



Designation: C752 – 03

Standard Specification for Nuclear-Grade Silver-Indium-Cadmium Alloy¹

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1. Scope

1.1 This specification covers silver-indium-cadmium alloy for use as a control material in light-water nuclear reactors.

1.2 The scope of this specification excludes the use of this material in applications where material strength of this alloy is a prime requisite. Also, this material must be protected from the primary water by a corrosion and wear resistant cladding.

2. Referenced Documents

2.1 *ASTM Standards*:²

C760 Test Methods for Chemical and Spectrochemical Analysis of Nuclear-Grade Silver-Indium-Cadmium Alloys

C859 Terminology Relating to Nuclear Materials

E105 Practice for Probability Sampling Of Materials

2.2 *ANSI Standard*:

B46.1 Surface Roughness³

ANSI/ASME NQA-1 Quality Assurance Program Requirements for Nuclear Facility Applications³

2.3 *U.S. Government Standard*:

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

3. Terminology

3.1 Terms shall be defined in accordance with the terminology in Terminology **C859**, except for the following:

3.1.1 The term “buyer” shall refer to the organization issuing the purchase order.

3.1.2 The term “seller” shall refer to the silver-indium-cadmium supplier.

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.

⁴ Available from U.S. Government Printing Office, North Capital and H Streets NW, Washington, DC 20401.

3.1.3 A lot shall be defined as all parts produced from the same melt by the same process.

4. Ordering Information

4.1 The buyer shall specify the following information on the order:

4.1.1 Quantity,

4.1.2 Lot size, and

4.1.3 Dimensions and tolerances.

5. Materials and Manufacture

5.1 The identity of each lot by melt number shall be maintained at all stages of manufacture.

5.2 Parts produced to this specification shall be made from billets by hot working and cold finishing to size.

5.3 The cold-finished parts shall be produced to the finish condition and dimensions as specified in the purchase order.

6. Chemical Composition

6.1 The parts shall conform to the following chemical composition:

Element	Weight %
Indium	15.00 ± 0.25
Cadmium	5.00 ± 0.25
Total impurities, max	0.50 max
Silver	remainder
Lead	0.03 max
Bismuth	0.03 max

7. Workmanship, Finish, and Appearance

7.1 The surface of the cold-finished part shall be free of oxides, grease, oil, residual lubricants, inclusions, and other extraneous materials.

7.2 Surface defects such as folds, cracks, seams, slivers, and blisters shall be cause for rejection.

7.3 Surface roughness shall be per **B46.1** not to exceed 0.81 μm rms (32 $\mu\text{in.}$ rms).

8. Sampling

8.1 A sampling plan to meet the acceptance criteria shall be agreed to between the buyer and the seller. Samples for chemical analysis shall be taken after completion of all hot-working operations. Recommended Practice **E105** is referenced as a guide.