



Standard Specification for Centrifugally Cast Dual Metal (Gray and White Cast Iron) Cylinders¹

This standard is issued under the fixed designation A 667/A 667M; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification² covers centrifugally cast cylinders with an outer layer of white cast iron and the remainder of the material of gray cast iron. These castings are suitable for pressure containing parts the design strength of which is based on the gray iron portion of the cylinder. These castings are suitable for service at temperatures up to 450°F [230°C].

1.2 The values stated in either inch-pound units or SI units are to be regarded separately as 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 independent of the other. Combining values from the two systems may result in nonconformance with the specification.

1.3 The following safety hazards caveat pertains only to the test method portion, Section 8, of this specification: *This standard does not purport to address all of the safety problems, 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:

A 278 Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650°F³

A 278M Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 345°C [Metric]³

3. Materials and Manufacture

3.1 The melting procedures shall be optional with the foundry.

3.2 The white iron portion of the cylinder shall be made to a minimum hardness of 55 Scleroscope “C”. The gray iron portion of the cylinder shall conform to Specification A 278, Class 20 [A 278M, Class 150].

3.3 The casting process shall be controlled to produce a metallurgical bond between the two metal layers.

4. Finish

4.1 All surfaces shall be machined prior to the cylinders being placed into service.

5. Physical Requirements

5.1 *Tensile Requirements*—Tension test specimens removed from the casting shall have a tensile strength not less than 80 % of that specified in 3.2.

5.2 Thickness of White Cast Iron:

5.2.1 The thickness of the white cast iron shall be not less than 5 % nor more than 30 % of the total finished wall thickness.

5.2.2 The thickness of the white cast iron shall be determined by ultrasonic testing.

6. Number of Tests

6.1 The number of tension tests shall be in conformance with Specifications A 278 and A 278M.

7. Specimen Preparation

7.1 Separately cast test bars may be used to represent the gray iron portion of the castings. The test bars shall be cast in core sand and have a nominal diameter of 2 in. [50 mm]. Tension test specimens shall be machined from test bars to the dimensions given for Specimen C in Specifications A 278 and A 278M.

7.2 At the option of the manufacturer he may substitute test bars taken from the gray iron portion of the casting. The test bars shall be taken midway between the inside diameter of the casting and the interface between the two layers. Tension test specimens machined from these test bars shall conform to the dimensions shown for Specimen C in Specifications A 278 and A 278M.

¹ This specification is under the jurisdiction of Committee A-4 on Iron Castings and is the direct responsibility of Subcommittee A04.01 on Grey and White Iron Castings.

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² For ASME Boiler and Pressure Vessel Code applications see related Specification SA-667 in Section II of that Code.

³ *Annual Book of ASTM Standards*, Vol. 01.02.