



Standard Test Method for Magnetic Properties of Magnetic Amplifier Cores¹

This standard is issued under the fixed designation A 598/A 598M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of the magnetic performance of fully processed cores for magnetic amplifier-type applications.

1.2 Tests may be conducted at excitation frequencies of 60, 400, 1600 Hz, or higher frequencies.

1.3 Permissible core sizes for this test method are limited only by the available power supplies and the range and sensitivity of the instrumentation.

1.4 At specified values of full-wave sinusoidal-current excitation, $H_{\max}$, this test method provides procedures of determining the corresponding value of maximum induction, $B_{\max}$.

1.5 At specified values of half-wave sinusoidal-current excitation, this test method provides procedures for determining the residual induction, B_r .

1.6 At increased specified values of half-wave sinusoidal-current excitation, this test method provides procedures for determining the dc reverse biasing magnetic field strength, H_1 , required to reset the induction in the core material past B_r to a value where the total induction change, ΔB_1 , becomes approximately one third of the induction change, $2 B_p$. It also provides procedures for determining the additional dc reset magnetic field strength, ΔH , which, combined with H_1 , is the value required to reset the induction in the core material past B_r to a value where the total induction change, ΔB_2 , becomes approximately two thirds of the induction change $2 B_p$.

1.7 This test method specifies procedures for determining core gain from the corresponding biasing and induction changes, ΔH and ΔB .

1.8 This test method covers test procedures and requirements for evaluation of finished cores which are to be used in

magnetic-amplifier-type applications. It is not a test for basic-material magnetic properties.

1.9 This test method shall be used in conjunction with Practice A 34/A 34.

1.10 Explanations of symbols and abbreviated definitions appear in the text of this test method. The official symbols and definitions are listed in Terminology A 340.

1.11 The values and equations stated in customary (cgs-emu and inch-pound) or SI units are to be regarded separately as standard. Within this test method, SI units are shown in brackets. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with this test method.

1.12 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

A 34/A 34M Practice for Sampling and Procurement Testing of Magnetic Materials²

A 340 Terminology of Symbols and Definitions Relating to Magnetic Testing²

A 596/A 596M Test Method for Direct-Current Magnetic Properties of Materials Using the Ballistic Method and Ring Specimens²

3. Terminology

3.1 *Definitions*—Below is a list of symbols and definitions as used in this test method. The official list of symbols and definitions may be found in Terminology A 340. (See Table 1 where indicated).

¹ This test method is under the jurisdiction of ASTM Committee A06 on Magnetic Properties and is the direct responsibility of Subcommittee A06.01 on Test Methods.

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² *Annual Book of ASTM Standards*, Vol 03.04.