

Part Number: 2631480002  
 Frequency Range: Lower & Broadband Frequencies 1-300 MHz (31 material)  
 Description: 31 ROUND CABLE CORE  
 Application: Suppression Components  
 Where Used: Cable Component  
 Part Type: Round Cable EMI Suppression Cores

## Mechanical Specifications

Weight: 12.000 (g)

## Part Type Information

Fair-Rite offers a broad selection of ferrite EMI suppression cable cores in several materials with guaranteed minimum impedance specifications.

-All cable cores have been burnished to remove the sharp edges.

-The column 'H' (Oe) gives for each cable core 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-turns) product. For the effect of the dc bias on the impedance of the core material, see the figures 18-23 in the application note 'How to choose Ferrite Components for EMI Suppression'.

-Suppression cable cores are controlled for impedances only. Minimum impedance values are specified for the + marked frequencies. The minimum impedance is typically the listed impedance less 20%.

-Single turn impedance tests for 31, 43 and 46 material cores are performed on the 4193A Vector Impedance Meter. The 61 material parts are tested on the 4191A RF Impedance Analyzer and 75 material parts are tested on the 4285A LCR Meter. Cores are tested with the shortest Practical wire length.

-For smaller suppression parts, refer to the EMI Suppression Bead section of our catalog.

-For any cable suppression core not listed here, feel free to contact our customer service group for availability and pricing.

-The 'C' dimension, the core length, can be modified to suit specific applications.

-Our Expanded Cable and Suppressor Kit (part number 0199000005) Contains a selection of these suppression cores.

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

## Mechanical Specifications

| Dim | mm    | mm<br>tol | nominal<br>inch | inch<br>misc. |
|-----|-------|-----------|-----------------|---------------|
| A   | 12.30 | ±0.40     | 0.485           | -             |
| B   | 4.95  | +0.25     | 0.200           | -             |
| C   | 25.40 | ±0.75     | 1.000           | -             |
| D   | -     | -         | -               | -             |
| E   | -     | -         | -               | -             |
| F   | -     | -         | -               | -             |
| G   | -     | -         | -               | -             |
| H   | -     | -         | -               | -             |
| J   | -     | -         | -               | -             |
| K   | -     | -         | -               | -             |

## Electrical Specifications

| Typical Impedance ( $\Omega$ ) |     |
|--------------------------------|-----|
| 1 MHz                          | 34  |
| 5 MHz                          | 88  |
| 10 MHz+                        | 115 |
| 25 MHz+                        | 175 |
| 100 MHz+                       | 295 |
| 250 MHz                        | 267 |

| Electrical Properties |     |
|-----------------------|-----|
| H(Oe)                 | .52 |

## Land Patterns

| V | W<br>ref | X | Y | Z |
|---|----------|---|---|---|
| - | -        | - | - | - |
| - | -        | - | - | - |

## Winding Information

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

## Reel Information

| Tape Width<br>mm | Pitch<br>mm | Parts 7 "<br>Reel | Parts 13 "<br>Reel | Parts 14 "<br>Reel |
|------------------|-------------|-------------------|--------------------|--------------------|
| -                | -           | -                 | -                  | -                  |

## Package Size

| Pkg Size |
|----------|
| -<br>(-) |

## 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

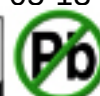
$A_L$  - Inductance Factor ( $\frac{L}{N^2}$ )

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 .....            | <b>3.5 - 4.5 mW/cm - °C</b>            |
| 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.



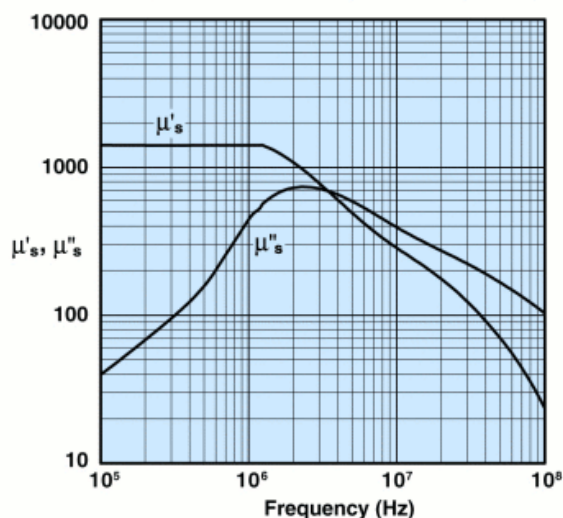
A MnZn ferrite designed specifically for EMI suppression applications from as low as 1 MHz up to 500 MHz. This material does not have the dimensional resonance limitations associated with conventional MnZn ferrite materials.

Round cable EMI suppression cores, round cable snap-its, flat cable EMI suppression cores, and flat cable snap-its are all available in 31 material.

### 31 Material Characteristics:

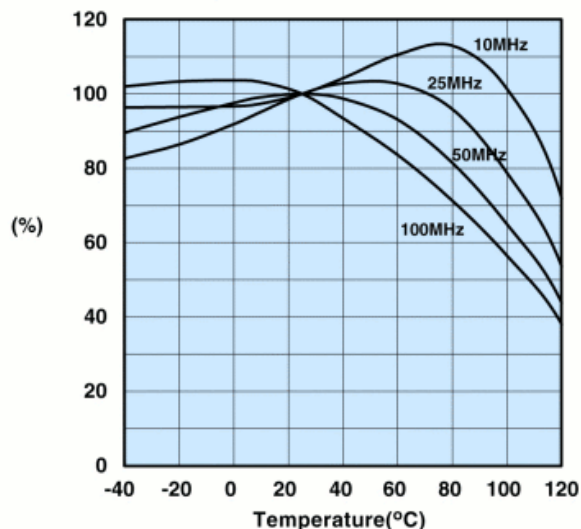
| Property                                                   | Unit             | Symbol              | Value           |
|------------------------------------------------------------|------------------|---------------------|-----------------|
| Initial Permeability @ B < 10 gauss                        |                  | $\mu_i$             | 1500            |
| Flux Density @ Field Strength                              | gauss<br>oersted | B<br>H              | 3400<br>5       |
| Residual Flux Density                                      | gauss            | $B_r$               | 2500            |
| Coercive Force                                             | oersted          | $H_c$               | 0.35            |
| Loss Factor @ Frequency                                    | $10^{-6}$<br>MHz | $\tan \delta \mu_i$ | 20<br>0.1       |
| Temperature Coefficient of Initial Permeability (20 -70°C) | %/°C             |                     | 1.6             |
| Curie Temperature                                          | °C               | $T_c$               | >130            |
| Resistivity                                                | $\Omega$ cm      | $\rho$              | $3 \times 10^3$ |

**Complex Permeability vs. Frequency**



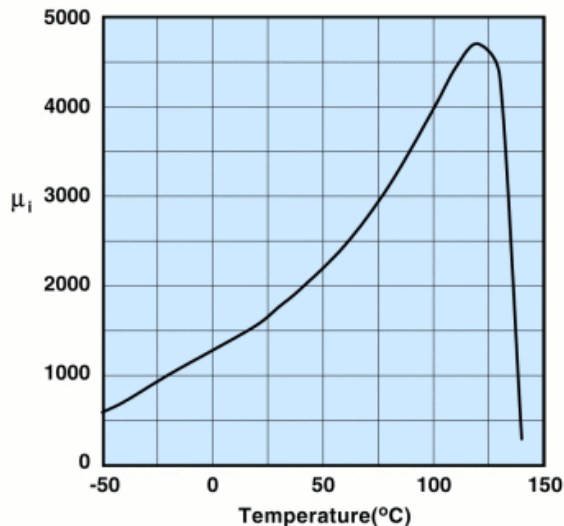
Measured on a 17/10/6mm toroid at 25°C using the HP 4284A and the HP 4291A.

**Percent of Original Impedance vs. Temperature**



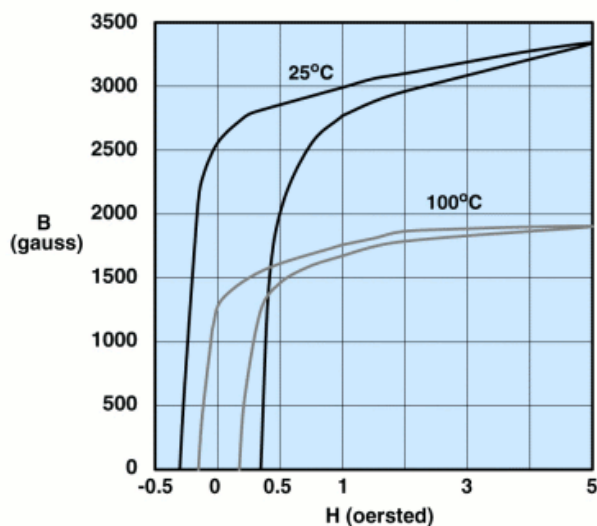
Measured on a 2631000301 using the HP4291A.

**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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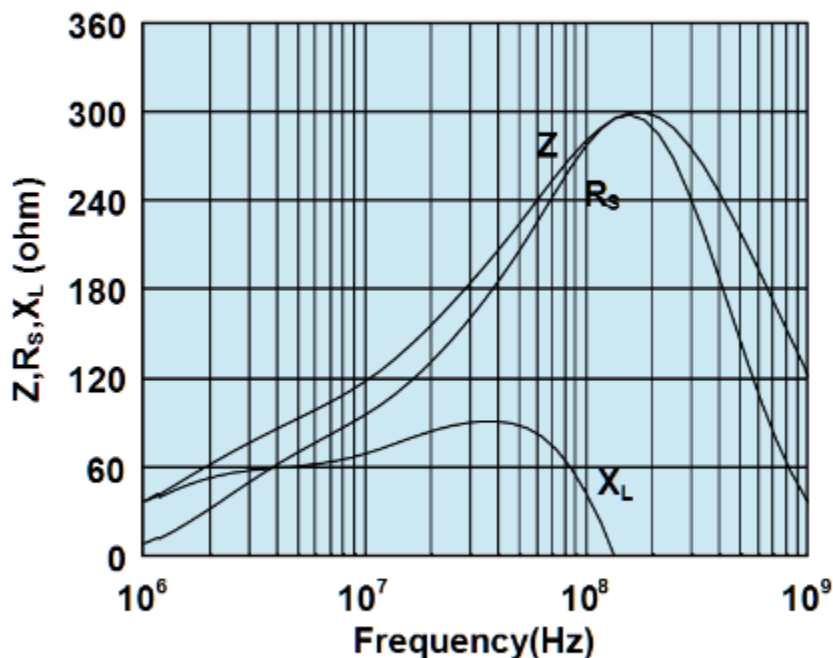
Ferrite Components for the Electronics Industry

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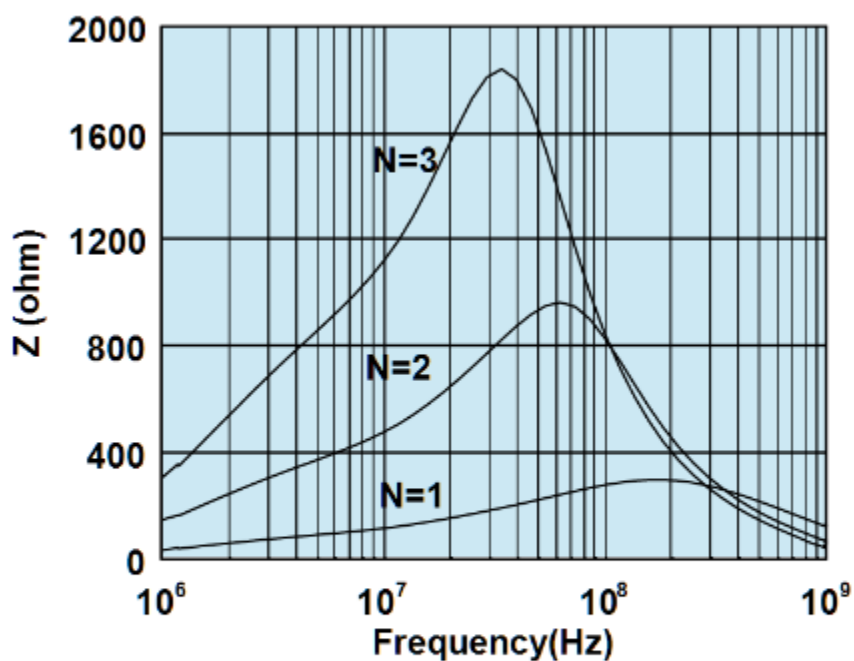
Fair-Rite Product's Catalog  
Part Data Sheet, 2631480002  
Printed: 2014-05-13



**2631480002**



Impedance, reactance, and resistance vs. frequency.



Impedance vs. frequency with one, two, and three turns.