



Designation: B653/B653M – 11 (Reapproved 2025)

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

This standard is issued under the fixed designation B653/B653M; 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, 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

B493 Specification for Zirconium and Zirconium Alloy Forgings

B523/B523M Specification for Seamless and Welded Zirconium and Zirconium Alloy Tubes

B550/B550M Specification for Zirconium and Zirconium Alloy Bar and Wire

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 For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

B551/B551M Specification for Zirconium and Zirconium Alloy Strip, Sheet, and Plate

B614 Practice for Descaling and Cleaning Zirconium and Zirconium Alloy Surfaces

B658/B658M Specification for Seamless and Welded Zirconium and Zirconium Alloy Pipe

2.2 *ANSI Standards:*

B16.9 Wrought Steel Butt-Welding Fittings³

B36.19 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 *weld fittings, n*—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 (PZ 2)*—Unalloyed zirconium.

4.1.2 *Grade R60704 (PZ 4)*—Zirconium-tin.

4.1.3 *Grade R60705 (PZ 5)*—Zirconium-niobium.

5. Ordering Information

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

5.1.1 Quantity,

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from Manufacturers Standardization Society of the Valve and Fittings Industry (MSS), 127 Park St., NE, Vienna, VA 22180-4602, <http://www.mss-hq.com>.

⁵ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990, <http://www.asme.org>.