

Part Number: 9498103002

Frequency Range: Dimensions

Description: 98 E CORE

Application: Inductive Components

Where Used: Closed Magnetic Circuit

Part Type: E Cores

Genaric Name: E19/5

## Mechanical Specifications

Weight: 4.600 (g)

## Part Type Information

The E core geometry offers an economical design approach for a wide range of inductive applications. The 77 and 78 materials are used in a variety power designs.

-Part number is for a single core.

-E cores can be supplied with the center post gapped to a mechanical dimension. E cores can also be gapped to an AI value. These cores will be supplied as sets. For any gapped E core requirement contact our customer service group.

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

-See [www.fair-rite.com/newfair/pdf/Directcurrent.pdf](http://www.fair-rite.com/newfair/pdf/Directcurrent.pdf) for document 'The Effect of Direct Current on the Inductance of a Ferrite Core', Figure 4 for information on AI vs. gap length.

-Fair-Rite equivalents to lamination sizes:

E2829	9477019002	E375	9477375002
E187	9477016002	E21	9477500002
E2425	9477015002	E625	9477625002, 9478625002

-Explanation of Part Numbers: Digits 1&2 = product class and 3&4 = material grade.

## Mechanical Specifications

Dim	mm	mm tol	nominal inch	inch misc.
A	19.00	±0.4	0.748	-
B	8.00	±0.3	0.315	-
C	4.80	±0.3	0.189	-
D	5.75	±0.25	0.226	-
E	13.80	min	0.543	min
F	4.50	±0.3	0.177	-
G	-	-	-	-
H	-	-	-	-
J	-	-	-	-
K	-	-	-	-

## Electrical Specifications

Typical Impedance ( $\Omega$ )	

Electrical Properties	
$A_L$ (nH)	1200 ±25%
$A_e$ (cm <sup>2</sup> )	0.22000
$\Sigma I/A$ (cm <sup>-1</sup> )	18.10
$l_e$ (cm)	3.99
$V_e$ (cm <sup>3</sup> )	0.87800
$A_{min}$ (cm <sup>2</sup> )	.216

## Land Patterns

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

## Winding Information

Turns	Wire	1st Wire	2nd Wire
Tested	Size	Length	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 ½ turn is defined as a single pass through a hole.

$\Sigma I/A$  - 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



## Ferrite Material Constants

Specific Heat .....	0.25 cal/g/°C
Thermal Conductivity .....	10x10 <sup>-3</sup> cal/sec/cm/°C
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.

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

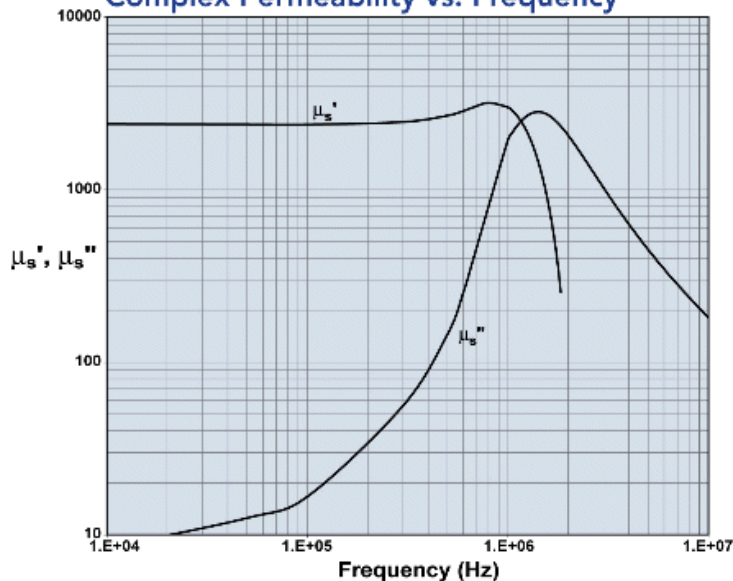
New type 98 Material is an improved version of Fair-Rite's 78 Material, this material supplies lower power loss at 100°C at moderate flux densities for operation below 200kHz.

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

### 98 Material Characteristics

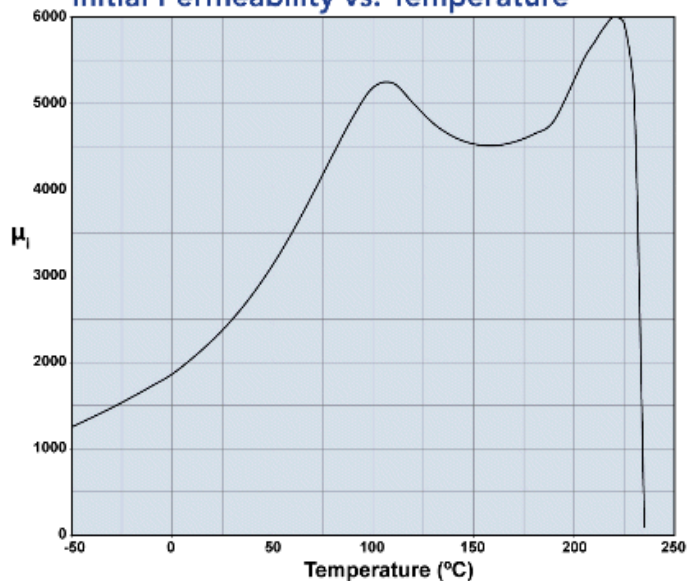
Property	Unit	Symbol	Value
Initial Permeability @ B < 10gauss		$\mu_i$	2400
Flux Density @ Field Strength	gauss oersted	B H	5000 5
Residual Flux Density	gauss	$B_r$	1800
Coercive Force	oersted	$H_c$	0.17
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan\delta/\mu_i$	3.5 0.1
Temperature Factor of Initial Permeability (25 - 60°C)	$10^{-8}/^{\circ}\text{C}$		5.8
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 HP 4291A.

### Initial Permeability vs. Temperature

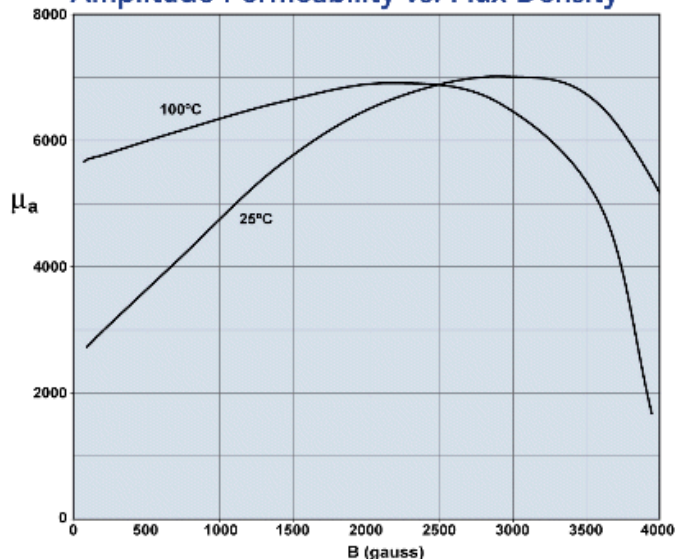


Measured on an 18/10/6mm toroid at 10kHz.



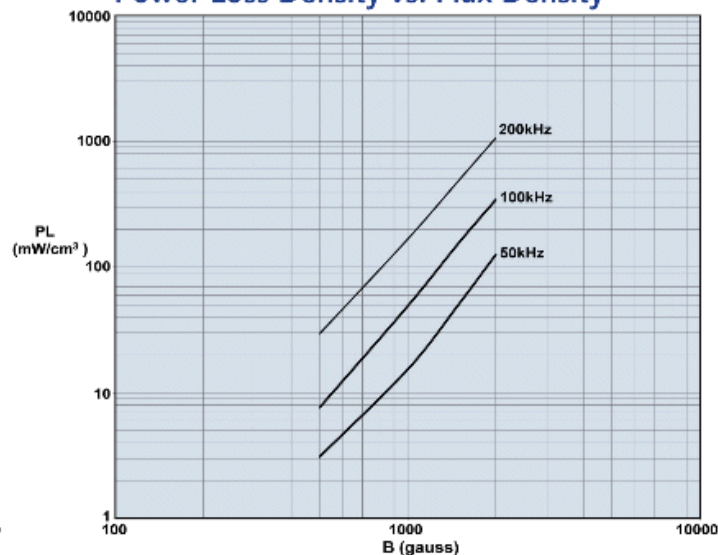
A low loss MnZn ferrite material for power applications up to 200kHz.

**Amplitude Permeability vs. Flux Density**



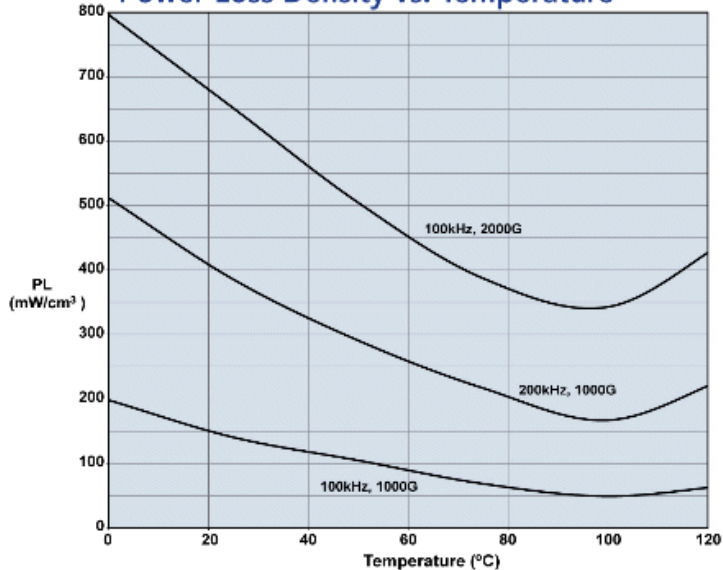
Measured on an 18/10/6mm toroid at 10kHz.

**Power Loss Density vs. Flux Density**



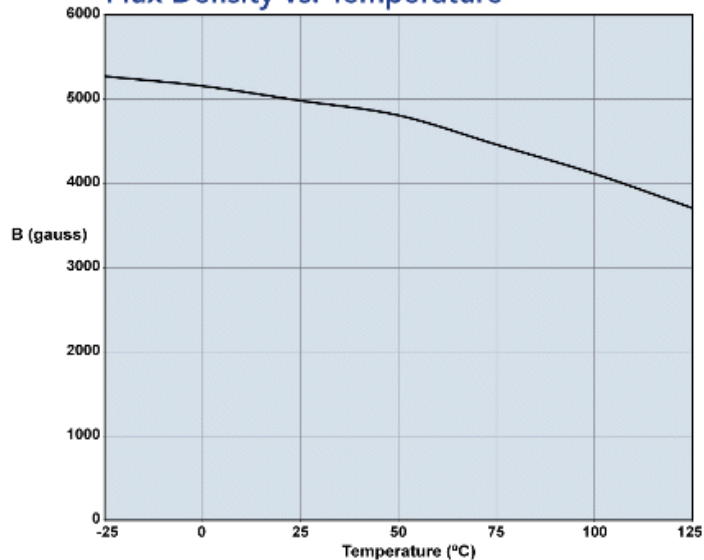
Measured on an 18/10/6mm toroid using the  
 Clarke Hess 258 VAW at 100°C.

**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.