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 μ_i,but magnetized by a large amplitude sine field.

$\tan\delta / \mu_i$ 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

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

Δ Rh:hysteresis loss resistance
ω: angular frequency
L : inductance of coil with the core
μ_e : effective permeability
Δ B : amplitude magnetic flux of density

D_F Disaccommodation Factor

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

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

T_C Curie Temperature

temperature at which a ferrite loses its ferromagnetism

ρ Specific Resistivity(Ωm)

d Apparent density,

The Apparent density is defined as a weight per unit volume.

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

Where W:weight of the magnetic core (g)
V:weight of the magnetic core (cm^3)

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

$$C_1 = \sum e / A \ (cm^{-1})$$

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

$$C_2 = \sum e / A^2 \ (cm^{-3})$$

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.

$$e_e = C_1^2 / C_2 \ (cm)$$

$$A_e = C_1 / C_2 \ (cm^2)$$

$$V_e = C_1^3 / C_2^2 \ (cm^3)$$