Designation: B 349/B 349M – 03

Standard Specification for Zirconium Sponge and Other Forms of Virgin Metal for Nuclear Application[1]

This standard is issued under the fixed designation B 349/B 349M; 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 covers one grade of virgin zirconium metal commonly designated as sponge because of its porous, sponge-like texture, but it may also take other forms such as chunklets.

1.2 The one grade described is designated as Reactor Grade R60001, suitable for use in nuclear applications. The main characteristic of the reactor grade is its low nuclear cross section as achieved by removal of hafnium. The manufacturer must use procedures to prevent contamination with other high cross-section materials.

1.3 Unless a single unit is used, for example corrosion mass gain in mg/dm^2, the values stated in either inch-pound or SI units are to be regarded separately as standard. The values stated in each system are not exact equivalents; therefore each system must be used independently of the other. SI values cannot be mixed with inch-pound values.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[2]

3. Terminology

3.1 *Lot Definitions:*

3.1.1 *castings*—a lot shall consist of all castings produced from the same pour.

3.1.2 *ingot*—no definition required.

3.1.3 *rounds, flats, tubes, and wrought powder metallurgical products (single definition, common to nuclear and non-nuclear standards)*—a lot shall consist of a material of the same size, shape, condition, and finish produced from the same ingot or powder blend by the same reduction schedule and the same heat treatment parameters. Unless otherwise agreed between manufacturer and purchaser, a lot shall be limited to the product of an 8 h period for final continuous anneal, or to a single furnace load for final batch anneal.

3.1.4 *sponge*—a lot shall consist of a single blend produced at one time.

3.1.5 *weld fittings*—definition is to be mutually agreed upon between manufacturer and the purchaser.

4. Ordering Information

4.1 Purchase orders for material under this specification shall include the following information, as required, to describe adequately the desired material:

4.1.1 Quantity,

4.1.2 Name of material,

4.1.3 Grade designation, and

4.1.4 ASTM designation and year of issue.

NOTE 1—A typical ordering description is as follows: 5000 lb (2000 kg) reactor grade zirconium, Grade R60001, ASTM Specification B 349 - 01.

4.2 In addition to the data specified in 4.1, the following options and points of agreement between the manufacturer and the purchaser shall be specified in the purchase order, as required.

4.2.1 Sampling and duplicate samples (see 7.1 and 7.2).

4.2.2 Certification reports (Section 13), and

4.2.3 Packaging (Section 15).

5. Materials and Manufacture

5.1 Zirconium metal is usually prepared by reduction of zirconium tetrachloride, and gets its physical characteristics from the processes involved in production. These characteristics may be expected to vary greatly with manufacturing methods. This specification, however, is not limited to material prepared by reduction of tetrachloride or to material of any specific physical form.

[1] This specification is under the jurisdiction of ASTM Committee B10 on Reactive and Refractory Metals and Alloys and is the direct responsibility of Subcommittee B10.02 on Zirconium and Hafnium.

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[2] *Annual Book of ASTM Standards*, Vol 14.02.