Symbols and Definitions

μ_i A.C. Initial Permeability
μ_i is defined as the limited value of a ferrite core at the origin of the curve of initial magnetization:

$$\mu_i = \frac{1}{\mu_0} \lim_{H \to 0} \frac{B}{H}$$

μ_0 : Permeability of vacuum
B: A.C.magnetic flux density
H: A.C.magnetic field strength

μ_a Amplitude Permeability
similar with μi ,but magnetized by a large amplitude sine field.

Tan δ / μ_i Relative Loss Factor
loss at low induction level.

PV Power loss
loss at high flux density level.

Bms Effective Saturation Magnetic Flux Density (mT)

Brms Residual Magnetic Flux Density (mT)

Hc Coercive Force (Oersteds) (A/m)

αF Temperature Factor of Permeability

$$\alpha F = \frac{\mu_2 - \mu_1}{\mu_1^{\,2}(T_2 - T_1)} \times 10^6 (T_2 > T_1)$$

μ_1 : Permeability of T_1
μ_2 : Permeability of T_2

ηB Hysteresis Material Constant

$$\eta B = \frac{\Delta Rh}{\omega L \mu_e \Delta B}$$

ΔRh: hyseresis loss resistance
ω: angular frequency
L : inductace of coil with the core
μ_e : effectve permeability
ΔB: amplitude magnetc flux of density

DF Disaccommodation Factor

$$D_F = \frac{\mu_{i1} - \mu_{i2}}{\mu_{i1}^{\,2}} \times \frac{1}{Log(t_1 / t_2)}$$

μ_{i1} : permeability measured at time t_1 after demagnetization
μ_{i2} : permeability measured at time t_2 after demagnetization

Tc Curie Temperature
temperature at which a ferrite loses is ferromagnetism

ρ Specific Resistivity(Ωm)

d Apparent density,
The Apparent density is defined as a weigh per unit volume

$$d = \frac{W}{V}(g/cm^3)$$

where W: weight of the magnetic core(g)
V : volume of the magnetic core(cm3)

A_L(nH) Inductance Factor
Inductance of a coil on a specified core divided by the square of the number of turns.(Unless otherwise specified the inductance test conditions for the inductance factor are at flux density<10 gauss).

Inductance

$$L = N^2 A_L (nH)$$

Effective Core Parameters

$$C_1 = \Sigma L / A (cm^{-1})$$

The summation of the magnetic path lengths of each section of a magnetic circuit divided by the corresponding magnetic area of the same section.

$$C_2 = \Sigma L / A^2 (cm^{-3})$$

The summation of the magnetic path lengths of each section of a magnetic circuit divided by the square of the corresponding magnetic area of the same section.

$Le = C_1^2/C_2$(cm) Effective magnetic path length
$Ae = C_1/C_2$(cm^2) Effective cross-sectional area
$Ve = C_1^3/C_2^2$(cm^3) Effective core volume
C_1 (mm^{-1}) Core constant
Aw (mm^2) Winding area of core
Ac (mm^2) cross-sectional centre leg area
W (g) Approx.weigh of core