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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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# Standard Specification for Sintered Bronze Structural Parts[1]

This standard is issued under the fixed designation B 255; 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.

ε[1] NOTE—Keywords were added editorially in October 1995.

## 1. Scope

1.1 This specification covers sintered metal powder structural parts made from one copper–tin composition of two types depending on density.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

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

## 2. Referenced Documents

2.1 *ASTM Standards:*

B 243 Terminology of Powder Metallurgy[2]

B 328 Test Method for Density, Oil Content, and Interconnected Porosity of Sintered Powder Metal Structural Parts and Oil–Impregnated Bearings[2]

E 54 Test Methods for Chemical Analysis of Special Brasses and Bronzes[3]

## 3. Ordering Information

3.1 Orders for parts under this specification shall include the following information:

3.1.1 Dimensions (see Section 8),

3.1.2 Chemical composition (see Section 5 and Table 1),

3.1.3 Density, Type (see 6.1 and Table 2),

3.1.4 Porosity (see 6.2),

3.1.5 Mechanical requirements (see Section 7), and

3.1.6 Certification (see Section 13).

## 4. Materials and Manufacture

4.1 Structural parts shall be made by molding and sintering metal powders followed by repressing and resintering, if necessary, to produce finished parts conforming to the requirements of this specification.

**TABLE 1 Chemical Requirements**

| Element | Composition, % |
|---|---|
| Copper | 87.5 to 90.5 |
| Tin | 9.5 to 10.5 |
| Carbon, max | 1.75 |
| Iron, max | 1.0 |
| Total other elements, max | 0.5 |

## 5. Chemical Composition

5.1 Orders for parts shall conform to the requirements prescribed in Table 1.

5.2 The chemical analysis shall be made in accordance with Test Methods E 54 or any other standard method agreed upon between the manufacturer and the purchaser.

## 6. Physical Properties

6.1 *Density*:

6.1.1 If the density does not vary more than 0.3 g/cm$^3$ from one section of the structural part to any other section, the overall density shall fall within the limits prescribed in Table 2.

6.1.2 If the density varies more than 0.3 g/cm$^3$ from one section of the part to any other, the manufacturer and the purchaser shall agree upon the critical section of the part where the stresses are highest. The density of this critical section, rather than the average density, shall fall within the limits prescribed in Table 2.

6.1.3 Density shall be determined in accordance with Test Method B 328.

6.2 *Porosity*:

6.2.1 When specified, the interconnecting porosity by volume shall not be less than the values prescribed in Table 3.

6.2.2 The porosity shall be determined in accordance with Test Method B 328.

## 7. Mechanical Properties

7.1 The manufacturer and the purchaser shall agree on qualification tests for the determination of mechanical properties.

**TABLE 2 Density Requirements**

| Type | Dry Density, g/cm$^3$ |
|---|---|
| I | 6.4 to 6.8 |
| II | 6.8 to 7.2 |

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

[3] *Annual Book of ASTM Standards*, Vol 03.05.