1、初始磁导率　Initial permeability, μ_i

初始磁导率是磁性材料的磁导率（B/H）在静态磁化曲线始端的极限值，即 $\mu_i=\frac{1}{\mu_0}\lim\frac{B}{H}\ (H\rightarrow 0)$

式中 μ_0为真空磁导率（$4\pi\times10^{-7}$H/m），H为磁场强度（A/m），B为磁通密度（T）

The initial permeability μ_i is the limit value at the initial magnetization curve's origin point and is given by the following formula: $\mu_i=\frac{1}{\mu_0}\lim\frac{B}{H}\ (H\rightarrow 0)$

Where　μ_0: Permeability of vacuum($4\pi\times10^{-7}$H/m),　H: Magnetic field strength(A/m)

B: Magnetic flux density(T)

2、有效磁导率　Effective permeability, μ_e

在闭合磁路中，或多或少地存在着气隙，若气隙很小可以忽略，则可以用有效磁导率来表征磁芯的导磁能力。

$$\mu_e=\frac{L}{\mu_0 N^2}\cdot\frac{le}{Ae}$$

L为装有磁芯的线圈的电感量（H），N为线圈匝数，Le为有效磁路长度（m），Ae为有效截面积（m^2）

This is usually defined as the permeability of a core forming a closed circuit where leakage flux is negligibly small.　$\mu_e=\frac{L}{\mu_0 N^2}\ \frac{le}{Ae}$

Where　L: self-inductance of core with coil(H), N: number of turns, Le: effective magnetic path length(m)

Ae: effective cross-sectional area(m^2)

3、饱和磁通密度　Saturation magnetic flux density, Bs(T)

磁化到饱和状态时的磁通密度。见图1。

The magnetic flux density at a magnetic field where H is up to an approximate saturation magnetic field value. (Fig.1)

4、剩余磁通密度　Residual magnetic flux density, (Br)

从饱和状态去除激励磁场后，磁芯中剩余的磁通密度。见图1。

The value of flux density retained by the core when the magnetic field is reduced from the state of the effective saturation magnetic flux density to zero. (Fig.1)

5、矫顽力　Coercivity, Hc(A/m)

从饱和状态去除磁场后，磁芯继续被反向激励磁场磁化，直至磁芯中磁通密度减为零，此时的磁场强度称为矫顽力(见图1)

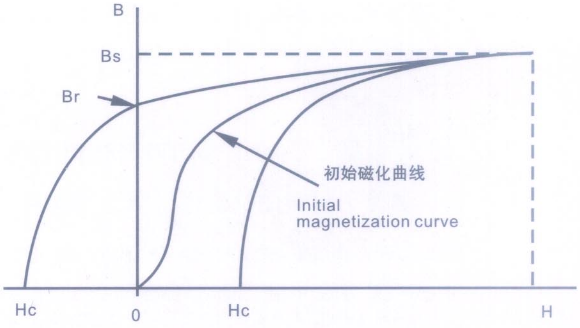

图1　Fig.1

The value of magnetic field strength whereby the flux density becomes zero under the intensification, in the opposite direction, of the magnetic field. (Fig. 1)

6、损耗因子　Loss factor, tan δ

损耗因子是磁滞损耗因子、涡流损耗因子和剩余损耗因子三者之和 $\tan\delta=\tan\delta_h+\tan\delta_e+\tan\delta_r$

式中$\tan\delta_h$为磁滞损耗因子，$\tan\delta_e$为涡流损耗因子，$\tan\delta_r$为剩余损耗因子

This is the sum of the hysteresis loss factor, eddy current loss factor and residual loss factor.

$\tan\delta=\tan\delta_h+\tan\delta_e+\tan\delta_r$

Where　$\tan\delta_h$　is the hysteresis loss factor　　$\tan\delta_e$　is the eddy current loss factor

$\tan\delta_r$　is the residual loss factor

7、比损耗因子　Relative loss factor, tan δ / μ

比损耗因子是损耗因子与磁导率之比：

$\tan\delta/\mu_i$（适用于材料），$\tan\delta/\mu_e$（适用于磁路中含有气隙的磁芯）

This is the ratio of loss factor to permeability.

$\tan\delta/\mu_i$ (for materials),　$\tan\delta/\mu_e$ (for cores with gaps in the magnetic circuit)

8、品质因数　Quality factor , Q

品质因数为损耗因子的倒数：$Q=1/\tan\delta$

This is the reciprocal of the loss factor and is given by $Q=1/\tan\delta$.

9、温度系数　Temperature coefficient, α_μ(1/K)

温度系数为温度在T_1和T_2范围内变化时，每变化1K相应的磁导率的相对变化量：

$$\alpha_\mu=\frac{\mu_2-\mu_1}{\mu_1}\cdot\frac{1}{T_2-T_1}\quad(T_2>T_1)$$

式中μ_1为温度为T_1时的磁导率，μ_2为温度为T_2时的磁导率

This is the fractional difference of permeability per 1K in a temperature range of from T_1 to T_2.

$$\alpha_\mu=\frac{\mu_2-\mu_1}{\mu_1}\cdot\frac{1}{T_2-T_1}\quad(T_2>T_1)$$

Where　μ_1 : permeability at temperature T_1,　μ_2 : permeability at temperature T_2

10、比温度系数　Relative temperature coefficient, $\alpha_{\mu r}$ (1/K)

温度系数和磁导率之比，即 $\alpha_{\mu r}=\frac{\mu_2-\mu_1}{\mu_2^2}\cdot\frac{1}{T_2-T_1}\quad(T_2>T_1)$

This is the temperature coefficient per unit permeability and is given by the following equation:

$$\alpha_{\mu r}=\frac{\mu_2-\mu_1}{\mu_2^2}\cdot\frac{1}{T_2-T_1}\quad(T_2>T_1)$$

11、居里温度　Curie temperature, Tc (℃)

在该温度下材料由铁磁性（或亚铁磁性）转变成顺磁性。见图2。

It is the critical temperature level at which the ferromagnetic state of the material changes to paramagnetic state. (Fig. 2)

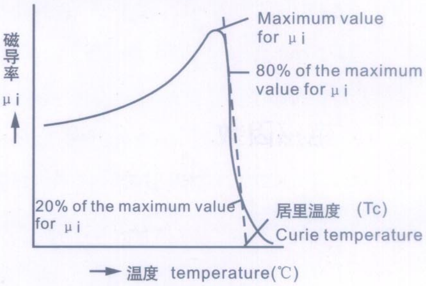

图2　Fig.2

12、减落因子　Disaccommodation factor, D_F

在恒温条件下，磁中性化后的磁芯的磁导率随时间的衰减变化，即$D_F=\frac{\mu_1-\mu_2}{\log\frac{t_2}{t_1}}\cdot\frac{1}{\mu_1^2}\quad(t_2>t_1)$

式中　μ_1为退磁后t_1分钟的磁导率，μ_2为退磁后t_2分钟的磁导率

This is the factor representing the variation of permeability through time after a complete demagnetization of the core at a constant temperature.

$$D_F=\frac{\mu_1-\mu_2}{\log\frac{t_2}{t_1}}\cdot\frac{1}{\mu_1^2}\quad(t_2>t_1)$$

Where　μ_1: permeability t_1 minutes after complete demagnetization.

μ_2: permeability t_2 minutes after complete demagnetization.

13、电阻率　Electrical resistivity, ρ (Ω/m)

具有单位截面积和单位长度的磁性材料的电阻。

This is the electrical resistance per unit length and cross-sectional area of a magnetic core.

14、密度　Density, d(kg/m^3)

单位体积材料的重量，即d=W/V

式中W为磁芯的重量（kg），V为磁芯的体积（m^3）

This is the weight per unit volume of a magnetic core as expressed below: d=W/V

Where W: weight of magnetic body(kg), V: volume of magnetic body (m^3)

15、单位功率损耗 Pcv或Pcm　Power loss Pcv & Pcm (kw/m^3、W/kg)

磁芯在高磁通密度下的单位体积损耗或单位重量损耗。该磁通密度可表示为$Bm=\frac{E}{4.44fNAe}$

式中E为施加在线圈上的电压有效值（V），Bm为磁通密度的峰值（T），f为频率（Hz），N为线圈匝数，Ae为有效截面积（m^2）。

目前，功率损耗的常用测量方法包括乘积电压表法和波形记忆法。（图3）

Power loss denotes the loss by an electrical transformer, such as a switching power supply, under a magnetization condition featuring a high frequency and large amplitude. Operating magnetic flux density is given by the following equation. $Bm=\frac{E}{4.44fNAe}$

Where E: voltage effective value applied to coil, Bm:peak value of magnetic flux density, f:frequency(Hz)
N: number of coil turns , Ae:effective cross-sectional area (m^2)

At present, the usual ways to measure the power loss are Multi-voltmeter Method and Waveform Memory Method. (Fig.3)

16、电感因数　Inductance factor, A_L(nH/N^2)

电感因数定义为具有一定形状和尺寸的磁芯上每一匝线圈产生的电感量，即$A_L=L/N^2$

式中L为装有磁芯的线圈的电感量（H），　N为线圈匝数

This is the inductance per turn of the coil wound around the ferrite cores with definite shape and dimension.

$A_L=L/N^2$

Where L: inductance of the coil with ferrite core, N:turns of the coil