

**Figure 1**

Part Number: 6278230121  
 Frequency Range: Dimensions  
 Description: 78 RM CORE  
 Application: Inductive Components  
 Where Used: Closed Magnetic Circuit  
 Part Type: RM Cores  
 Generic Name: RM8

## Mechanical Specifications

Weight: 13.000 (g)

## Part Type Information

RM4, RM5, RM6, RM8, RM10, RM12, RM14

RM (Rectangular Modulus) cores allow better shielding than E type geometries while also providing easier winding accessibility and better power dissipation than a pot core configuration. Fair-Rites standard RM cores all have a solid center post and standard height, low profile and alternate materials are available upon request.

- RM cores can be supplied with the center post gapped to a mechanical dimension.
- RM cores can also be supplied to an AL value, these would be supplied in sets.

## Mechanical Specifications

| Dim | mm    | mm<br>tol | nominal<br>inch | inch<br>misc. |
|-----|-------|-----------|-----------------|---------------|
| A   | 22.75 | ± 0.45    | 0.896           | -             |
| B   | 8.20  | ± 0.1     | 0.323           | -             |
| C   | 10.80 | ± 0.2     | 0.425           | -             |
| D   | 5.50  | ± 0.15    | 0.217           | -             |
| E   | 17.30 | ± 0.3     | 0.681           | -             |
| F   | 8.40  | ± 0.15    | 0.331           | -             |
| G   | 9.80  | min       | 0.386           | min           |
| H   | -     | -         | -               | -             |
| J   | 19.10 | ± 0.4     | 0.752           | -             |
| K   | -     | -         | -               | -             |

## Electrical Specifications

| Typical Impedance ( $\Omega$ ) |  |
|--------------------------------|--|
|                                |  |

| Electrical Properties          |           |
|--------------------------------|-----------|
| $A_L$ (nH)                     | 3000 ±25% |
| $A_e$ (cm <sup>2</sup> )       | 0.60000   |
| $\sum I/A$ (cm <sup>-1</sup> ) | 6.70      |
| $l_e$ (cm)                     | 4.03      |
| $V_e$ (cm <sup>3</sup> )       | 2.41900   |
| $A_{min}$ (cm <sup>2</sup> )   | .554      |

### 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.

$\sum I/A$  - 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

## 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 | Pitch | Parts 7 " | Parts 13 " | Parts 14 " |
|------------|-------|-----------|------------|------------|
| mm         | mm    | Reel      | Reel       | Reel       |
| -          | -     | -         | -          | -          |

## Package Size

| Pkg Size |
|----------|
| -        |
| (-)      |

## Connector Plate

| # Holes | # Rows |
|---------|--------|
| -       | -      |



## 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.*

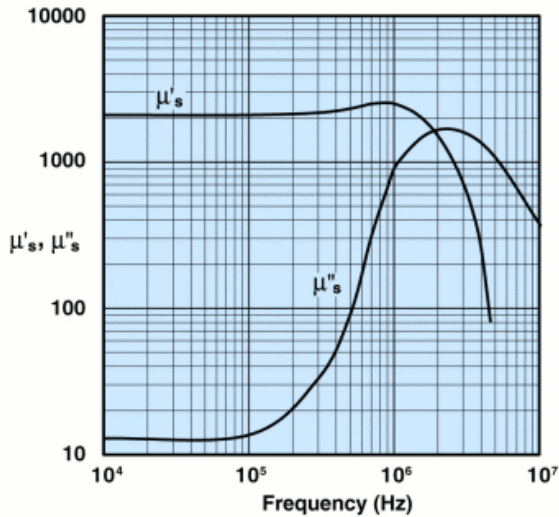
See next page for further material specifications.



### 78 Material Characteristics:

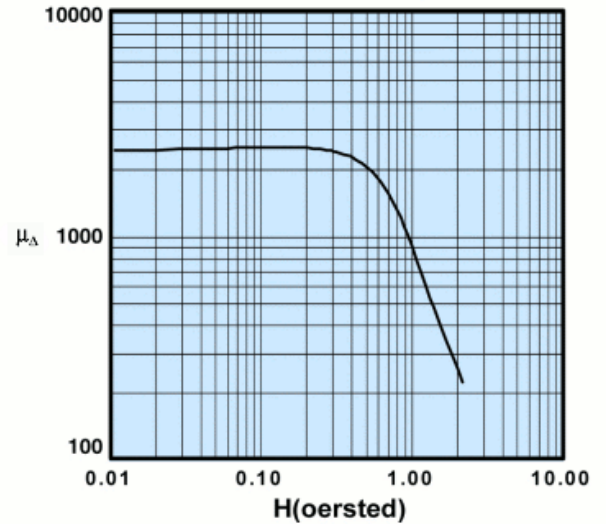
| Property   | Unit             | Symbol              | Value           |
|--|------------------|---------------------|-----------------|
| Initial Permeability @ B < 10 gauss                        |                  | $\mu_i$             | 2300            |
| Flux Density @ Field Strength                              | gauss<br>oersted | B<br>H              | 4800<br>5       |
| Residual Flux Density                                      | gauss            | $B_r$               | 1500            |
| Coercive Force   | oersted          | $H_c$               | 0.20            |
| Loss Factor @ Frequency                                    | $10^{-6}$<br>MHz | $\tan \delta \mu_i$ | 4.5<br>0.1      |
| Temperature Coefficient of Initial Permeability (20 -70°C) | %/°C             |                     | 1.0             |
| Curie Temperature  | °C               | $T_c$               | >200            |
| Resistivity  | $\Omega$ cm      | $\rho$              | $2 \times 10^2$ |

### Complex Permeability vs. Frequency

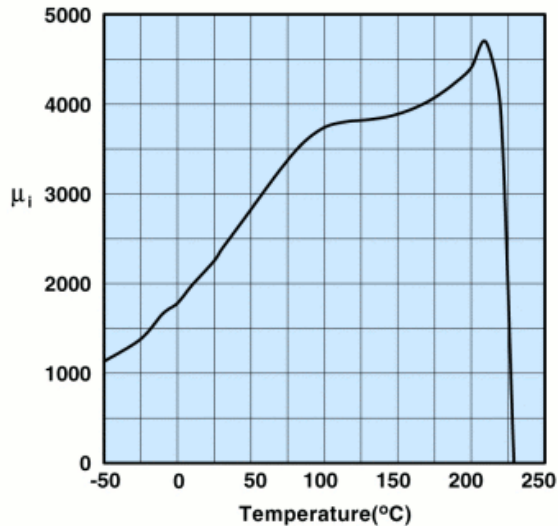


Measured on an 18/10/6mm toroid using the HP 4284A and the HP 4291A.

### Incremental Permeability vs. H

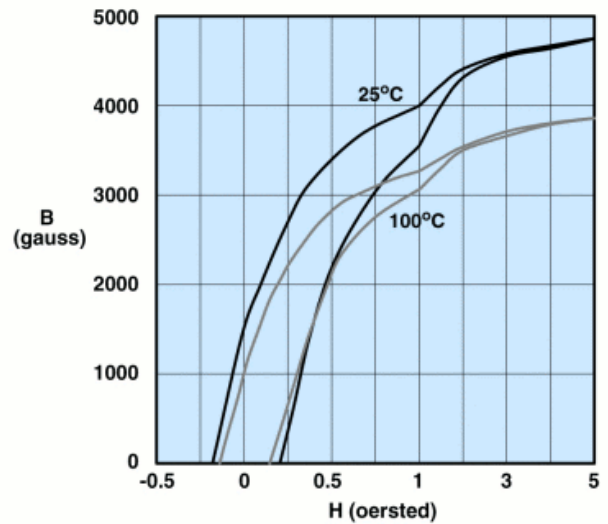


### Initial Permeability vs. Temperature



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

### Hysteresis Loop



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



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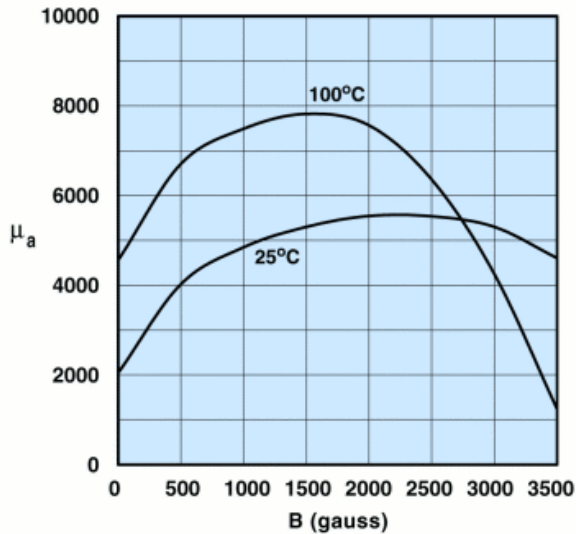
Ferrite Components for the Electronics Industry

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Fair-Rite Product's Catalog  
Part Data Sheet, 6278230121  
Printed: 2012-03-05

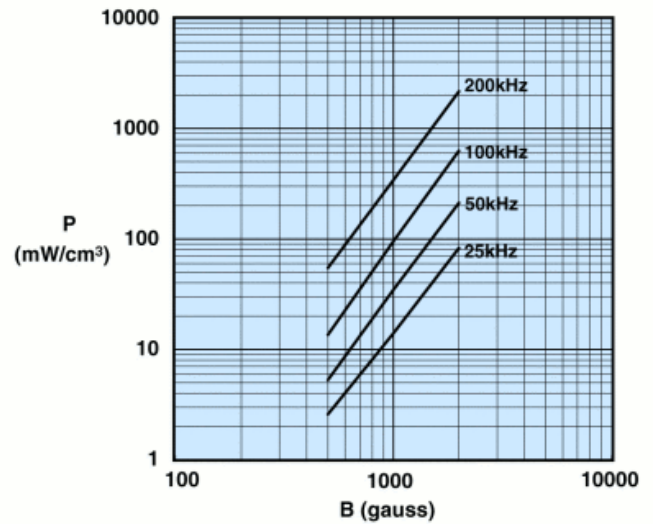


## Amplitude Permeability vs. Flux Density



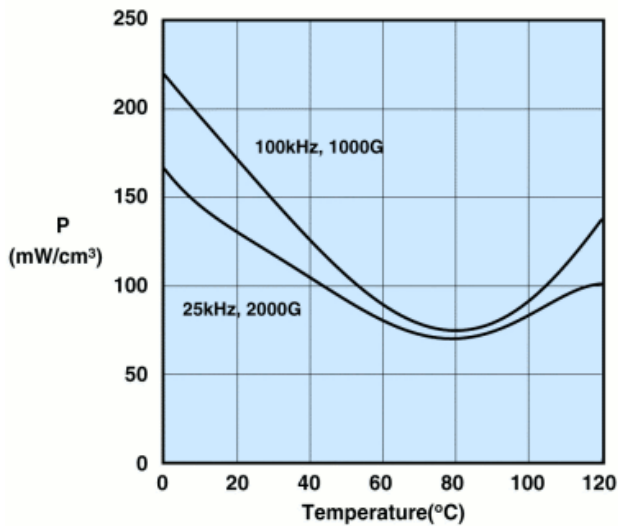
Measured on an 18/10/6mm toroid at 10kHz.

## Power Loss Density vs. Flux Density



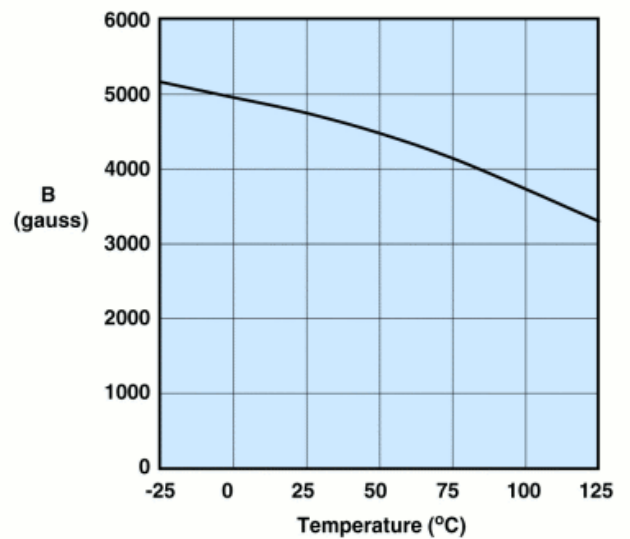
Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW at 100°C

## 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.