



Designation: B 658/B 658M – 01

Standard Specification for Seamless and Welded Zirconium and Zirconium Alloy Pipe¹

This standard is issued under the fixed designation B 658/B 658M; 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 specification² covers three grades of seamless and welded zirconium pipe.

1.2 Unless a single unit is used, for example corrosion mass gain in mg/dm², 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 methods 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

E 8 Test Methods for Tension Testing of Metallic Materials³

2.2 *ANSI Standard:*

B36.19 Stainless Steel Pipe⁴

2.3 *ASME Standard:*

ASME Boiler and Pressure Vessel Code, Section IX⁵

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *annealed*—for purposes of this specification “annealed” denotes material that exhibits a recrystallized grain structure.

3.2 *Lot Definitions:*

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

3.2.2 *ingot*—no definition required.

3.2.3 *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.

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

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

4. Classification

4.1 The pipe is furnished in three grades as follows:

4.1.1 *Grade R60702*—Unalloyed zirconium.

4.1.2 *Grade R60704*—Zirconium-tin alloy.

4.1.3 *Grade R60705*—Zirconium-niobium alloy.

5. Ordering Information

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

5.1.1 Quantity (weight or total length),

5.1.2 Name of material (zirconium pipe),

5.1.3 Grade number (see 4.1),

5.1.4 Nominal pipe size and schedule (Table X1.1),

5.1.5 Lengths (random or specified cut lengths),

5.1.6 Method of manufacture (Section 6),

5.1.7 Workmanship and quality level requirements (Section 10),

5.1.8 ASTM designation and year of issue, and

5.1.9 Additions to the specification and supplementary requirements, if required.

NOTE 1—A typical ordering description is as follows: 240-ft (70 mm) zirconium pipe, seamless, descaled 3.0-in. (75 mm) Schedule 40 by 12-ft (3 m) lengths, ASTM B 658, dated ___, Grade R60702.

6. Materials and Manufacture

6.1 Seamless pipe shall be made from any seamless method that will yield a product meeting this specification.

6.2 Pipe containing welded seams or other joints made by

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 Nov. 10, 2001. Published January 2002. Originally published as B 658 – 79. Last previous edition B 658 – 97.

² For ASME Boiler and Pressure Vessel Code Applications, see related Specification SB-658 in Section II of that Code.

³ *Annual Book of ASTM Standards*, Vol 03.01.

⁴ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁵ Available from American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017.