

Figure 1

Part Number: 0446164181  
 Frequency Range: Broadband Frequencies 25-300 MHz (Economical 46 material)  
 Description: 46 ROUND CABLE CORE ASSEMBLY  
 Application: Suppression Components  
 Where Used: Cable Component  
 Part Type: Round Cable Snap-Its  
 Preferred Part: ✓

## Mechanical Specifications

Weight: 61.000 (g)

## Part Type Information

Round cable snap-its can easily accommodate round cables or bundled wires with diameters from 2.5 mm (.100") to 25.4 mm (1.000"). These assemblies are available in four ferrite material classes to suppress differential or common-mode conducted EMI from 1 MHz into the GHz region. The polypropylene cases are meeting the RoHS restrictions of hazardous substances and have a flammability rating of UL94 V-0.

-Round cable snap-it assemblies are controlled for impedances only. The impedances listed are typical values. Minimum impedance values are specified for the + marked frequencies. The minimum guaranteed impedance is the listed impedance less 20%.

-Single turn impedance tests for the 31, 43 and 44 material are performed on the 4193A Vector Impedance Analyzer. The 61 material parts are tested on the 4191A RF Impedance Analyzer. Cores are tested with the shortest practical wire length.

-Many of the snap-it parts have round core equivalents. See Round Cable EMI Suppression Cores section of our catalog.

-'B' Dimension is the core Dimension.

-Round Cable Snap-it Kits are available for each of the four suppression materials. 31 Snap-It Kit (0199000030), 43 Snap-It Kit (0199000031), 46 Core and Snap-It Kit (0199000032) and 61 Snap-It Kit (0199000033).

-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	31.00	-	1.220	-
B	13.05	-	0.514	-
C	39.40	-	1.550	-
D	15.25	-	0.600	-
E	-	-	-	-
F	-	-	-	-
G	-	-	-	-
H	-	-	-	-
J	-	-	-	-
K	-	-	-	-

## Electrical Specifications

Typical Impedance ( $\Omega$ )	
10 MHz	73
25 MHz	115
100 MHz+	205
250 MHz	275

Electrical Properties	

## 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.

$\Sigma$ l/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.



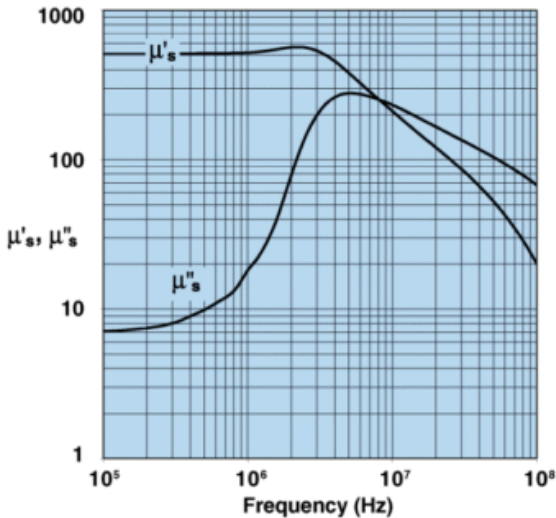
### 46 Material Characteristics:

Property	Unit	Symbol	Value
Initial Permeability @ B < 10 gauss		$\mu_i$	500
Flux Density @ Field Strength	gauss oersted	B H	3000 10
Residual Flux Density	gauss	$B_r$	1900
Coercive Force	oersted	$H_c$	0.40
Loss Factor @ Frequency	$10^{-6}$ MHz	$\tan \delta / \mu_i$	60 0.1
Temperature Coefficient of Initial Permeability (20 -70°C)	%/°C		-----
Curie Temperature	°C	$T_c$	>140
Resistivity	$\Omega$ cm	$\rho$	$1 \times 10^8$

Our latest material development is a MgZn ferrite intended for suppression applications. This material does not use nickel in its composition, hence it avoids potential environmental issues as well as reduces the cost of the material component of suppression parts. The suppression performance of the 46 material is similar to our widely used 43 material.

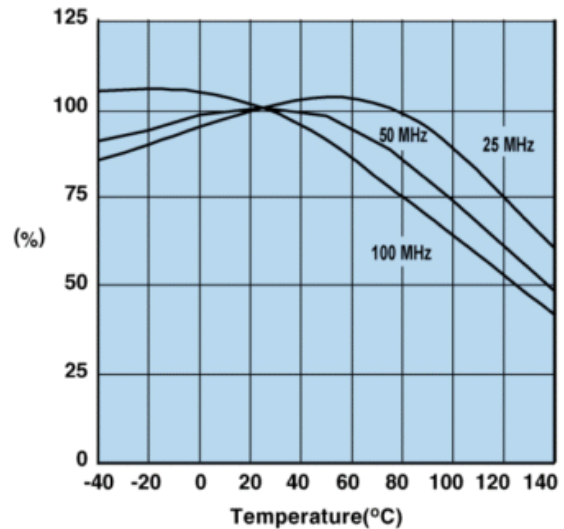
The new Fair-Rite grade 46 is supplied in the larger sizes of the round cable EMI suppression and snap-it cores.

### Complex Permeability vs. Frequency



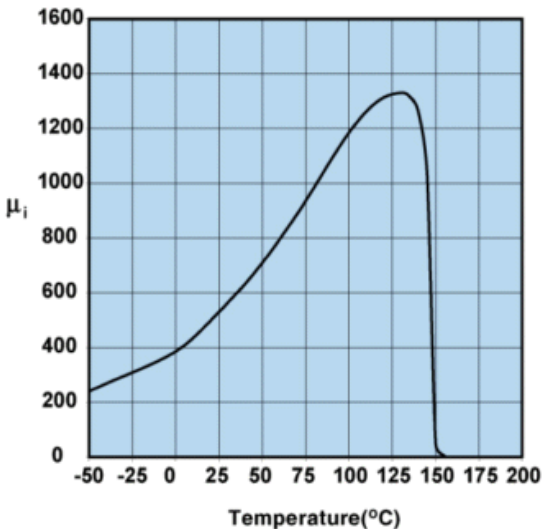
Measured on a 17/10/6mm toroid using the HP 4284A and the HP 4291A.

### Percent of Original Impedance vs. Temperature



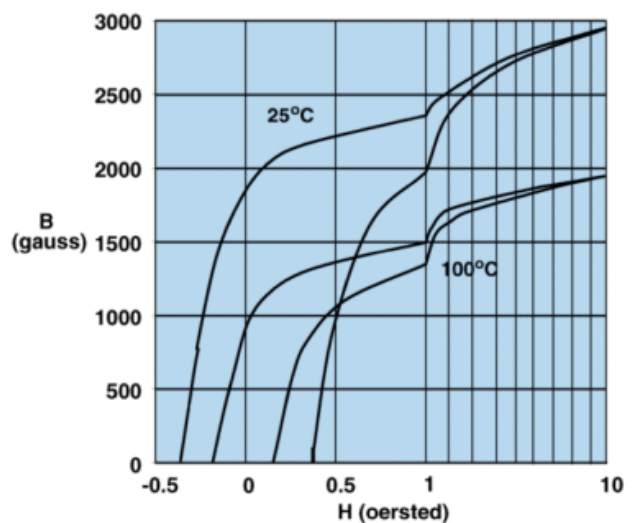
Measured on a 2646000301 using the HP4291A.

### Initial Permeability vs. Temperature



Measured on a 17/10/6mm toroid at 100kHz.

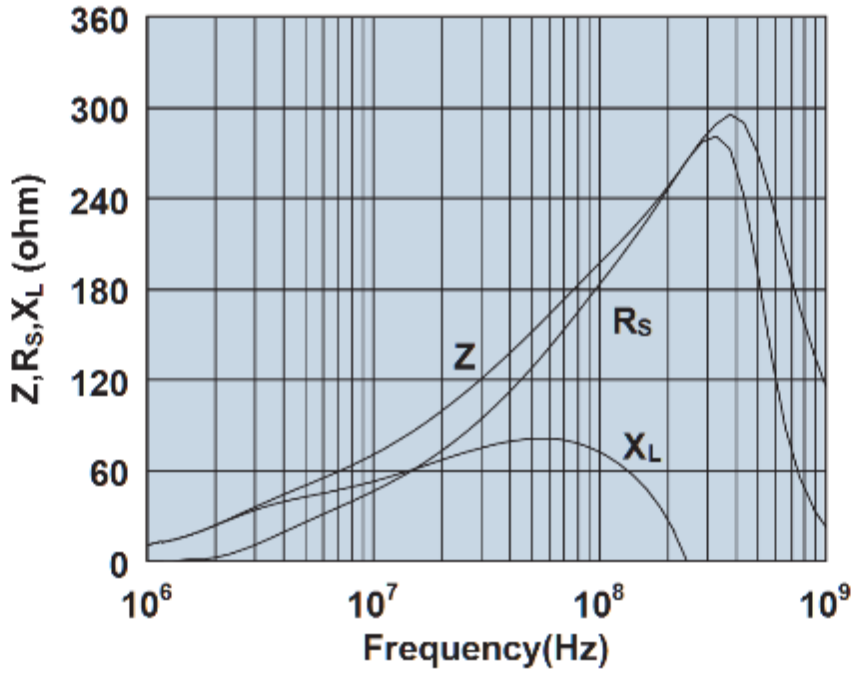
### Hysteresis Loop



Measured on a 17/10/6mm toroid at 10kHz.



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Impedance, reactance, and resistance vs. frequency.