ )

N/AWG - Number of Turns/Wire Size for Test Coil

$l_e$ : Effective Path Length

$V_e$ : Effective Core Volume

NI - Value of dc Ampere-turns



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## Ferrite Material Constants

Specific Heat .....	0.25 cal/g/°C
Thermal Conductivity .....	<b>3.5 - 4.5 mW/cm - °C</b>
Coefficient of Linear Expansion .....	8 - 10x10 <sup>-6</sup> /°C
Tensile Strength .....	4.9 kgf/mm <sup>2</sup>
Compressive Strength .....	42 kgf/mm <sup>2</sup>
Young's Modulus .....	15x10 <sup>3</sup> kgf/mm <sup>2</sup>
Hardness (Knoop) .....	650
Specific Gravity .....	≈ 4.7 g/cm <sup>3</sup>

*The above quoted properties are typical for Fair-Rite MnZn and NiZn ferrites.*

See next page for further material specifications.



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A low loss MnZn ferrite material for power applications up to 200 kHz.

New type 98 Material is an improved version of Fair-Rite's 78 Material, this material supplies, lower power loss at 100°C at moderate flux densities for operation below 200 kHz.

Shapes available in 98 material are Toroids, U Cores, E & I Cores, Pot Cores, RM, PQ, ETD, EFD, EP, EER.

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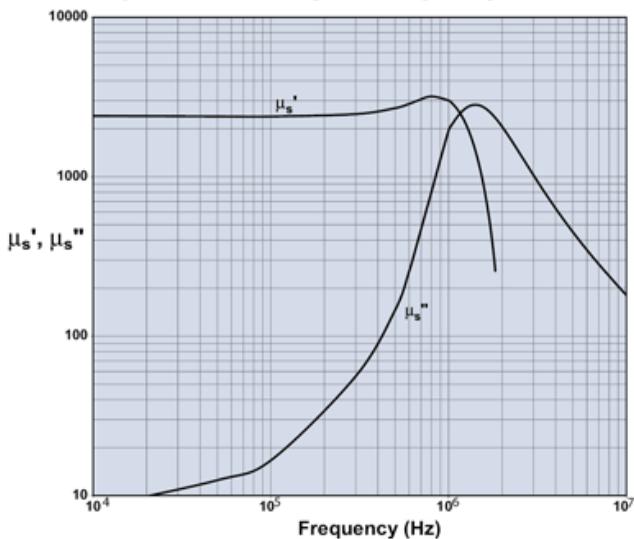


**RoHS**  
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### 98 Material Characteristics

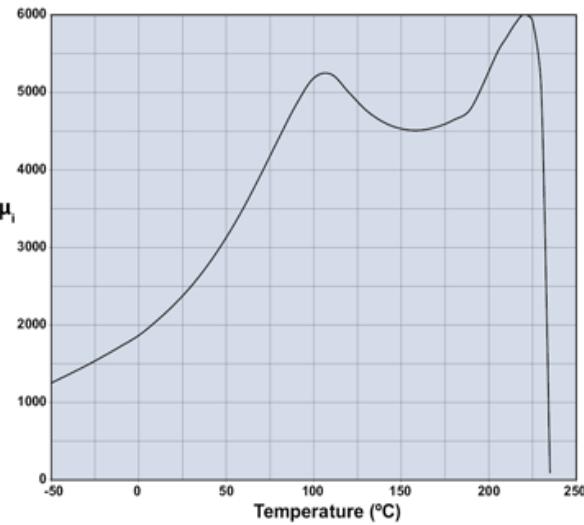
Property	Unit	Symbol	Value
Initial Permeability @ B < 10gauss		$\mu_i$	2400
Flux Density @ Field Strength	gauss oersted	B H	5000 5
Residual Flux Density	gauss	$B_r$	1800
Coercive Force	oersted	$H_c$	0.17
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan\delta/\mu_i$	3.5 0.1
Temperature Coefficient of Initial Permeability (20 - 70°C)	% / °C		1.5
Curie Temperature	°C	$T_c$	> 215
Resistivity	ohm-cm	$\rho$	200

### Complex Permeability vs. Frequency

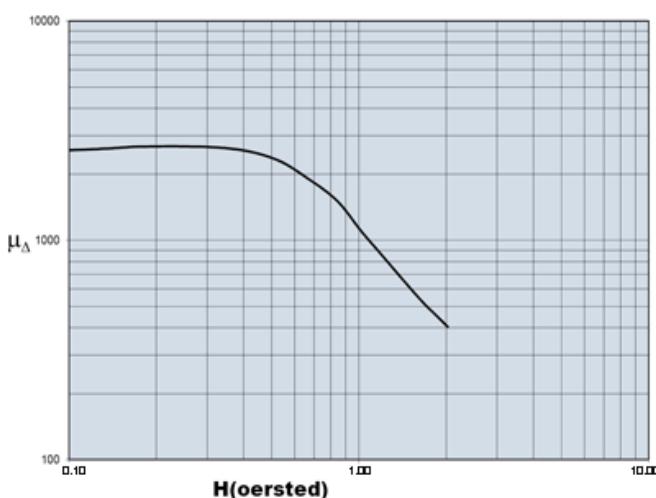


Measured on an 18/10/6mm toroid using  
HP 4284A and HP4291A.

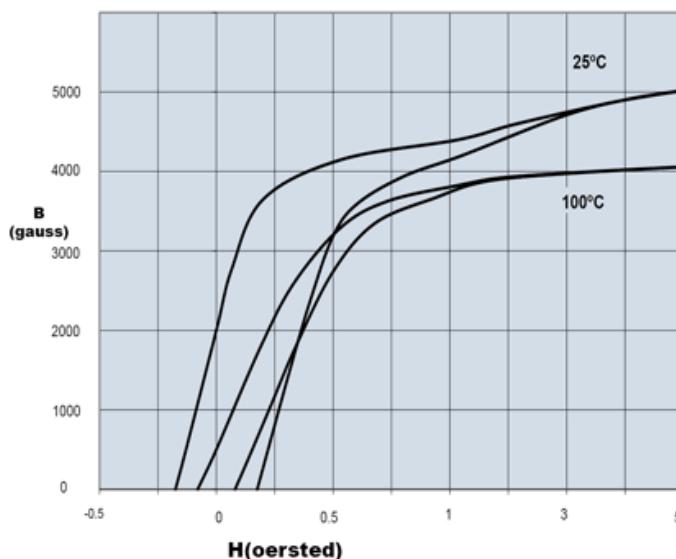
### Initial Permeability vs. Temperature



### Incremental Permeability vs. H



### Hysteresis Loop





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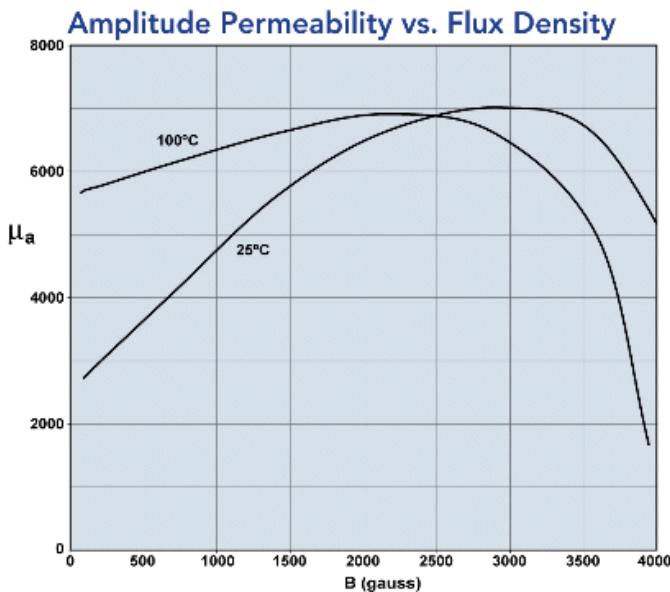
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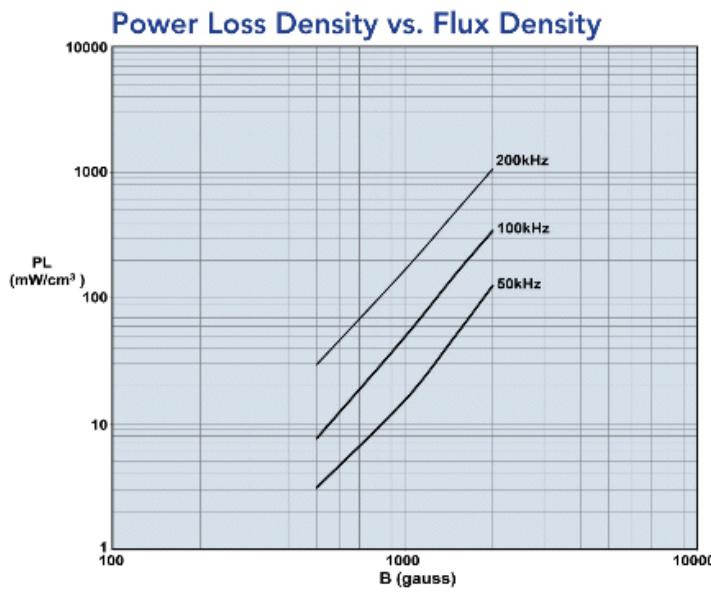
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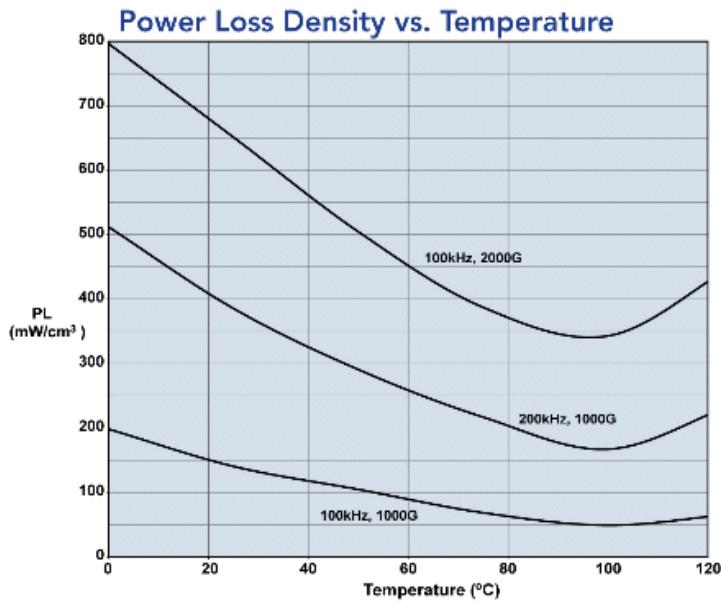
A low loss MnZn ferrite material for power applications up to 200kHz.



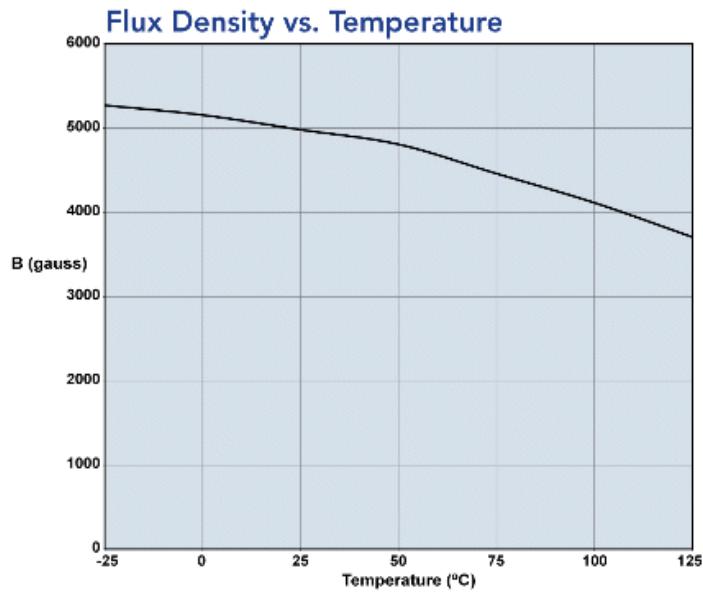
Measured on an 18/10/6mm toroid at 10kHz.



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



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



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