# Fair-Rite Products Corp. Your Signal Solution<sub>®</sub>

Ferrite Components for the Electronics Industry

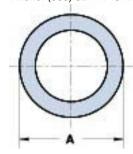
Fair-Rite Products Corp. PO Box J,One Commercial Row, Wallkill, NY 12589-0288 Phone: (888) 324-7748 www.fair-rite.com

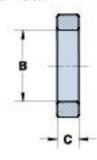
Fair-Rite Product's Catalog Part Data Sheet, 5977003801 Printed: 2014-06-11













Part Number: 5977003801

Frequency Range: Medium Permeability, 77 (ui=2000) & 78 (ui=2300) materials

Description: 77 TOROID

Application: Inductive Components

Where Used: Closed Magnetic Circuit

Part Type: Toroids

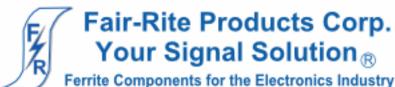
**Mechanical Specifications** 

Weight: 106.000(g)

## Part Type Information

A ring configuration provides the ultimate utilization of the intrinsic ferrite material properties. Toroidal cores are used in a wide variety of applications such as power input filters, ground-fault interrupters, common-mode filters and in pulse and broadband transformers.

- -Toroids are listed by initial permeability classes and increasing dimension of the inside diameter.
- -All toroidal cores are supplied burnished to break sharp edges.
- -Toroids are tested for AL values at 10 kHz.
- -Toroids with an outside diameter of 9.5mm (.375") or smaller can be supplied Parylene C coated. The Parylene coating will increase the 'A' and 'C' dimensions and decrease the 'B' dimension a maximum of 0.038mm (.0015"). The ninth digit of a Parylene coated toroid part number is a '1'. See the material characteristics of Parylene C in our online catalog.
- -Toroids with an outside diameter of 9.5mm (.375") or larger can be supplied with a uniform coating of thermo-set plastic coating. This coating will increase the 'A' and 'C' dimensions and decrease the 'B' dimension a maximum of 0.5mm (.020"). The 9th digit of the thermo-set plastic coated toroid part number is a '2'. Thermo-set plastic coating is RoHS compliant.
- -Thermo-set plastic coated parts can withstand a minimum breakdown voltage of 1000 Vrms, uniformly applied across the 'C' dimension of the toroid.
- -The "C" dimension may be modified to suit specific applications.
- -For any toroidal core requirement not listed in the catalog, please contact our customer service department for availability and pricing.
- -Explaination of Part Numbers: Digits 1&2 = product class, 3&4 = material grade, 9th digit 1 = Parylene coating, 2 = thermo-set plastic coating.



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## Mechanical Specifications

Dim	mm	mm	nominal	inch
		tol	inch	misc.
Α	61.00	±1.30	2.400	-
В	35.55	±0.85	1.400	ı
С	12.70	±0.50	0.500	ı
D	•	ı	ı	ı
Е	•	ı	ı	ı
F	•	ı	ı	ı
G	-	-	-	-
Н	-		-	•
J	-		-	
K	-	-	-	-

## **Electrical Specifications**

Typical Impedance ( $\Omega$ )			
Electrical Properties			
A <sub>L</sub> (nH)	2950 ±25%		
Ae(cm <sup>2</sup> )	1.58000		
$\Sigma$ I/A(cm <sup>-1</sup> )	9.20		
l <sub>e</sub> (cm) 14.50			
V <sub>2</sub> (cm <sup>3</sup> )	22.80000		

## **Land Patterns**

V	W	Х	Υ	Z
-	-	-		-

## Winding Information

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

## **Reel Information**

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

∠I/A - Core Constant

A<sub>e</sub>: Effective Cross-Sectional Area

 $A_1$  - Inductance Factor  $\left(\frac{L}{N^2}\right)$ 

I e: Effective Path Length

Ve: Effective Core Volume

NI - Value of dc Ampere-turns

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



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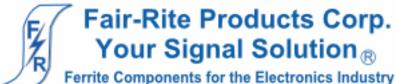




## **Ferrite Material Constants**

0.25 cal/g/°C Specific Heat ..... 3.5 - 4.5 mW/cm - °C Thermal Conductivity ..... Coefficient of Linear Expansion ..... 8 - 10x10-6/°C 4.9 kgf/mm<sup>2</sup> Tensile Strength ..... Compressive Strength ..... 42 kgf/mm<sup>2</sup> 15x103 kgf/mm2 Young's Modulus ..... Hardness (Knoop)..... 650 Specific Gravity .....  $\approx 4.7 \text{ g/cm}^3$ The above quoted properties are typical for Fair-Rite MnZn and NiZn ferrites.

See next page for further material specifications.



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

Pot cores, E&I cores, U cores, rods, toroids, and bobbins are all available in 77 material.

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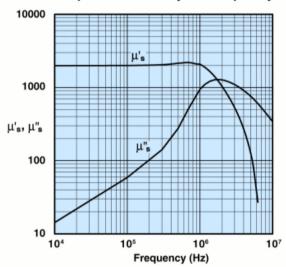




#### 77 Material Characteristics:

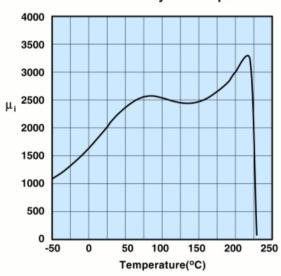
Property	Unit	Symbol	Value
Initial Permeability B < 10 gauss		$\mu_{i}$	2000
Flux Density	gauss	В	4900
@ Field Strength	oersted	н	5
Residual Flux Density	gauss	B,	1800
Coercive Force	oersted	H <sub>c</sub>	0.30
Loss Factor	10-6	tan δ/μ,	15
@ Frequency	MHz		0.1
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		0.7
Curie Temperature	°C	T.	>200
Resistivity	Ωcm	ρ	1x10 <sup>2</sup>

#### Complex Permeability vs. Frequency



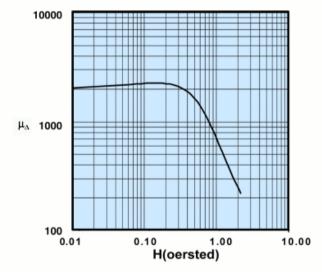
Measured on an 18/10/6mm toroid using the HP 4284A and the HP 4291A.

#### Initial Permeability vs. Temperature

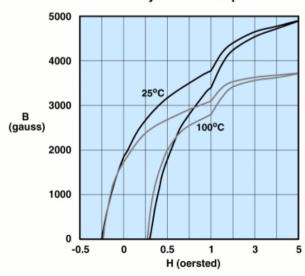


Measured on an 18/10/6mm toroid at 100kHz.

#### Incremental Permeability vs. H



#### **Hysteresis Loop**



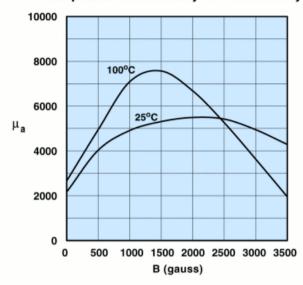
Measured on an 18/10/6mm toroid at 10kHz.

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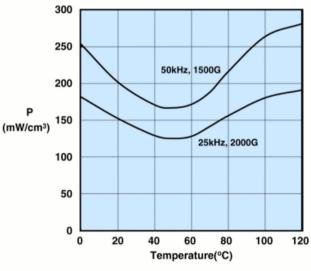
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#### Amplitude Permeability vs. Flux Density



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

#### Power Loss Density vs. Temperature



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

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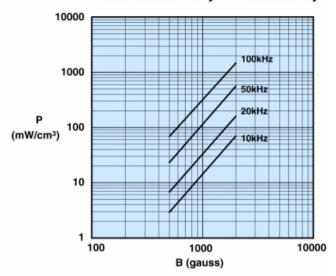
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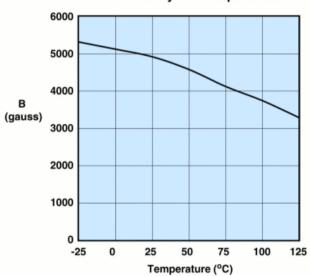


#### Power Loss Density vs. Flux Density



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

#### Flux Density vs. Temperature



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