



Designation: B494/B494M – 08 (Reapproved 2020)

Standard Specification for Primary Zirconium¹

This standard is issued under the fixed designation B494/B494M; 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 two grades of zirconium metal commonly designated as sponge or chunklets, but may also take other forms. This specification does not include crystal bar zirconium. This sponge is used in non-nuclear applications.

1.2 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.

1.3 *The following precautionary caveat pertains only to the test method portions of this specification. 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

3. Terminology

3.1 *Forms:*

3.1.1 *sponge, n*—zirconium metal produced from the reduction of the chloride, usually by magnesium.

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.

Current edition approved April 1, 2020. Published April 2020. Originally approved in 1969. Last previous edition approved in 2014 as B494/B494M – 08 (2014). DOI: 10.1520/B0494_B0494M-08R20.

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.

3.1.1.1 *Discussion*—The process is one where the metal condenses to the solid state and does not melt.

3.1.2 *chunklets, n*—zirconium metal produced from the reduction of the chloride, usually by sodium.

3.1.2.1 *Discussion*—In this process, the reduced metal is melted and dripped onto a rotating disk to form chunklets.

3.2 *Lot*—a lot shall consist of a single blend produced at one time.

4. Classification

4.1 Primary zirconium is furnished in two grades:

4.1.1 *Grade R60702*—Unalloyed zirconium.

4.1.2 *Grade R60703*—Unalloyed zirconium for metallurgical alloying.

5. Ordering Information

5.1 Orders for material under this specification shall include the following information, when applicable:

5.1.1 Quantity (weight),

5.1.2 Name of material (zirconium sponge or chunklet),

5.1.3 Grade number (see 4.1),

5.1.4 ASTM designation and year of issue,

5.1.5 Check analysis (see 7.2),

5.1.6 Sampling of small blends (see 8.1.1),

5.1.7 Inspection (see 11.1),

5.1.8 Product marking (Section 15),

5.1.9 Packaging (Section 16),

5.1.10 Oxygen limits, when needed (Table 1), and

5.1.11 Additions to the specification as required.

NOTE 1—A typical ordering description is as follows: 3000 lb [2000 kg] zirconium sponge, ASTM B494/B494M - 01, Grade R60703.

6. Materials and Manufacture

6.1 Zirconium metal is usually prepared by reduction of zirconium tetrachloride, and it 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 metal prepared by reduction of tetrachloride or to material of any specific physical form.

6.2 Only virgin zirconium metal, in identified, uniform, well-mixed blends, shall be supplied under this specification.