



Designation: ~~A 839/A 839M – 96~~ 839 – 02

Standard Specification for Iron-Phosphorus Powder Metallurgy (P/M) Parts for Soft Magnetic Applications¹

This standard is issued under the fixed designation ~~A 839/A 839M~~; 839; 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 This specification is under the jurisdiction of ASTM Committee A06 on Magnetic Properties and is the direct responsibility of Subcommittee A06.02 on Materials Specifications.

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1. Scope

1.1 This specification covers parts produced from iron-phosphorus powder metallurgy materials. These parts are used in magnetic applications requiring higher permeability and electrical resistivity and lower coercive ~~force~~ field strength than attainable routinely from parts produced from iron powder.

1.2 Two powder types are covered; Type I containing nominally 0.45 % phosphorus, and Type II containing nominally 0.8 % phosphorus.

1.3 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.

1.4 The values stated in ~~either~~ customary (cgs-emu and inch-pound) units ~~or SI units~~ are to be regarded ~~separately~~ as standard. Within the text, the SI units are shown in brackets. The values stated given in each system parentheses are mathematical conversions to SI units which are provided for information only and are not exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with this specification. considered standard.

2. Referenced Documents

2.1 ASTM Standards:

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

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

A 773/A 773M Test Method for ~~D-C~~ dc Magnetic Properties of Materials Using Ring and Permeameter Procedures with ~~D-C~~ dc Electronic Hysteresigraphs²

B 328 Test Method for Density, Oil Content, and Interconnected Porosity of Sintered Powder 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. Ordering Information

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

3.1.1 Reference to this specification and year of issue/revision.

3.1.2 The type of powder to be used (see 4.1 and Table 1).

3.1.3 Reference to an applicable part drawing.

3.1.4 Quantity required.

3.1.5 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~~ user and the producer (see 5.2).

3.1.6 Magnetic property requirements if they are other than stated in Table 2.

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 03.06⁵.