



Designation: **A842 – 11a A842 – 11a (Reapproved 2018)^{ε1}**

Standard Specification for Compacted Graphite Iron Castings¹

This standard is issued under the fixed designation A842; 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.

^{ε1} NOTE—Footnote 3 was updated editorially in November 2018.

1. Scope

1.1 This specification covers castings made of compacted graphite iron, which is described as cast iron with the graphite in compacted (vermiform) shapes and essentially free of flake graphite in the bulk of the casting.

1.2 No precise quantitative relationship can be stated between the properties of iron in the various locations of the same casting and those of a test bar cast from the same iron (see **Appendix X1**).

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3.1 *Exception*—The inch-pound units in **Figs. 1-3** are standard. SI units are added for information only.

1.4 *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.*

1.5 *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

A247 Test Method for Evaluating the Microstructure of Graphite in Iron Castings

E8/E8M Test Methods for Tension Testing of Metallic Materials

2.2 Federal Standard:³

Federal Standard No. 123 Marking for Shipment (Civil Agencies)

¹ This specification is under the jurisdiction of ASTM Committee **A04** on Iron Castings and is the direct responsibility of Subcommittee **A04.02** on Malleable and Ductile Iron Castings.

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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 Available from ~~Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098~~, <http://dodssp.daps.dla.mil>—General Services Administration—Vendor Support Center, <https://vsc.gsa.gov/administration/files/Compliance-with-FED-STD123H.pdf>.

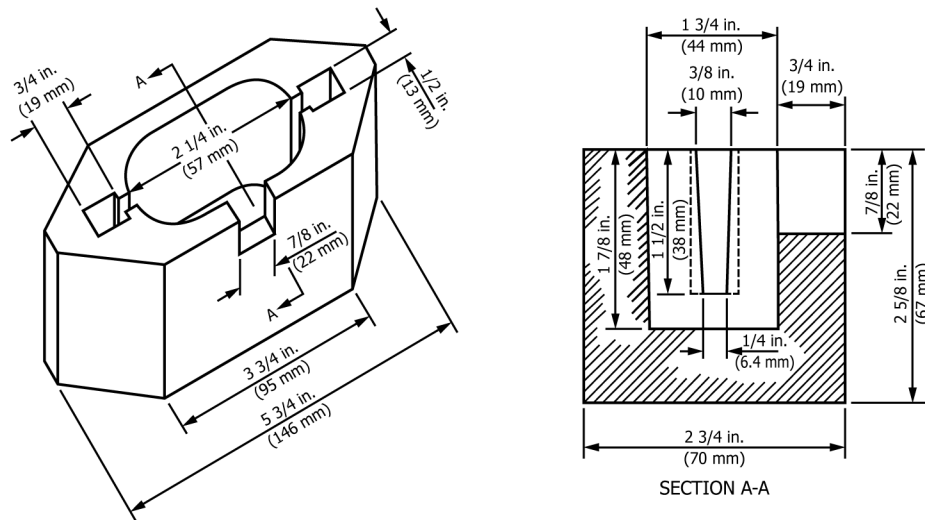


FIG. 1 Test Coupon for Microscopical Examination of Compacted Graphite Iron

2.3 American National Standard:⁴

MIL-STD-129 Marking for Shipment and Storage

3. Ordering Information

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

- 3.1.1 ASTM designation and year of issue,
- 3.1.2 Grade of compacted graphite iron required as identified in Table 1,
- 3.1.3 Special properties, if required, required (see 4.1 and 10.1),
- 3.1.4 If samples other than those identified in Section 9 are required,
- 3.1.5 Certification if so designated by the purchaser, and
- 3.1.6 Special preparation for delivery, if required.

4. Chemical Composition

4.1 It is the intent of this specification to subordinate chemical composition to mechanical properties; however, any chemical requirement may be specified by agreement between the manufacturer and the purchaser.

5. Requirements

5.1 Compacted graphite cast iron shall be examined metallographically for the acceptable graphite formation. Nondestructive testing such as ultrasonic velocity or resonance frequency may also be used to determine the graphite nodularity. However, in cases of dispute, the metallographic examination shall prevail.

5.2 The metallographic examination shall be performed on a sample sectioned from the casting, on a separately cast test coupon, coupon as shown in Fig. 1, or on a test lug from a casting. The location on the casting from which the metallographic specimen is sectioned shall be agreed by the manufacturer and the purchaser. In the case of a test coupon or test lug, the specimen shall represent the last metal from the treated batch. The casting lug dimension and location shall be agreed by manufacturer and purchaser.

5.3 When castings are produced to this specification by treating the iron in the mold for graphite form control, the manufacturer may use separately cast test coupons or cut test specimens from castings to qualify conformance of the microstructure requirements. When separately cast test coupons are used, the test coupons shall have a chemical composition representative of that in the castings, produced from that iron poured, and having a cooling rate equivalent to that obtained through use of test molds as shown in Figs. 1-34. The size of the cast coupon representing the castings shall be the option of the purchaser. In case no option is expressed, the manufacturer shall make the choice. When test specimens are to be taken from a casting, the location shall be agreed on by the purchaser and the manufacturer and documented on the casting drawing. It is the manufacturer's required responsibility to maintain adequate controls and documentation to assure the customer that test specimen microstructures are representative of microstructure in the castings shipped.

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