Designation: A 834 – 95 (Reapproved 2001)

Standard Specification for Common Requirements for Iron Castings for General Industrial Use[1]

This standard is issued under the fixed designation A 834; 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 a group of requirements that are mandatory requirements when used in conjunction with the following iron casting specifications issued by ASTM:

ASTM Specification[2]
A47
A48
A197
A220
A278
A319
A395
A436
A439
A 518
A 532
A536
A571
A 823
A 842
A 874
A 897

1.2 This specification also covers a group of supplementary requirements which may be applied to the above specifications as indicated herein. These are provided for use when additional testing or inspection is desired and apply only when specified individually by the purchaser in the order.

1.3 The requirements of the individual material specification, and this general specification shall prevail in the sequence named.

1.4 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 *ASTM Standards:*

A 47 Specification for Ferritic Malleable Iron Castings[2]

A 48 Specification for Gray Iron Castings[2]

A 197 Specification for Cupola Malleable Iron[2]

A 220 Specification for Pearlitic Malleable Iron[2]

A 247 Test Method for Evaluating the Microstructure of Graphite in Iron Castings[2]

A 278 Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650°F[2]

A 319 Specification for Gray Iron Castings for Elevated Temperatures for Non-Pressure Containing Parts[2]

A 395 Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures[2]

A 436 Specification for Austenitic Gray Iron Castings[2]

A 439 Specification for Austenitic Ductile Iron Castings[2]

A 518 Specification for Corrosion-Resistant High-Silicon Iron Castings[2]

A 532 Specification for Abrasion-Resistant Cast Irons[2]

A 536 Specification for Ductile Iron Castings[2]

A 571 Specification for Austenitic Ductile Iron Castings for Pressure-Containing Parts Suitable for Low-Temperature Service[2]

A 644 Terminology Relating to Iron Castings[2]

A 802/A802M Practice for Steel Castings, Surface Acceptance Standards, Visual Examination[2]

A 823 Specification for Statically Cast Permanent Mold Gray Iron Castings[2]

A 842 Specification for Compacted Graphite Iron Castings[2]

A 874 Specification for Ferritic Ductile Iron Castings Suitable for Low-Temperature Service[2]

A 897 Specification for Austempered Ductile Iron Castings[2]

A 919 Terminology Relating to Heat Treatment of Metals[3]

E 8 Test Methods for Tension Testing of Metallic Materials[4]

E 10 Test Method for Brinell Hardness of Metallic Materials[4]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[5]

E 30 Test Methods for Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron[6]

E 59 Practice for Sampling Steel and Iron for Determination of Chemical Composition[7]

E 94 Guide for Radiographic Testing[8]

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

Current edition approved Oct. 10, 1995. Published December 1995. Originally published as A 834 – 84. Last previous edition A 834 – 94.

[2] *Annual Book of ASTM Standards*, Vol 01.02.

[3] Discontinued; see *1999 Annual Book of ASTM Standards*, Vol 01.01.

[4] *Annual Book of ASTM Standards*, Vol 03.01.

[5] *Annual Book of ASTM Standards*, Vol 14.02.

[6] Discontinued; see *1994 Annual Book of ASTM Standards*, Vol 03.05.

[7] Discontinued; see *1995 Annual Book of ASTM Standards*, Vol 03.05.

[8] *Annual Book of ASTM Standards*, Vol 03.03.

E 165 Test Method for Liquid Penetrant Examination[8]
E 351 Test Methods for Chemical Analysis of Cast Iron—All Types[9]
E 689 Reference Radiographs for Ductile Iron Castings[8]
E 709 Guide for Magnetic Particle Examination[8]
E 802 Reference Radiographs for Gray Iron Castings Up to 4½in. (114 mm) in Thickness[8]
2.2 *Military Standard:*
MIL-STD-129 Marking for Shipment and Storage[10]
2.3 *Federal Standard:*
Fed. Std. No. 123 Marking for Shipment (Civil Agencies)[10]

3. Terminology

3.1 *Definitions:*
3.1.1 Definitions for many terms common to iron castings and their heat treatment are found in Terminology A 919 and Terminology A 644. A classification of graphite structure is found in Test Method A 247.

4. Ordering Information

4.1 The purchase order for castings ordered under this specification shall stipulate the applicable material specification(s), grade of iron, and any options or additions to the basic requirements, including the supplementary requirements included in this specification.

5. Tensile Requirements

5.1 The individual product specifications vary as to whether tension tests are required. For this reason, and to determine specific test requirements, the individual product specification shall be reviewed. When required, tension tests shall be determined in accordance with Test Methods E 8.

6. Chemical Requirements

6.1 The individual product specifications vary as to whether chemical analysis is required. To determine specific requirements, the individual product specification should be reviewed.
6.2 Sampling shall be conducted in accordance with Test Method E 59. Spectrographic or other methods such as those in Test Methods E 30 and E 351 may be used for chemical analysis. In the event of a dispute regarding chemical composition, Test Methods E 351 and E 30 shall be used for referee purposes.
6.3 The chemical analysis for total carbon shall be made on chilled pencil-type specimens or from thin wafers approximately 1/32 in. (0.8 mm) thick cut from test coupons. Drillings are not reliable because of a probable loss of graphite.
6.4 Chemical analysis results shall be rounded, in accordance with Practice E 29, to the nearest unit in the last right-hand place of values in the table of chemical requirements.
6.5 A product analysis may be made by the purchaser from material representing each heat, lot, or casting. The analysis shall be made on representative material. Samples for carbon analysis shall be taken no closer than ¼ in. to a cast surface, and shall follow the practice in 5.3, except where the size or shape of the casting does not permit such sampling. The chemical composition thus determined shall meet the requirements specified in the applicable specification for the grade involved.

7. Workmanship, Finish, and Appearance

7.1 All castings shall be made in a workman-like manner and shall conform to the dimensions on drawings furnished by the purchaser before manufacture is started. If the pattern is supplied by the purchaser, the dimensions of the casting shall be as predicted by the pattern.

8. Sampling

8.1 A lot shall consist of one of the following:
8.1.1 All the metal from a single heating in a batch–type melting furnace.
8.1.2 All the metal poured from two or more batch–type melting furnaces into a single ladle or a single casting.
8.1.3 All the metal poured from a continuous melting furnace for a given period of time between changes in charge, processing conditions, or aim-for chemistry, or 4 h, whichever is the shorter period.
8.1.3.1 The purchaser may agree to extend the 4-h time period to 8 h if the manufacturer can demonstrate sufficient process control to warrant such an extension.

9. Inspection

9.1 All tests and inspections required by this specification shall be performed by the manufacturer or other reliable sources whose services have been contracted for by the manufacturer. Complete records of all tests and inspections shall be maintained by the manufacturer and shall be available for review by the purchaser.
9.2 The manufacturer shall afford the purchaser's inspector all reasonable facilities necessary to satisfy that the material is being produced and furnished in accordance with the applicable specification. Foundry inspection by the purchaser shall not interfere unnecessarily with the manufacturer's operations.
9.3 When agreed upon between manufacturer and purchaser, test specimens or unbroken test bars from the same lot shall be saved for a period of 3 months after date of the test report.
9.4 When unbroken test bars are reprocessed with castings for rehearing, test specimens from these bars shall be saved, as described in 9.3.
9.5 The purchaser reserves the right to perform any inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to the prescribed requirements.

10. Repair

10.1 Any repair shall be made in accordance with the requirements of the individual specification using procedures qualified by the manufacturer for the type of repair involved.

11. Rejection and Rehearing

11.1 Castings which fail to conform to the requirements specified when inspected or tested by the purchaser or his agent

[9] *Annual Book of ASTM Standards*, Vol 03.05.
[10] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

may be rejected. Rejection shall be reported to the manufacturer or supplier promptly and in writing. In case of dissatisfaction with the test results, the manufacturer or supplier may make claim for a rehearing.

12. Packaging and Package Marking

12.1 Unless otherwise specified in the contract or purchase order, cleaning, preservation, and packaging of castings shall be in accordance with the manufacturer's commercial practice. Packing and marking shall also be adequate to identify the contents and to ensure acceptance and safe delivery by the carrier for the mode of transportation employed.

12.2 *Government Procurement*—When specified in the contract or purchase order, marking for shipment shall be in accordance with the requirements of Fed. Std. No. 123 for civil agencies and MIL-STD-129 for military activities.

13. Quality Assurance

13.1 The surface of the casting shall be free of adhering sand, scale, cracks, and hot tears as determined by visual examination. Other surface discontinuities shall meet the visual acceptance standards specified in the order. Visual Practice A 802/A 802M or other visual standards may be used to define acceptable surface discontinuities and finish. Unacceptable visual surface discontinuities shall be removed and their removal verified by visual examination of the resultant cavities.

13.2 When additional inspection is desired, Supplementary Requirements S1, S2, or S3 may be specified.

14. Keywords

14.1 chemical composition; common requirements; general industry; inspection; iron castings; ordering information; packaging; quality assurance; repair; sampling; tensile requirements; terminology; workmanship

SUPPLEMENTARY REQUIREMENTS

Supplementary requirements shall be applied only when specified by the purchaser. Details of the supplementary requirements shall be agreed upon by the manufacturer and purchaser. The specified tests shall be performed by the manufacturer prior to shipment of the castings.

S1. Magnetic Particle Examination

S1.1 Castings shall be examined for surface discontinuities by magnetic particle examination. The examination shall be in accordance with Practice E 709. The extent of examination and the basis for acceptance shall be agreed upon between the manufacturer and purchaser.

S2. Radiographic Examination

S2.1 Castings shall be examined for internal defects by means of X-rays or gamma rays. The procedure shall be in accordance with Guide E 94, and types and degrees of discontinuities considered shall be judged by Reference Radiographs E 689 and E 802. The extent of examination and basis for acceptance shall be agreed upon between the manufacturer and purchaser.

S3. Liquid Penetrant Examination

S3.1 Castings shall be examined for surface discontinuities by means of liquid penetrant examination. The examination shall be in accordance with Practice E 165. Areas to be inspected, methods and types of liquid penetrants to be used, developing procedure, and basis for acceptance shall be agreed upon between the manufacturer and purchaser.

S4. Certification

S4.1 The manufacturer's certification shall be furnished to the purchaser stating that the material was manufactured, sampled, tested, and inspected in accordance with the material specification, including the year date, and was found to meet the requirements. Additionally, the certification shall include for each lot the results of all tests required by the material specification and any supplementary or additional requirements imposed by the purchase order.

S4.2 A signature is not required on the certification or test report. However, the document shall clearly identify the organization submitting the certification and the authorized agent of the manufacturer who certified the test results. Notwithstanding the absence of a signature, the organization submitting the certification is responsible for its content.

S4.3 The test report shall be furnished within 5 working days of shipment of the castings.

S5. Prior Approval of Major Repairs

S5.1 Major repairs as defined and agreed upon between the manufacturer and purchaser shall be subject to the prior approval of the purchaser.

S6. Marking

S6.1 The manufacturer's name or identification mark and the part identification number shall be cast or stamped on all castings. When further specified, lot numbers shall be marked on individual castings.

S6.2 When the castings are of such size that individual marking is impracticable, they shall be grouped by part identification or lot number and placed in a container. The container shall be marked with the required identification.

S7. Hardness Test

S7.1 Hardness measurements at specified locations on the castings shall be made in accordance with Test Method E 10 and reported.