Designation: B 783 – 04

Standard Specification for Materials for Ferrous Powder Metallurgy (P/M) Structural Parts[1]

This standard is issued under the fixed designation B 783; 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 a variety of ferrous P/M structural materials and includes a classification system or material designation code. The classification system used in this specification includes chemical composition, minimum tensile; 0.2 % offset yield strength for as-sintered materials and minimum ultimate tensile strength for heat-treated materials (sinter hardened or quenched and tempered). It also contains minimum density and maximum coercive field strength requirements for iron-phosphorus materials. Material classification is governed by the designation code which is explained in Appendix X1. The data provided display typical mechanical properties achieved under commercial manufacturing procedures. Physical and mechanical property performance characteristics can change as a result of subsequent processing steps beyond those designated in this standard. These changes could improve or degrade the properties.

1.2 Property values stated in inch-pound units are the standard. Conversion factors to SI units may be approximate.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

A 839 Specification for Iron-Phosphorus Powder Metallurgy (P/M) Parts for Soft Magnetic Applications

B 243 Terminology of Powder Metallurgy

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

B 528 Test Method for Transverse Rupture Strength of Metal Powder Specimens

E 8 Test Methods for Tension Testing of Metallic Materials

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

2.2 *Other Standard:*

MPIF Standard 35 Materials Standard for P/M Structural Parts[3]

3. Terminology

3.1 *Definitions*—Definitions of powder metallurgy terms can be found in Terminology B 243. Additional descriptive information is available in the Related Materials section of Vol 02.05 of the *Annual Book of ASTM Standards.*

4. Ordering Information

4.1 Materials for parts conforming to this specification shall be ordered by material designation code.

4.2 Orders for parts under this specification may include the following information:

4.2.1 Certification, if required (see Section 11),

4.2.2 Test methods and mechanical properties other than strength (see 8.2 and 8.3),

4.2.3 Density (see 7.1),

4.2.4 Porosity or oil content (see 7.2), and

4.2.5 Special packaging if required.

5. Materials and Manufacture

5.1 Structural parts shall be made by pressing and sintering metal powders with or without subsequent heat treating. Parts may also be made by repressing or repressing and resintering sintered parts, if necessary, with or without subsequent heat treatment to produce finished parts conforming to the requirements of this specification.

6. Chemical Composition

6.1 The material shall conform to the requirements of Table 1.

6.2 Chemical analysis, if required, shall be made by methods agreed upon by the producer and the user.

6.3 Various analytical test methods are used to determine the chemical composition (see ASTM standards for the appropriate test methods) of P/M materials. Combustion-infra-red

[1] This specification is under the jurisdiction of ASTM Committee B09 on Metal Powders and Metal Powder Products and is the direct responsibility of Subcommittee B09.05 on Structural Parts.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from MPIF, 105 College Road East, Princeton, NJ 08540.

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