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**NATIONAL STANDARD OF THE
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Measuring methods for anti-EMI soft ferrite materials

抗电磁干扰软磁铁氧体材料的测量方法

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Foreword

This guiding technical document is drafted in accordance with the rules given in GB/T 1.1-2009.

This guiding technical document is for reference only. Suggestions and comments on it should be reported to the standardization administrative department under the State Council.

This guiding technical document was proposed by the Ministry of Industry and Information Technology of the People's Republic of China.

This guiding technical document is under the jurisdiction of the National Technical Committee on Magnetic Components and Ferrite Materials of Standardization Administration of China (SAC/TC 89).

This guiding technical document was drafted under the responsibility of the Southwest Institute of Applied Magnetism.

1 Scope

The Chinese guidance document for measuring the ferrite materials used to kill electromagnetic interference. An anti-EMI ferrite is not asked to store energy or to transform

power; it is asked to be lossy at exactly the frequencies where the noise lives, so that a cable clamp or a bead turns a common-mode current into heat rather than into radiation. That makes it an odd material to characterize: the number that matters is not the permeability but the complex permeability and the nominal impedance derived from it, measured over a frequency sweep, and if two laboratories wind their coils differently or work at different flux densities they will not agree. This guiding technical document specifies the measuring methods for anti-EMI soft ferrite materials and is meant to guide their standardized measurement. It sets the environmental conditions and the atmospheric conditions under which the measurement is made, prescribes the ring sample - sintered, unmachined, of rectangular cross-section and of a size taken from the ring core dimension standard - and then gives, for each of the six quantities in turn, the sample and test conditions, the principle of the method, the test instruments and the measurement procedure. The six are the initial permeability, the complex permeability, the nominal impedance, the resistivity, the Curie temperature and the hysteresis loop with the saturation flux density, the remanence and the coercivity. Being a GB/Z, it is guidance for reference rather than a requirement, and it is read alongside the companion material specification GB/Z 28865.

This guiding technical document specifies the measuring methods for anti-EMI soft ferrite materials.

This guiding technical document is used to guide the standardized measurement of anti-EMI soft ferrite materials.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated edition applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 9632.1-2002 Measuring methods for magnetic cores of inductors and transformers used in telecommunication (IEC 60367-1:1982, IDT).

GB/T 28868-2012 Dimensions of ring cores of magnetic oxide without coating.

GB/Z 28865-2012 Specification for anti-EMI soft ferrite materials.

3.1 General

When a magnetic measurement is carried out, the sample should as a rule be brought to the magnetically normalized state in accordance with Clause 6 of GB/T 9632.1-2002 at least twenty-four hours beforehand, and the measurement made afterwards. This step may also be omitted where it does not affect the measured value.

Throughout the measurement the sample shall be protected so that it is not affected by

mechanical shock and vibration or by magnetic disturbance, and shrinkage of the winding that a change of temperature may produce shall be avoided.

3.2 Atmospheric conditions for the measurement

The atmospheric conditions for the measurement shall comply with the following provisions: standard atmospheric conditions, defined by a temperature range, a relative humidity range and an air pressure range; and arbitration atmospheric conditions, defined by a narrower temperature, relative humidity and air pressure. The measurement may be made at any one temperature within the range of the standard atmospheric conditions, and throughout the measurement the temperature shall not change to a degree that would appreciably affect the measured result; in some cases a temperature-controlled chamber has to be used. The values themselves are in the standard.

4 Samples

For the measurement of the performance parameters of anti-EMI soft ferrite materials, ring samples of rectangular cross-section shall as far as possible be used that have not been subjected to external stress after sintering, that is, that have not been ground; the sample shall be free of appearance or internal defects that would affect the accuracy of the measured result. The sample size is best chosen from the range of the ring core dimensions specified in GB/T 28868-2012, with the corresponding effective cross-sectional area, the ratio of outside diameter to inside diameter and the ratio of height to inside diameter falling within the values stated in the standard.