



Designation: C751 – 16

## Standard Specification for Nuclear-Grade Boron Carbide Pellets<sup>1</sup>

This standard is issued under the fixed designation C751; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification applies to boron carbide pellets for use as a control material in nuclear reactors.

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

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

C559 Test Method for Bulk Density by Physical Measurements of Manufactured Carbon and Graphite Articles

C750 Specification for Nuclear-Grade Boron Carbide Powder

C791 Test Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Boron Carbide

C859 Terminology Relating to Nuclear Materials

E105 Practice for Probability Sampling of Materials

2.2 *ANSI Standard:*

ANSI/ASME NQA-1 Quality Assurance Program Requirements for Nuclear Facilities<sup>3</sup>

2.3 *U.S. Government Document:*

Title 10, CFR, Energy Part 50 (10 CFR 50) Licensing of Domestic Production and Utilization Facilities<sup>4</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee C26 on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee C26.03 on Neutron Absorber Materials Specifications.

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<sup>2</sup> 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.

<sup>3</sup> Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

<sup>4</sup> Available from U.S. Government Printing Office, Washington, DC 20402.

### 3. Terminology

3.1 Terms shall be defined in accordance with Terminology C859 or ASTM Dictionary of Engineering Science and Technology, except for the following:

3.2 *buyer*—the organization issuing the purchase order.

3.3 *pellet lot*—quantity of pellets produced from one boron carbide powder lot using one set of process parameters. The pellet lot size shall be agreed upon between seller and buyer.

3.4 *powder lot*—a fixed quantity of boron carbide powder blended together such that samples taken in accordance with Section 7 on Sampling can be considered as representative of the entire fixed quantity.

3.5 *seller*—boron carbide pellet supplier.

### 4. Chemical Composition

4.1 The starting boron carbide powder used to produce these pellets shall be in accordance with Specification C750.

4.2 Analytical chemistry methods used to test pellets for conformance with this specification shall be those of Method C791 or demonstrated equivalent methods agreed upon between buyer and seller.

4.3 The <sup>10</sup>B concentration (gram <sup>10</sup>B per unit volume or grams <sup>10</sup>B per unit length) may be specified by the buyer. The buyer should consider the following in specifying the allowable range in <sup>10</sup>B concentration:

4.3.1 Variations in chemical composition,

4.3.2 Bulk pellet density,

4.3.3 Boron isotopic composition, and

4.3.4 Pellet dimensions.

4.4 The finished boron carbide pellets shall conform to the chemical analysis in Table 1.