



Standard Specification for Iron Graphite Sintered Bearings (Oil-Impregnated)¹

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1. Scope

1.1 This specification covers iron-base sintered metal powder, oil-impregnated bearings. There are two grades, depending on the level of combined carbon (see Table 1):

1.1.1 *Grade 1, Iron Graphite*—low combined carbon and

1.1.2 *Grade 2, Iron Graphite*—high combined carbon.

1.2 The values stated in inch-pound units are the standard. The metric equivalents of inch-pound units may be approximate.

NOTE 1—Definitions of powder metallurgy terms can be found in Definitions B 243. Additional useful information is available in the Related Material section of Vol 02.05 of the *Annual Book of ASTM Standards*.

NOTE 2—Information on design, permissible loads, dimensional tolerances, and recommended press fits and running clearances are provided in Appendix X1.

2. Referenced Documents

2.1 *ASTM Standards*:

B 243 Terminology of Powder Metallurgy²

B 328 Test Method for Density, Oil Content, and Interconnected Porosity of Sintered Powder Metal Structural Parts and Oil-Impregnated Bearings²

E 9 Test Methods of Compression Testing of Metallic Materials at Room Temperature³

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 Orders for material under this specification shall include the following information:

3.1.1 Grade (Table 1),

3.1.2 Dimensions, and

3.1.3 Certification (see Section 13).

¹ This specification is under the jurisdiction of ASTM Committee B-9 on Metal Powders and Metal Powder Products and is the direct responsibility of Subcommittee B09.04 on Bearings.

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² *Annual Book of ASTM Standards*, Vol 02.05.

³ *Annual Book of ASTM Standards*, Vol 03.01.

⁴ *Annual Book of ASTM Standards*, Vol 03.06.

TABLE 1 Chemical Requirements

Element	Composition, %	
	Grade 1	Grade 2
Iron, min	94.5	94.5
Graphite	2.0 to 3.0	1.5 to 2.5
Total other elements by difference, max	2.0	2.0
Combined carbon	0 to 0.5	0.5 to 1.0

4. Materials and Manufacture

4.1 Bearings shall be made by cold compacting and sintering metal powders, with or without sizing, to produce finished parts conforming to the requirements of this specification.

5. Chemical Composition

5.1 The material shall conform to the requirements prescribed in Table 1.

6. Physical Properties

6.1 *Density*—The density of bearings supplied fully impregnated with lubricant shall be within the limits prescribed in Table 2. Density determinations shall be made in accordance with Test Method B 328.

6.2 *Oil Content*—Oil content of bearings shall not be less than 18 % for each grade when determined in accordance with Test Method B 328.

7. Mechanical Properties

7.1 *Radial Crushing Force*:

7.1.1 Radial crushing force shall be determined by compressing the test specimen between two flat steel surfaces at a “no load” speed no greater than 0.2 in./min (5 mm/min), the direction of the load being normal to the longitudinal axis of the specimen. The point at which the load drops as a result of the first crack shall be considered the crushing strength. This test shall be applied to plain cylindrical bearings. Flanged bearings shall be tested by cutting off the flange and compressing the two sections separately. Each section shall meet the minimum strength requirements prescribed in Table 3.

7.1.2 Radial crushing force shall not be less than the value calculated as follows:

$$P = KLT^2/(D - T) \quad (1)$$