Designation: ~~C784 – 16~~ C784 – 20

Standard Specification for Nuclear-Grade Aluminum Oxide-Boron Carbide Composite Pellets[1]

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 (ε) 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.~~after SI units 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:*[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 AluminumOxide-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:*[3]

ANSI/ASME NQA-1 Quality Assurance Program Requirements for Nuclear Facilities

2.3 *Government Standard:*[4]

~~Title 10,~~10 CFR 50 Title 10, Code of Federal Regulations, Energy Part ~~50 (10CFR50), Domestic~~ 50—Domestic Licensing of Production and Utilization Facilities

3. Terminology

~~3.1 *Definitions:*~~

~~3.1.1 Terms shall be defined in accordance with Terminology C859 except for the following:~~

3.1 ~~*Definitions of Terms Specific to This Standard:*~~*Definitions:*

3.1.1 Terms shall be defined in accordance with Terminology C859, except for the following:

3.1.2 *buyer*—organization issuing the purchase order.

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

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[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.

Current edition approved ~~April 1, 2016~~Jan. 1, 2020. Published ~~April 2016~~February 2020. Originally approved in 1976. Last previous edition approved in ~~2012~~2016 as ~~C784 – 05 (2012).~~C784 – 16. DOI: ~~10.1520/C0784-16.~~10.1520/C0784-20.

[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~~Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY ~~10036.~~10036, http://www.ansi.org.

[4] Available from ~~Superintendent of Documents,~~ U.S. Government Printing Office, ~~Washington, DC 20402.~~Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, http://www.access.gpo.gov.

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

3.1.5 *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.

3.1.6 *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 Test 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: