



Designation: C784 – 05(Reapproved 2012)

Standard Specification for Nuclear-Grade Aluminum Oxide-Boron Carbide Composite Pellets¹

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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:²

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 Facilities³

¹ 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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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.

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

2.3 Government Standard:

Title 10, Code of Federal Regulations, Energy Part 50 (10CFR50), Domestic Licensing of Production and Utilization Facilities⁴

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.

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:

Si	2.0 weight % max
Fe + Cr + Ni	0.6 weight % max
Mg	1.0 weight % max

⁴ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.