



Designation: **C784 – 05 (Reapproved 2012) C784 – 16**

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

This standard is issued under the fixed designation C784; 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 pellets composed of mixtures of aluminum oxide and boron carbide that may be ultimately used in a reactor core, for example, in neutron absorber rods.

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](#)

[C809 Test Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Aluminum Oxide and Aluminum Oxide-Boron Carbide Composite Pellets](#)

[C859 Terminology Relating to Nuclear Materials](#)

[C1031 Specification for Nuclear-Grade Aluminum Oxide Powder](#)

[E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves](#)

[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 *Government Standard:*

[Title 10, Code of Federal Regulations, Energy Part 50 \(10CFR50\), Domestic Licensing of Production and Utilization Facilities](#)<sup>4</sup>

### 3. Terminology

3.1 *Definitions:*

3.1.1 Terms shall be defined in accordance with Terminology [C859](#) except for the following:

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *buyer*—organization issuing the purchase order.

3.2.2 *pellet*—a fabricated geometric shape of aluminum oxide-boron carbide having a chemical composition as described in Section 4.

3.2.3 *pellet lot*—that quantity of pellets produced from one powder mixture lot using one set of mixing and process parameters. Pellet lot size shall be agreed upon between the seller and the buyer.

3.2.4 *powder mixture lot*—a specified quantity of aluminum oxide and boron carbide made up of powders from one or more sources blended together such that samples taken in accordance with Section 7 can be considered as representative of the entire specified quantity.

3.2.5 *seller*—pellet supplier.

<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](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto: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 Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

#### 4. Technical Requirements

4.1 *Major Constituents*—Aluminum oxide-boron carbide pellets shall be fabricated using major constituents that meet the requirements of Specifications **C750** and **C1031**.

4.2 *Chemical Composition:*

4.2.1 Use analytical chemistry methods in accordance with Methods **C809** or demonstrated alternate methods agreed upon between the buyer and the seller.

4.2.2 The finished pellets shall conform to the following chemical analysis:

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