

Part Number: 6695212021  
 Frequency Range: Dimensions  
 Description: 95 PQ CORE  
 Application: Inductive Components  
 Where Used: Closed Magnetic Circuit  
 Part Type: PQ Cores  
 Generic Name: PQ20/20

## Mechanical Specifications

Weight: 16.000 (g)

## Part Type Information

PQ20/16, PQ20/20, PQ26/20, PQ26/25, PQ32/20, PQ32/30, PQ35/35, PQ40/40, PQ50/50

PQ cores were developed for use in power applications. The large surface area to volume of the core aids in heat dissipation. PQ cores are employed both in filter and transformer designs for switch mode power supplies.

- PQ cores can be supplied with the centerpost gapped to a mechanical dimension.
- PQ 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   | 20.50 | ± 0.4     | 0.807           | -             |
| B   | 10.20 | ± 0.15    | 0.402           | -             |
| C   | 14.00 | ± 0.4     | 0.551           | -             |
| D   | 7.00  | ± 0.15    | 0.276           | -             |
| E   | 18.00 | ± 0.4     | 0.709           | -             |
| F   | 8.80  | ± 0.2     | 0.346           | -             |
| G   | 12.00 | min       | 0.472           | min           |
| H   | -     | -         | -               | -             |
| J   | -     | -         | -               | -             |
| K   | -     | -         | -               | -             |

## Electrical Specifications

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

| Electrical Properties          |           |
|--------------------------------|-----------|
| $A_L$ (nH)                     | 3500 ±25% |
| $A_e$ (cm <sup>2</sup> )       | 0.62500   |
| $\sum I/A$ (cm <sup>-1</sup> ) | 7.20      |
| $l_e$ (cm)                     | 4.52      |
| $V_e$ (cm <sup>3</sup> )       | 2.52600   |
| $A_{min}$ (cm <sup>2</sup> )   | .608      |

### 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.



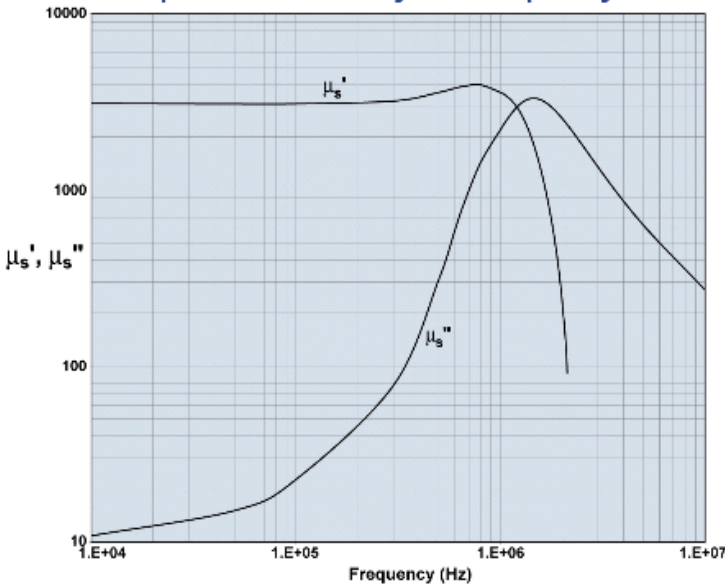
A low loss MnZn ferrite material for power applications up to 200kHz with low temperature variation. New type 95 Material is a low loss power material, which features less power loss variation over temperature (25-120°C) at moderate flux densities for operation below 200 kHz.

Shapes available in 95 material are Toroids, U cores, Pot Cores, RM, PQ, EFD, EP.

### 95 Material Characteristics

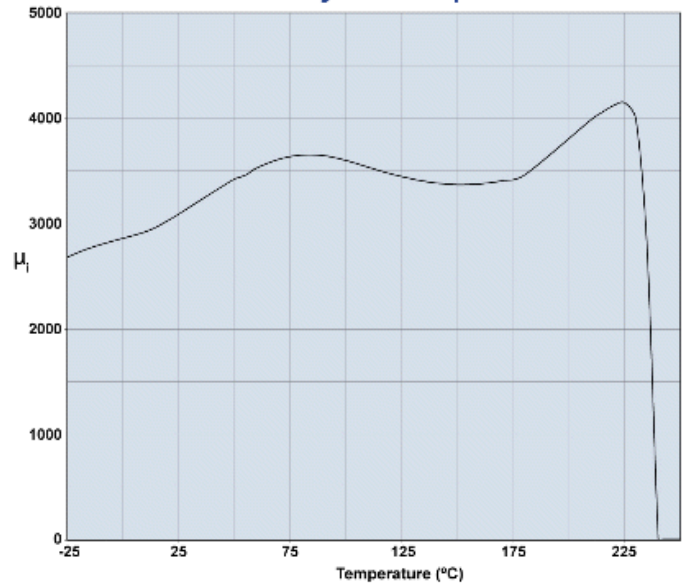
| Property  | Unit                     | Symbol             | Value      |
|---|--------------------------|--------------------|------------|
| Initial Permeability<br>@ B < 10gauss                     |                          | $\mu_i$            | 3000       |
| Flux Density<br>@ Field Strength                          | gauss<br>oersted         | B<br>H             | 5000<br>5  |
| Residual Flux Density                                     | gauss                    | $B_r$              | 800        |
| Coercive Force  | oersted                  | $H_c$              | 0.13       |
| Loss Factor<br>@ Frequency                                | $10^{-6}$<br>MHz         | $\tan\delta/\mu_i$ | 3.0<br>0.1 |
| Temperature Factor of<br>Initial Permeability (25 - 60°C) | $10^{-8}/^\circ\text{C}$ |                    | 2.5        |
| Curie Temperature   | °C                       | $T_c$              | > 220      |
| Resistivity   | ohm-cm                   | $\rho$             | 200        |

Complex Permeability vs. Frequency



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

Initial Permeability vs. Temperature

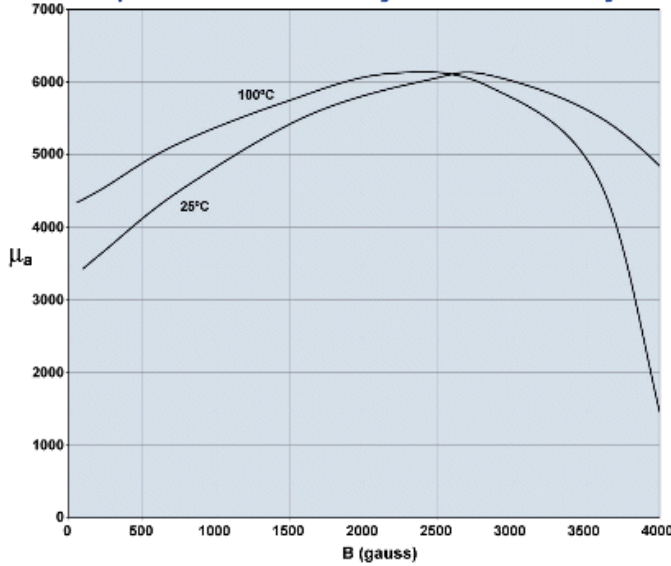


Measured on an 18/10/6mm toroid at 10kHz.



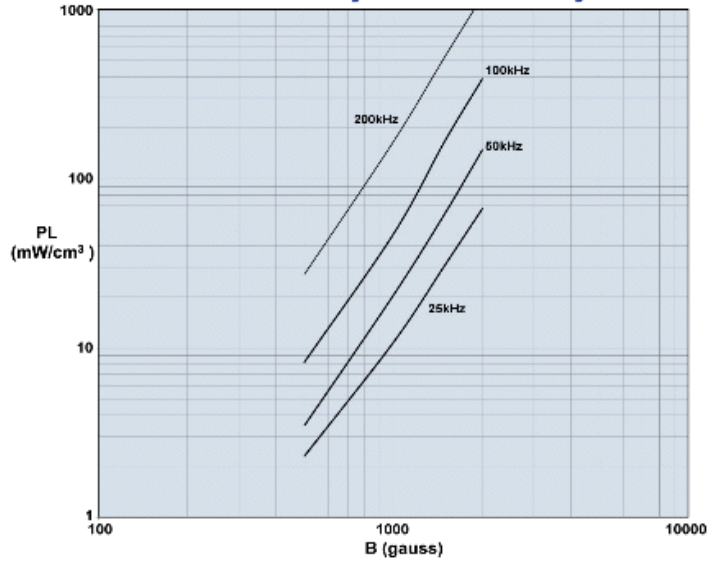
A low loss MnZn ferrite material for power applications up to 200kHz with low temperature variation.

**Amplitude Permeability vs. Flux Density**



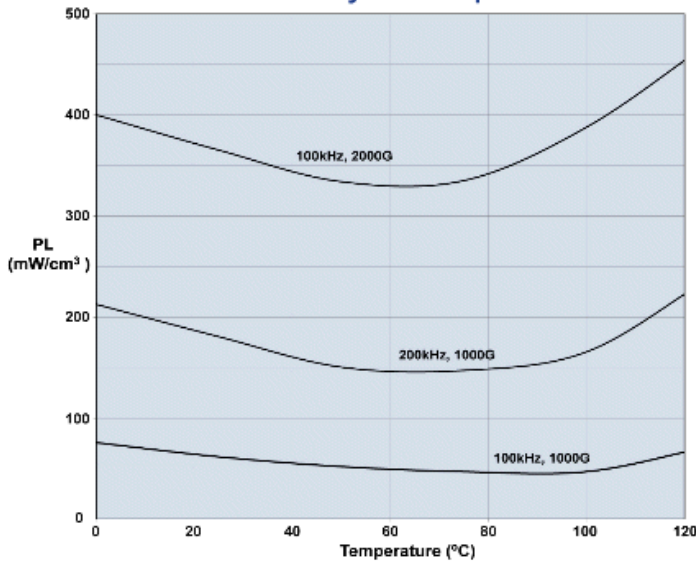
Measured on an 18/10/6mm toroid at 10kHz.

**Power Loss Density vs. Flux Density**



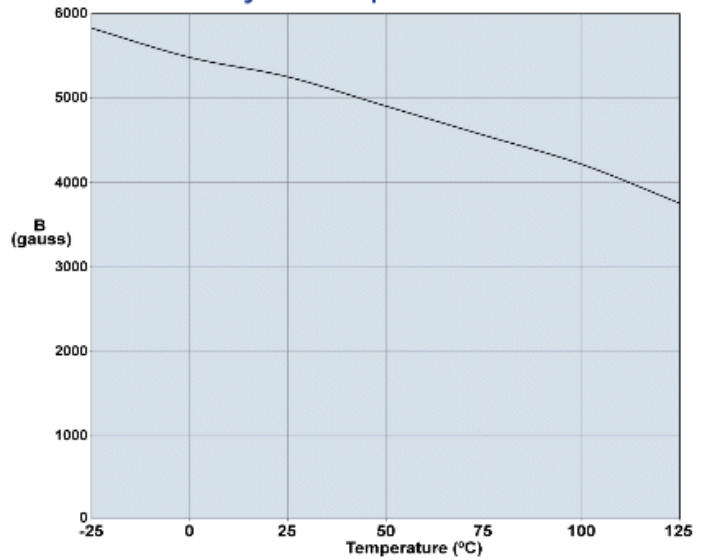
Measured on an 18/10/6mm toroid using the Clarke Hess 258 VAW at 100°C.

**Power Loss Density vs. Temperature**



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

**Flux Density vs. Temperature**



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