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JAPANESE INDUSTRIAL STANDARD

Measuring method for high frequency core loss in amorphous magnetic cores

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Measuring method for high frequency
core loss in amorphous magnetic cores

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1. Scope

This Japanese Industrial Standard specifies the measuring method for core loss in the case where the amorphous magnetic core is excited by a.c. power source of sinusoidal wave of 400 Hz to 1 MHz.

Remarks: Applicable Standard to this Standard is the following:

JIS H 7004 Glossary of Terms Used in Amorphous Metals

2. Definitions

For the purposes of this Standard definitions of main terms are in accordance with JIS H 7004.

3. Test conditions

3.1 Test temperature The test temperature shall be, as a rule, $23 \pm 5^\circ\text{C}$.

3.2 Power source for test The power source to be used for test shall be provided with a power amplifier of broad zone having the following characteristics.

- (1) Stabilities of voltage and frequency of power source at the time of test must be within $\pm 0.2\%$ respectively.
- (2) The form factor of power-source voltage should preferably be within 1.11 ± 0.01 .

Remarks: In order to keep the power-source voltage at sinusoidal wave, the impedance of inside of power source should be made as small as possible in comparison with the impedance of excitation coil.

Further, when the power factor of magnetic core is low, a large power source capacity is required and therefore sufficient care is to be taken for selection of power source.

- (3) Frequencies at standard measuring are to be 1 KHz, 10 kHz, 100 kHz and 1 MHz.

3.3 Maximum magnetic flux density at standard measuring The maximum magnetic flux densities at standard measuring shall be 50 mT, 100 mT, 200 mT, 500 mT and 1000 mT. However, the saturated magnetic flux density shall be not more than 80 %.

4. Sample

The sample shall be as follows:

- (1) The form of magnetic core is to be toroidal form, and so stored as not to receive stress at the time of winding of wire in a case.

Dimensions of magnetic core are, as a rule, to be as given in Table 1. However, except the case where it is determined otherwise according to agreement between the parties concerned with delivery.

Table 1. Dimensions of magnetic core

Unit: mm

Number	Outer diameter	Inner diameter	Height
No. 1	40±5	25±5	10
No. 2	28±4	20±4	10
No. 3	20±2	15±2	10
No. 4	20±2	15±2	5
No. 5	12±2	8±2	5

- (2) The winding is to be performed along the magnetic path uniformly. However, except the case where the number of windings has become extremely small in the neighborhood of 1 MHz.

Further, the number of winding is, as a rule, to be as indicated in Table 2. However, except the case where it is determined otherwise according to agreement between the parties concerned.

Table 2. Values of number of windings

Frequency	No. of magnetic core dimension	Maximum magnetic flux density				
		50 mT	100 mT	200 mT	500 mT	1 000 mT
1 kHz	No. 1	—	—	30	30	30
	No. 2	—	—	40	40	40
10 kHz	No. 1	10	10	10	10	—
	No. 2	20	20	20	20	—
100 kHz	No. 2	5	5	5	5	—
	No. 3	5	5	5	5	—
	No. 4	10	10	10	10	—
	No. 5	10	10	10	10	—
1 MHz	No. 3	2	2	2	—	—
	No. 4	2	2	2	—	—
	No. 5	2	2	2	—	—