Designation: B853 – 07

StandardSpecification for Powder Metallurgy (PM) Boron Stainless Steel Structural Components[1]

This standard is issued under the fixed designation B853; 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 stainless steel powder metallurgy (PM) structural components with a 7.7-g/cm^3 minimum density that are fabricated from prealloyed powder consisting primarily of iron, chromium, nickel, molybdenum, and boron[2] and are intended for use in corrosive service.

1.2 With the exception of density values, for which g/cm3 is the industry standard, the values stated in inch-pound units are to be regarded as the standard. The SI values given in parentheses are converted in accordance with IEEE/ASTM SI 10 and are for information only.

2. Referenced Documents

2.1 *ASTM Standards:*[3]

A262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
B117 Practice for Operating Salt Spray (Fog) Apparatus
B243 Terminology of Powder Metallurgy
B311 Test Method for Density of Powder Metallurgy (PM) Materials Containing Less Than Two Percent Porosity
E8 Test Methods for Tension Testing of Metallic Materials
E354 Test Methods for Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys
E572 Test Method for Analysis of Stainless and Alloy Steels by X-ray Fluorescence Spectrometry
E1019 Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Fusion Techniques
E1086 Test Method for Atomic Emission Vacuum Spectrometric Analysis of Stainless Steel by Point-to-Plane Excitation Technique
G48 Test Methods for Pitting and Crevice Corrosion Resistance of Stainless Steels and Related Alloys by Use of Ferric Chloride Solution
IEEE/ASTM SI 10 American National Standard for Metric Practice

3. Terminology

3.1 *Definitions*—Definitions of powder metallurgy terms can be found in Terminology B243. Additional descriptive information is in the Related Material section of Volume 02.05 of the *Annual Book of ASTM Standards.*

4. Ordering Information

4.1 Orders for components under this specification shall include the following information:

4.1.1 Dimensions (see Section 9),
4.1.2 Chemical composition (see Section 6 and Table 1),
4.1.3 Density (see Section 7),
4.1.4 Mechanical properties (see Section 8 and Table 2),
4.1.5 Certification (see Section 13),
4.1.6 Reference to the standard.

5. Materials and Manufacture

5.1 Structural components shall be made by cold pressing and sintering prealloyed powder.

5.2 The sintering temperature is dependent on the chemical composition of the powder.

6. Chemical Composition

6.1 The material shall conform to the composition limits specified in Table 1.

6.2 Chemical analysis should be made in accordance with Test Methods E354, E572, E1019, and E1086.

7. Physical Properties

7.1 *Density:*

7.1.1 The sintered density shall be 7.7 g/cm^3 minimum.

7.1.2 Density shall be determined in accordance with Test Method B311.

8. Mechanical Properties

8.1 The purchaser and manufacturer shall agree upon the method to be used to verify the typical yield or tensile strength

[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 B09.11 on Near Full Density Powder Metallurgy Materials.

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[2] U.S. Patents 3980444, 4014680, 4032336.

[3] 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.

*A Summary of Changes section appears at the end of this standard