



Designation: C785 – 08

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

This standard is issued under the fixed designation C785; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope

1.1 This specification applies to pellets of aluminum oxide that may be ultimately used in a reactor core, for example, as filler or spacers within fuel, burnable poison, or control rods. In order to distinguish between the subject pellets and “burnable poison” pellets, it is established that the subject pellets are not intended to be used as neutron-absorbing material.

1.2 The values stated 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.

### 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

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

C1233 Practice for Determining Equivalent Boron Contents of Nuclear Materials

E105 Practice for Probability Sampling of Materials

#### 2.2 ANSI Standard:

ANSI/ASME NQA-1 Quality Assurance Requirements for Nuclear Facility Applications<sup>3</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 (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

#### 2.3 U.S. Government Document:

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

### 3. Terminology

3.1 *Definitions*—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*—fabricated geometric shape of aluminum oxide having a chemical composition as described in Section 4.

3.2.3 *pellet lot*—that quantity of pellets produced from one aluminum oxide powder lot using one set of process parameters whose limits have been agreed upon between the seller and the buyer.

3.2.4 *powder lot*—a specified quantity of aluminum oxide powder made up of powders from one or more sources, blended together such that samples taken in accordance with 7.1 can be considered as representative of the entire specified quantity.

3.2.5 *seller*—aluminum oxide pellet supplier.

### 4. Chemical Composition

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

4.2 The finished aluminum oxide pellets shall conform to the following chemical analysis:

B <sub>2</sub> O <sub>3</sub> + boric acid	0.01 weight % max
Si	2.0 weight % max
Fe + Cr + Ni	0.6 weight % max
Mg	1.0 weight % max
Na	0.2 weight % max
Ca	0.3 weight % max
Hf	200 µg/g pellet max
F	50 µg/g pellet max
F + Cl + I + Br	100 µg/g pellet max

<sup>4</sup> Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, http://www.access.gpo.gov.