Designation: A834 – 95 (Reapproved 2020)

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

This standard is issued under the fixed designation A834; 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/A47M
A48/A48M
A197/A197M
A220/A220M
A278/A278M
A319
A395/A395M
A436
A439/A439M
A518/A518M
A532/A532M
A536
A571/A571M
A823
A842
A874/A874M
A897/A897M

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 standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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]

A47/A47M Specification for Ferritic Malleable Iron Castings

A48/A48M Specification for Gray Iron Castings

A197/A197M Specification for Cupola Malleable Iron

A220/A220M Specification for Pearlitic Malleable Iron

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

A278/A278M Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650 °F (350 °C)

A319 Specification for Gray Iron Castings for Elevated Temperatures for Non-Pressure Containing Parts

A395/A395M Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures

A436 Specification for Austenitic Gray Iron Castings

A439/A439M Specification for Austenitic Ductile Iron Castings

A518/A518M Specification for Corrosion-Resistant High-Silicon Iron Castings

A532/A532M Specification for Abrasion-Resistant Cast Irons

A536 Specification for Ductile Iron Castings

A571/A571M Specification for Austenitic Ductile Iron Castings for Pressure-Containing Parts Suitable for Low-Temperature Service

A644 Terminology Relating to Iron Castings

A802/A802M Practice for Steel Castings, Surface Acceptance Standards, Visual Examination

A823 Specification for Statically Cast Permanent Mold Gray Iron Castings

A842 Specification for Compacted Graphite Iron Castings

[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.

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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.

A874/A874M Specification for Ferritic Ductile Iron Castings Suitable for Low-Temperature Service
A897/A897M Specification for Austempered Ductile Iron Castings
A919 Terminology Relating to Heat Treatment of Metals (Withdrawn 1999)[3]
E8/E8M Test Methods for Tension Testing of Metallic Materials
E10 Test Method for Brinell Hardness of Metallic Materials
E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
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/E94M Guide for Radiographic Examination Using Industrial Radiographic Film
E165/E165M Practice for Liquid Penetrant Testing for General Industry
E351 Test Methods for Chemical Analysis of Cast Iron—All Types
E689 Reference Radiographs for Ductile Iron Castings
E709 Guide for Magnetic Particle Testing
E802 Reference Radiographs for Gray Iron Castings Up to 4½ in. (114 mm) in Thickness

2.2 *Military Standard:*[4]
MIL-STD-129 Marking for Shipment and Storage

2.3 *Federal Standard:*[4]
Fed. Std. No. 123 Marking for Shipment (Civil Agencies)

3. Terminology

3.1 *Definitions:*

3.1.1 Definitions for many terms common to iron castings and their heat treatment are found in Terminology A919 and Terminology A644. A classification of graphite structure is found in Test Method A247.

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 E8/E8M.

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 Practice E59. Spectrographic or other methods such as those in Test Methods E30 and E351 may be used for chemical analysis. In the event of a dispute regarding chemical composition, Test Methods E351 and E30 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 E29, 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 workmanlike 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.

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

[4] Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://www.dodssp.daps.mil.

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 three 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 ensure 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 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. Practice A802/A802M 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 Requirement 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 Guide E709. 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 E94/E94M, and types and degrees of discontinuities considered shall be judged by Reference Radiographs E689 and E802. 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 E165/E165M. 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