



Standard Specification for Soft Magnetic Iron Parts Fabricated by Powder Metallurgy (P/M) Techniques¹

This standard is issued under the fixed designation A 811; 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 specification covers parts produced from iron powder metallurgy materials.

1.2 This specification deals with P/M parts in the sintered or annealed condition. Should the sintered parts be subjected to any secondary operation that causes mechanical strain, such as machining or sizing, they should be resintered or annealed.

1.3 The values stated in customary (cgs-emu and inch-pound) units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units which are provided for information only and are not considered standard.

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

A 773 Test Method for dc Magnetic Properties of Materials Using Ring and Permeameter Procedures with dc Electronic Hysteresisgraphs²

B 328 Test Method for Density, Oil Content, and Interconnected Porosity of Sintered Metal Structural Parts and Oil-Impregnated Bearings³

E 1019 Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel and in Iron, Nickel, and Cobalt Alloys⁴

3. Terminology

3.1 The terms and symbols used in this specification are defined in Terminology A 340.

4. Ordering Information

4.1 Purchase orders for parts conforming to this specification shall include the following information:

4.1.1 Reference to this specification and year of issue/revision,

4.1.2 Reference to an applicable part drawing,

4.1.3 Quantity required,

4.1.4 A critical cross section of the part shall be defined and so indicated on the applicable part drawing. The location of the critical section is by mutual agreement between the purchaser and the producer (6.2),

4.1.5 Magnetic property requirements if they are other than stated in Table 1,

4.1.6 Whether certification of chemical analysis or magnetic property evaluation is required (Sections 5 and 7),

4.1.7 Marking and packaging requirements (Section 12), and

4.1.8 Exceptions to this specification or special requirements such as functional testing as mutually agreed upon between the producer and the purchaser.

5. Chemical Composition

5.1 The chemical composition of the parts shall conform to the requirements prescribed in Table 2.

5.2 Determination of metallic constituents shall be by a method acceptable to both the producer and the purchaser. Analysis of carbon, oxygen, sulfur, and nitrogen shall be done in accordance with Test Methods E 1019.

6. Sintered Density Requirements

6.1 Magnetic and residual induction of P/M parts strongly depend on density. The density of P/M parts is determined by the compressibility of the powder, the compacting pressure, and sintering practice (temperature, time, and atmosphere).

¹ This specification is under the jurisdiction of ASTM Committee A06 on Magnetic Properties and is the direct responsibility of Subcommittee A06.02 on Material Specifications.

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² Annual Book of ASTM Standards, Vol 03.04.

³ Annual Book of ASTM Standards, Vol 02.05.

⁴ Annual Book of ASTM Standards, Vol 03.05.