MEASURING MAGNETIC CHARACTERISTICS

In order to make calculation formulas simple, the CGS units are applied in the following data. Converting to SI units, please refer to "THE UNITS CONVERSION TABLE" shown in the following description.

1. Measurement of B-H characteristics

Certain magnetic test equipment is required to measure the fundamental characteristic of a magnet including residual flux density $B_r$, coercive force $H_c$, intrinsic coercive force $H_c\mu$ and maximum energy product $(BH)_{\text{max}}$.

This equipment includes; a gauss meter, flux meter, X-Y recorder, electromagnet and a sample that allows no air gap in the circuit when it is inserted between the electromagnet pole-pieces. To eliminate the air gap, a small core sample is precisely machined. It is therefore difficult to measure precisely for shapes actually used. In these situations, the following simple methods are used to measure magnet properties (Please refer to figure 1).

2. Simple measurement method for a typical magnet

The simple measurement method shown in below uses a gauss meter with probe and a flux meter with a search coil. A good practice is to make a standard magnet for calibration and adjustment to establish consistency in the test over time.

2-a. Measurement method of flux density $B$

A gauss meter is generally used with a semiconductor hall element to measure the surface flux density and the magnetic flux density at some points (Please refer to figure 2).

2-b. Measurement method of flux

When measuring flux, flux-meter and search coils are regularly used (Please refer to figure 3).