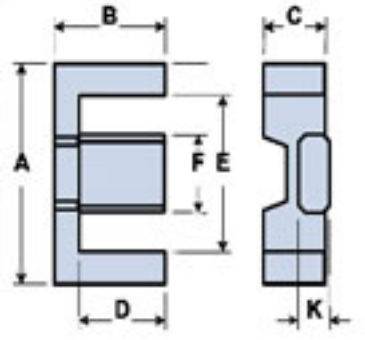
Fair-Rite Products Corp.
Your Signal Solution®
Ferrite Components for the Electronics Industry
Fair-Rite Products Corp. PO Box J,One Commercial Row, Wallkill, NY 12589-0288
Phone: (888) 324-7748 www.fair-rite.com

Fair-Rite Product's Catalog
Part Data Sheet, 8998202021
Printed: 2013-07-03



Part Number:	8998202021
Frequency Range:	Dimensions
Description:	98 EFD CORE
Application:	Inductive Components
Where Used:	Closed Magnetic Circuit
Part Type:	EFD Cores
Generic Name:	EFD20

Mechanical Specifications

Weight:	7.000 (g) per Set

Part Type Information

EFD10, EFD12, EFD15, EFD20, EFD25, EFD30

EFD (Economical Flat Design) cores have been designed to maximize volume in a low profile geometry. EFD cores allow maximum throughput power density with reasonably low mass for board level installation.

-EFD cores can be supplied with the centerpost 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	20.00	± 0.55	0.787	-
B	10.00	± 0.25	0.394	-
C	6.65	± 0.2	0.262	-
D	7.70	± 0.25	0.303	-
E	15.40	± 0.5	0.606	-
F	8.90	± 0.3	0.350	-
G	-	-	-	-
H	-	-	-	-
J	-	-	-	-
K	3.60	± 0.15	0.142	-

Electrical Specifications

Typical Impedance (Ω)	

Electrical Properties	
A_L (nH)	1200 ±25%
Ae(cm^2)	0.31000
Σl/A(cm^{-1})	15.60
l_e (cm)	4.74
V_e (cm^3)	1.44000
A_{min} (cm^2)	.290

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

l_e: Effective Path Length

A_e: Effective Cross-Sectional Area

V_e: Effective Core Volume

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

NI - Value of dc Ampere-turns

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

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Ferrite Material Constants

Specific Heat	0.25 cal/g/°C
Thermal Conductivity	**3.5 - 4.5 mW/cm** - °C
Coefficient of Linear Expansion	8 - $10x10^{-6}$/°C
Tensile Strength	4.9 kgf/mm²
Compressive Strength	42 kgf/mm²
Young's Modulus	$15x10^3$ kgf/mm²
Hardness (Knoop)	650
Specific Gravity	≈ 4.7 g/cm³

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.

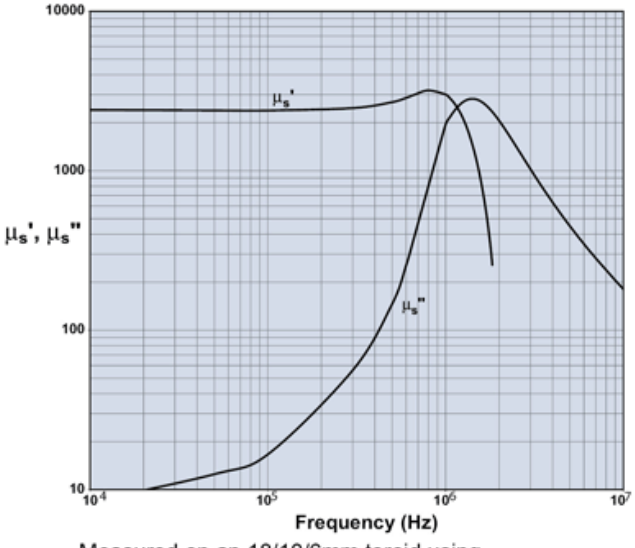
New type 98 Material is an improved version of Fair-Rite's 78 Material, this material supplies, lower power loss at 100°C at moderate flux densities for operation below 200 kHz.

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

98 Material Characteristics

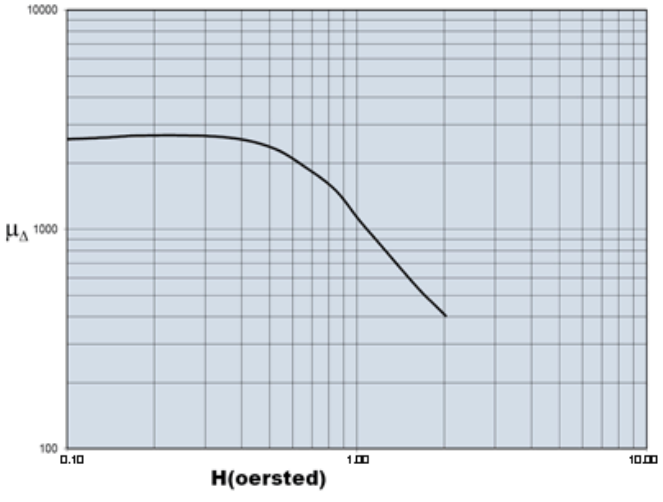
Property	Unit	Symbol	Value
Initial Permeability @ B < 10gauss		μ_i	2400
Flux Density @ Field Strength	gauss oersted	B H	5000 5
Residual Flux Density	gauss	B_r	1800
Coercive Force	oersted	H_c	0.17
Loss Factor @ Frequency	10^{-6} MHz	$\tan\delta/\mu_i$	3.5 0.1
Temperature Coefficient of Initial Permeability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

Complex Permeability vs. Frequency

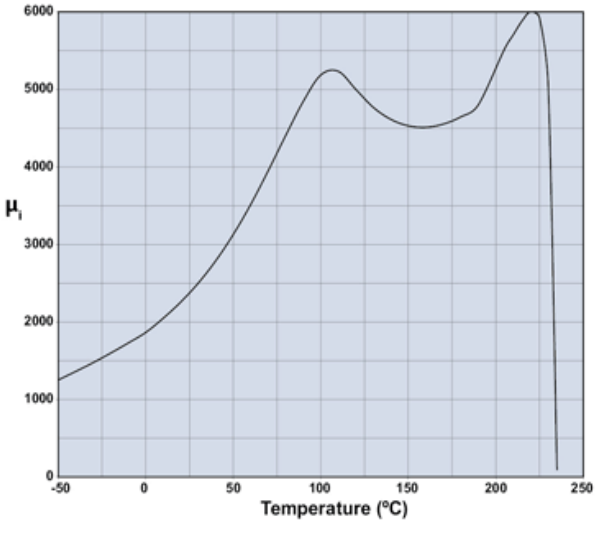


Measured on an 18/10/6mm toroid using HP 4284A and HP4291A.

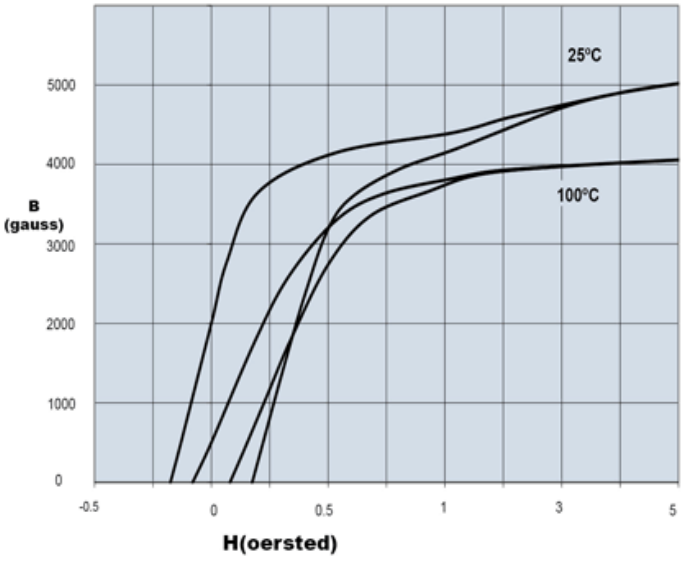
Incremental Permeability vs. H



Initial Permeability vs. Temperature



Hysteresis Loop



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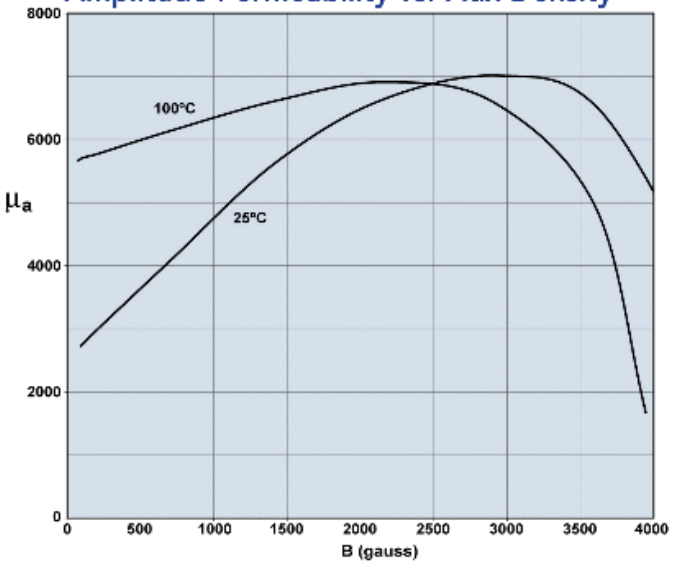
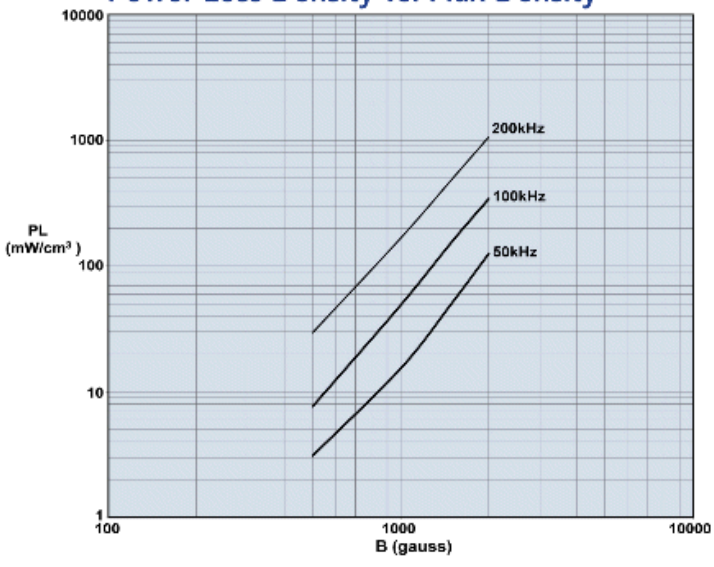
A low loss MnZn ferrite material for power applications up to 200kHz.

Amplitude Permeability vs. Flux Density



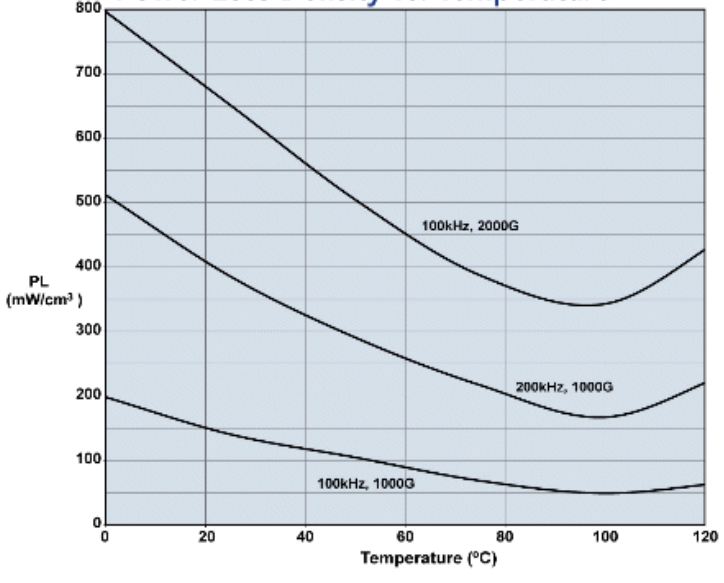
Measured on an 18/10/6mm toroid at 10kHz.

Power Loss Density vs. Flux Density



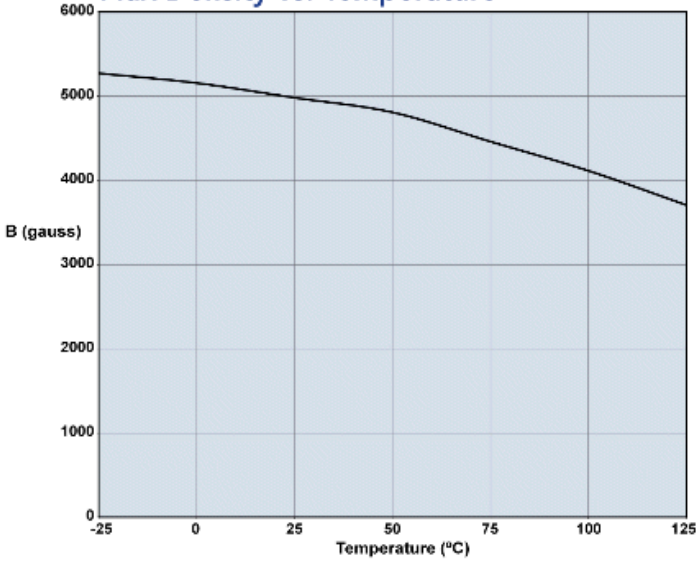
Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW at 100°C.

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.