



Standard Specification for Austenitic Gray Iron Castings¹

This standard is issued under the fixed designation A436; 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 U.S. Department of Defense.

1. Scope

1.1 This specification covers austenitic gray iron castings that are used primarily for their resistance to heat, corrosion, and wear. Austenitic gray iron is characterized by uniformly distributed graphite flakes, some carbides, and the presence of sufficient alloy content to produce an austenitic structure.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

E30 Test Methods for Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron (Withdrawn 1995)³

E59 Practice for Sampling Steel and Iron for Determination of Chemical Composition (Withdrawn 1996)³

E94 Guide for Radiographic Examination

E165 Practice for Liquid Penetrant Examination for General Industry

E351 Test Methods for Chemical Analysis of Cast Iron—All Types

E433 Reference Photographs for Liquid Penetrant Inspection

E446 Reference Radiographs for Steel Castings Up to 2 in. (50.8 mm) in Thickness

3. Ordering Information

3.1 Orders for material to this specification shall include the following information:

3.1.1 ASTM designation and date of issue,

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

Current edition approved Nov. 1, 2015. Published November 2015. Originally approved in 1959. Last previous edition approved in 2011 as A436–84 (2011). DOI: 10.1520/A0436-84R15.

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 The last approved version of this historical standard is referenced on www.astm.org.

- 3.1.2 Type of austenitic gray iron required (see 5.1),
- 3.1.3 Heat treatment required (see 4.2 through 4.5),
- 3.1.4 If repair of castings is permitted (see 4.6),
- 3.1.5 Size and number of test bars required (see 11 through 8.4 and 12.1),
- 3.1.6 If special tests are required (see Section 7 and 9.1),
- 3.1.7 If certification is required (see 14.1), and
- 3.1.8 If different preparation for delivery requirements are needed (see 15.1).

4. Materials and Manufacture

4.1 Melting may be done in any furnace that produces castings meeting the chemical compositions and mechanical properties outlined in this specification. These include cupolas, air furnaces, electric furnaces, crucible furnaces, and so forth.

4.2 By agreement between the manufacturer and the purchaser, the castings may be stress relieved by heating to and holding in the temperature range from 1150 to 1200°F (620 to 650°C) for not less than 1 nor more than 2 h/in. of thickness in the thickest section. Heating and cooling shall be uniform and shall be not more than 400°F (222°C)/h for castings less than 1 in. in maximum thickness, nor more than 400°F/h divided by the maximum section thickness in inches for thicker castings. During the cooling cycle, castings may be cooled in still air after the temperature has dropped to 600°F (315°C).

4.3 If the manufacturer can demonstrate that another treatment provides satisfactory stress relief, it may be used by agreement between the manufacturer and the purchaser.

4.4 Whenever dimensional changes in high-temperature service are a problem, by agreement between the manufacturer and the purchaser, the castings may be stabilized by heating at 1600°F (870°C) for 1 h/in. of section, for a minimum of 1 h. Otherwise, the austenite that is supersaturated with respect to carbon may reject carbon during service and produce dimensional changes.

4.5 By agreement between the manufacturer and the purchaser, castings with chilled edges or excessive carbides may be annealed at 1750 to 1900°F (955 to 1040°C) for ½ to 5 h, followed by uniform cooling, preferably in still air.

4.6 Castings shall not be repaired by welding, plugging, or other methods without written permission from the purchaser.