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Standard Specification for Sintered Aluminum Structural Parts¹

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1. Scope

1.1 This specification covers sintered aluminum structural parts made primarily from aluminum powders to which controlled amounts of master alloys or elemental copper, magnesium, and silicon have been added by mixing.

1.2 This specification covers the following variables:

1.2.1 *Composition*—Depending upon levels of copper, magnesium, and silicon content, two grades, and

1.2.2 *Density*—Type.

1.3 Parts ordered to this specification will be in one of the following conditions:

1.3.1 As-sintered,

1.3.2 As-repressed for additional density, or

1.3.3 All other conditions plus heat treated.

1.4 With the exception of the values for density, for which the use of the gram per cubic centimeter unit is long-standing industry practice, the values stated in SI units are to be regarded as the standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

B243 *Terminology of Powder Metallurgy*

B962 *Test Methods for Density of Compacted or Sintered Powder Metallurgy (PM) Products Using Archimedes' Principle*

B963 *Test Methods for Oil Content, Oil-Impregnation Efficiency, and Surface-Connected Porosity of Sintered Powder Metallurgy (PM) Products Using Archimedes' Principle*

E8 *Test Methods for Tension Testing of Metallic Materials*

3. Terminology

3.1 *Definitions*—Definitions of powder metallurgy terms can be found in Terminology B243. Additional descriptive

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.

information is available in the Related Material Section of Volume 02.05 of the *Annual Book of ASTM Standards*.

4. Ordering Information

4.1 Orders for material to this specification shall include the following information:

4.1.1 Dimensions (see 9.1),

4.1.2 Chemical composition (see 6.1),

4.1.3 Density (see 7.1),

4.1.4 State of heat treatment,

4.1.5 Mechanical property requirements (see 8.1), and

4.1.6 Certification (see 14.1).

5. Materials and Manufacture

5.1 Structural parts shall be made by compacting and sintering metal powders 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 The chemical analysis shall be made in accordance with the methods prescribed in the latest edition of the *Annual Book of ASTM Standards*, Vol 03.05, or any other approved method agreed upon between the manufacturer and the purchaser.

7. Density

7.1 The parts shall conform to the density range prescribed in Table 2.

7.2 The density shall be measured in accordance with Test Method B962.

7.3 If the density does not vary more than 0.1 g/cm³ from one section of the structural part to any other section, the overall density shall fall within the limits prescribed in Table 2.

7.4 If the density varies more than 0.1 g/cm³ from one section of the structural part to any other section, the manufacturer and the purchaser shall agree upon a critical section of the part where the stresses are the highest. The density of this critical section rather than the average density shall fall within the limits prescribed in Table 2.