



Designation: B853 – 16 (Reapproved 2021)^{ε1}

Standard Specification for Powder Metallurgy (PM) Boron Stainless Steel Structural Components¹

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.

^{ε1} NOTE—Editorial changes were made in 3.1 and the Supplementary Requirements section in September 2021.

1. Scope*

1.1 This specification covers stainless steel powder metallurgy (PM) structural components with a 7.7-g/cm³ minimum density that are fabricated from prealloyed powder consisting primarily of iron, chromium, nickel, molybdenum, and boron² and are intended for use in corrosive service.

1.2 With the exception of the values for density and the mass used to determine density, for which the use of the gram per cubic centimetre (g/cm³) and gram (g) units is the long-standing industry practice, the values in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

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 [Metric] E0008_E0008M

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.

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 Wavelength Dispersive 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 Inert Gas Fusion Techniques

E1086 Test Method for Analysis of Austenitic Stainless Steel by Spark Atomic Emission Spectrometry

G48 Test Methods for Pitting and Crevice Corrosion Resistance of Stainless Steels and Related Alloys by Use of Ferric Chloride Solution

3. Terminology

3.1 *Definitions*—Definitions of powder metallurgy terms can be found in Terminology B243. Additional descriptive information is available under “General Information on PM” on the ASTM B09 web page.

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, 10.1, and Table 1),
- 4.1.3 Density (see Section 7),
- 4.1.4 Mechanical properties (see Section 8, 10.2, 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.

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