



Designation: B 653/B 653M – 02

Standard Specification for Seamless and Welded Zirconium and Zirconium Alloy Welding Fittings¹

This standard is issued under the fixed designation B 653/B 653M; 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 fittings, factory made from three grades of zirconium and zirconium alloys. The term welding fittings applies to butt-welding parts such as 45 and 90° elbows, 180° returns, caps, tees, reducers, lap-joint stub ends, and other types.

1.2 The values stated in either inch-pound units or SI units are to be regarded separately as the standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

1.3 *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:

- B 493 Specification for Zirconium and Zirconium Alloy Forgings²
- B 523 Specification for Seamless and Welded Zirconium and Zirconium Alloy Tubes²
- B 550 Specification for Zirconium and Zirconium Alloy Bar and Wire²
- B 551 Specification for Zirconium and Zirconium Alloy Strip, Sheet, and Plate²
- B 614 Practice for Descaling and Cleaning Zirconium and Zirconium Alloy Surfaces²
- B 658 Specification for Seamless and Welded Zirconium and Zirconium Alloy Pipe²

2.2 ANSI Standards:

- B 16.9 Wrought Steel Butt-Welding Fittings³

B 36.19 Stainless Steel Pipe³

2.3 *Manufacturers' Standardization Society of the Valve and Fittings Industry Standards:*

SP-25 Standard Marking System for Valves, Fittings, Flanges, and Unions⁴

SP-43 Standard Practice for Light Weight Stainless Steel Fittings⁴

2.4 *American Society of Mechanical Engineers:*

ASME Boiler and Pressure Vessel Code, Sections VIII and IX⁵

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 loaf 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. Classification

4.1 The fittings are furnished in three grades as follows:

4.1.1 *Grade R60702*— Unalloyed zirconium.

4.1.2 *Grade R60704*— Zirconium-tin.

4.1.3 *Grade R60705*— Zirconium-niobium.

5. Ordering Information

5.1 Orders for materials under this specification shall include the following information:

⁴ Available from Manufacturers Standardization Society of the Valve and Fittings Industry (MSS), 127 Park St., NE, Vienna, VA 22180-4602.

⁵ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990.

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 02.04.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.