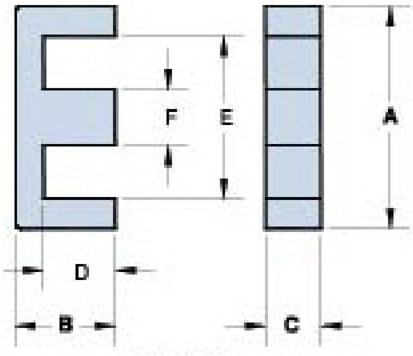
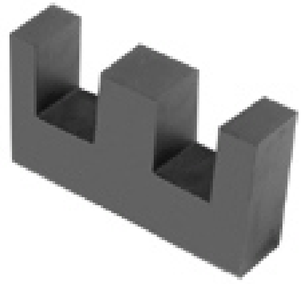
Fair-Rite Products Corp.
Your Signal Solution®
Ferrite Components for the Electronics Industry
Fair-Rite Products Corp. PO Box J,One Commercial Row, Wallkill, NY 12589-0288
Phone: (888) 324-7748 www.fair-rite.com





Part Number:	9478115002
Frequency Range:	Dimensions
Description:	78 E CORE
Application:	Inductive Components
Where Used:	Closed Magnetic Circuit
Part Type:	E Cores
Genaric Name:	E42/20

Mechanical Specifications

Weight: 112.000(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 Al value. These cores will be supplied as sets. For any gapped E core requirement contact our customer service group.

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

-See 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 Al 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.

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Fair-Rite Product's Catalog
Part Data Sheet, 9478115002
Printed: 2013-02-27

ISO 9001 Registered · TS 16949 Registered · Pb · RoHS Material Declaration

Mechanical Specifications

Dim	mm	mm tol	nominal inch	inch misc.
A	42.00	±0.7	1.654	-
B	21.20	±0.3	0.835	-
C	19.85	±0.35	0.781	-
D	15.15	±0.3	0.596	-
E	29.50	min	1.161	min
F	11.90	±0.3	0.469	-
G	-	-	-	-
H	-	-	-	-
J	-	-	-	-
K	-	-	-	-

Electrical Specifications

Typical Impedance (Ω)	

Electrical Properties	
A_L (nH)	5200 ±25%
Ae(cm^2)	2.35000
Σl/A(cm^{-1})	4.17
l_e (cm)	9.79
V_e (cm^3)	23.10000
A_{min}(cm^2)	2.310

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 ½ turn is defined as a single pass through a hole.

Σl/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	10×10^{-3} cal/sec/cm/°C
Coefficient of Linear Expansion	8 - 10×10^{-6}/°C
Tensile Strength	4.9 kgf/mm^2
Compressive Strength	42 kgf/mm^2
Young's Modulus	15×10^3 kgf/mm^2
Hardness (Knoop)	650
Specific Gravity	$\approx$ 4.7 g/cm^3

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

See next page for further material specifications.

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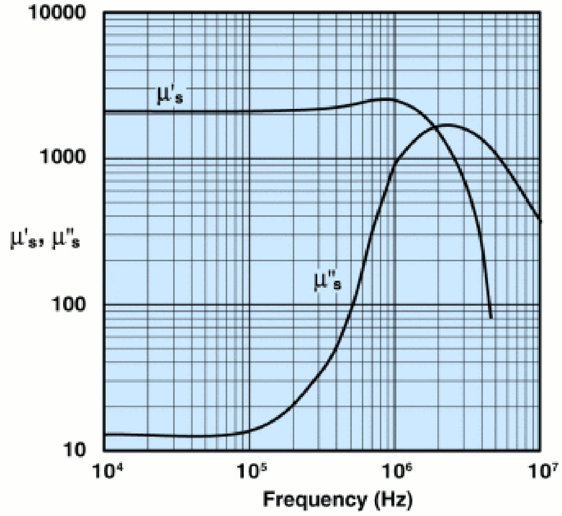
78 Material Characteristics:

Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		μ_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	Ω cm	ρ	$2x10^2$

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

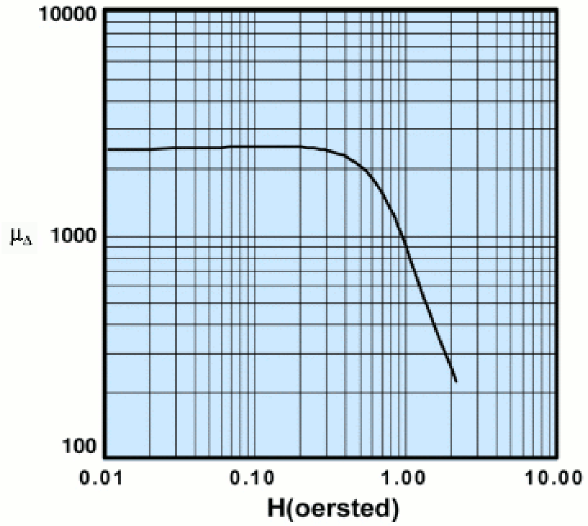
RFID rods, toroids, U cores, and E&I cores are all available in 78 material.

Complex Permeability vs. Frequency

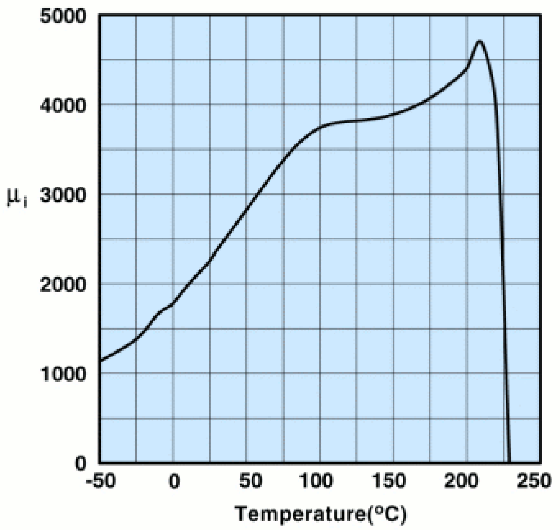


Measured on an 18/10/6mm toroid using the HP 4284A and the HP 4291A.

Incremental Permeability vs. H

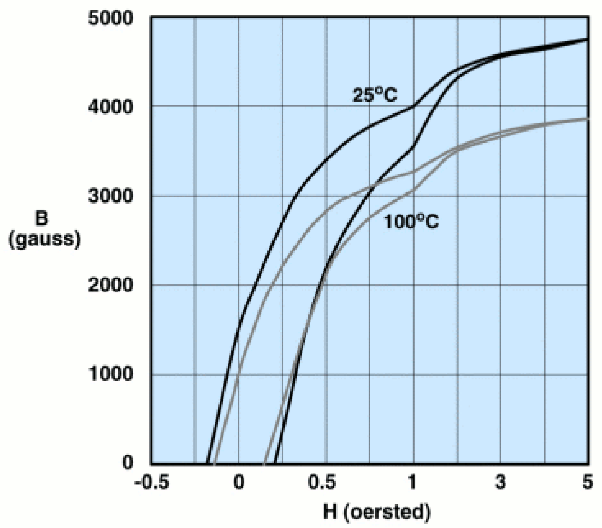


Initial Permeability vs. Temperature



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

Hysteresis Loop



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

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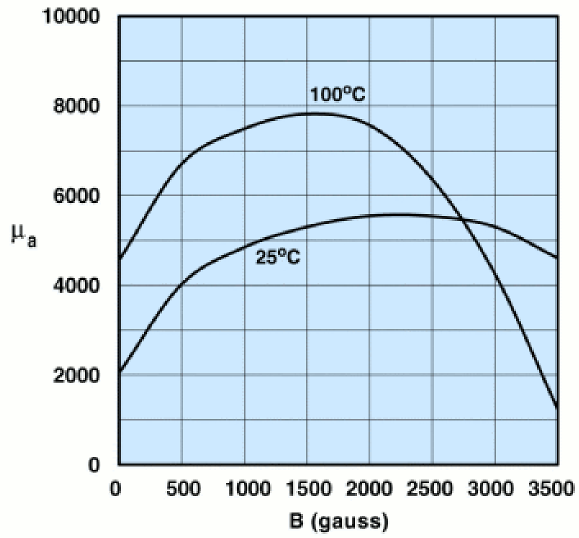
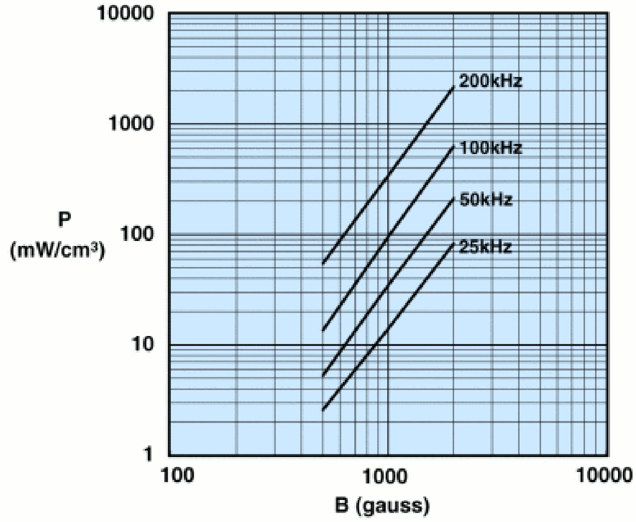
Amplitude Permeability vs. Flux Density



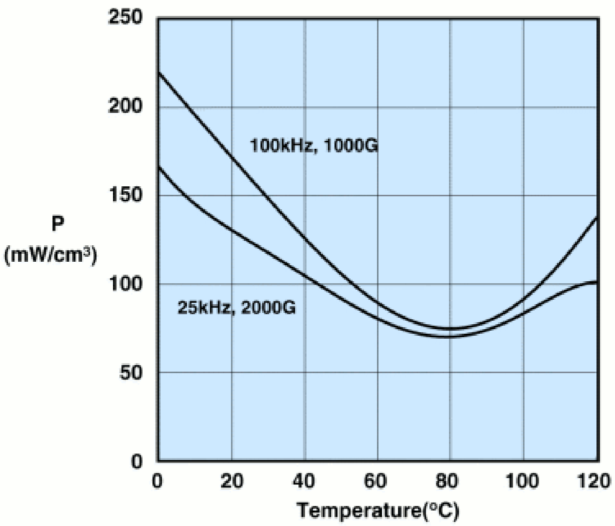
Measured on an 18/10/6mm toroid at 10kHz.

Power Loss Density vs. Flux Density



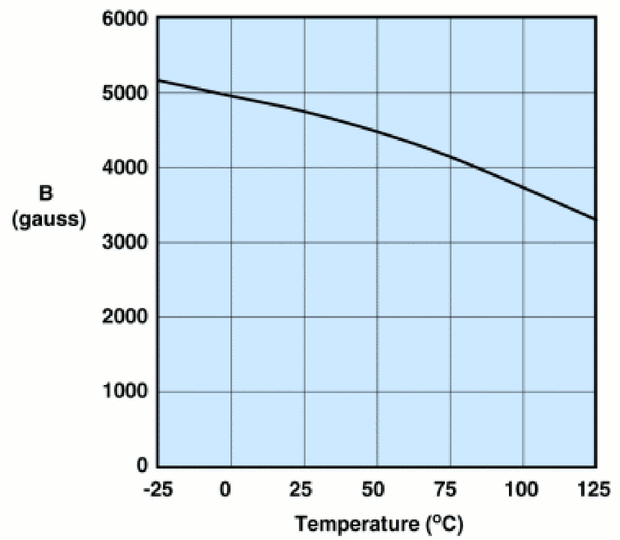
Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW at 100°C

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.