



Designation: B 439 – 00

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

This standard is issued under the fixed designation B 439; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

- 1.1 This specification covers sintered metal powder, oil-impregnated, bearings of four iron-base compositional grades:
Grades 1 and 2—iron-carbon
Grades 3 and 4—iron-copper
- 1.2 The values stated in inch-pound units are to be regarded as the standard. The metric equivalents of inch-pound units may be approximate.

2. Referenced Documents

2.1 ASTM Standards:

- 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

3. Ordering Information

- 3.1 Orders for material under this specification shall include the following information:
- 3.1.1 Grade (Section 5),
 - 3.1.2 Density (6.1),
 - 3.1.3 Dimensions, and
 - 3.1.4 Certification (12.1).

4. Manufacture

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

5. Chemical Requirements

- 5.1 The material shall conform to the requirements as to the chemical composition 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.
- 6.2 *Oil Content*—Oil content of bearings shall not be less than that shown in Table 2.
- 6.3 *Radial Crushing Strength*—Radial crushing strength shall not be less than the value calculated as follows:

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

where:

- P = radial crushing strength, lbf (or N);
 D = outside diameter of bearing, in. (or mm);
 T = wall thickness of bearing, in. (or mm);
 K = strength constant as shown in Table 3 for grade specified, psi (MPa); and
 L = length of bearing, in. (or mm).

7. Workmanship, Finish, and Appearance

- 7.1 Bearings shall be uniform in composition. When cut or fractured, the exposed surface shall be of uniform appearance. The parts shall be free from defects which would affect their serviceability.

8. Sampling

- 8.1 *Lot*—Unless otherwise specified, a lot shall consist of parts of the same form and dimensions made from powders of the same composition, formed and sintered under the same conditions, and submitted for inspection at one time.
- 8.2 *Sample for Chemical Analysis*—At least one sample for chemical analysis shall be taken from each lot. A representative sample of chips may be obtained by milling, drilling, or crushing at least two pieces with clean dry tools without lubrication. To obtain oil-free chips, the parts selected for test shall have the oil extracted in accordance with Test Method B 328, if necessary.

- 8.3 *Mechanical Tests*—The manufacturer and purchaser shall agree on a representative number of specimens for mechanical tests.

9. Test Methods

- 9.1 *Density and Oil Content*—Density and oil content shall be determined in accordance with Test Method B 328.

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.

Current edition approved October 10, 2000. Published December 2000. Originally published as B 439-66 T to replace portions of B 202. Last previous edition B 439-95 (2000).

² Annual Book of ASTM Standards, Vol 02.05.

³ Annual Book of ASTM Standards, Vol 03.01.