



# Standard Specification for Ferritic Ductile Iron Castings Suitable for Low-Temperature Service<sup>1</sup>

This standard is issued under the fixed designation A 874/A 874M; 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 ductile iron castings suitable for service at temperatures of  $-40^{\circ}\text{F}$  [ $-40^{\circ}\text{C}$ ] and above.

1.2 The values stated in either inch-pound 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 shall be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

1.3 The following precautionary statement pertains only to the test methods portion, Section 11, of this specification: *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 and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:

A 247 Test Method for Evaluating the Microstructure of Graphite in Iron Castings<sup>2</sup>

E 8 Test Methods for Tension Testing of Metallic Materials<sup>3</sup>

E 30 Test Methods for Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron<sup>4</sup>

E 59 Practice for Sampling Steel and Iron for Determination of Chemical Composition<sup>4</sup>

E 94 Guide for Radiographic Testing<sup>5</sup>

E 165 Test Method for Liquid Penetrant Examination<sup>5</sup>

E 351 Test Methods for Chemical Analysis of Cast Iron—All Types<sup>4</sup>

E 562 Practice for Determining Volume Fraction by Systematic Manual Point Count<sup>3</sup>

E 689 Reference Radiographs for Ductile Iron Castings<sup>5</sup>

E 709 Guide for Magnetic Particle Examination<sup>5</sup>

## 3. Ordering Information

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

3.1.1 Drawing, catalog number, or part identification,

3.1.2 Quantity (weight or number of pieces),

3.1.3 ASTM designation and year of issue,

3.1.4 Marking instructions (see Section 15),

3.1.5 Place of inspection (see 13.1),

3.1.6 Limits on residual elements (see 5.2),

3.1.7 Visual and dimensional acceptance standard (see 7.1),

3.1.8 Sampling plan (see Section 9), and

3.1.9 Supplementary requirements.

## 4. Materials and Manufacture

4.1 Castings may be supplied either as cast or heat treated and shall have essentially a ferritic structure that contains no massive carbides.

## 5. Chemical Composition

5.1 The iron shall conform to the requirements for chemical composition shown in Table 1.

5.2 By agreement between the manufacturer and purchaser, analysis may be required and limits established for elements not specified in Table 1.

## 6. Mechanical and Microstructural Properties

6.1 *Tensile Properties*—The iron shall conform to the requirements for tensile properties shown in Table 2.

6.2 *Microstructure*—Graphite contained in the microstructure shall be evaluated in accordance with Test Method A 247. The percent of each graphite type shall be estimated, and the total of all estimates shall equal 100 %. The total percent of Types 1 and 2 graphite shall be a minimum of 90 %.

## 7. Workmanship, Finish, and Appearance

7.1 The surface of the casting shall be examined visually and shall be free from adhering sand, scale, cracks, and hot tears. Other surface discontinuities shall meet visual and dimensional acceptance standards specified in the order.

7.2 Conditioning of castings is permitted to the extent that the removal of metal does not extend into the envelope of the finished container and does not alter the properties of the metal

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee A-4 on Iron Castings and is the direct responsibility of Subcommittee A04.02 on Malleable and Ductile Iron Castings.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 01.02.

<sup>3</sup> Annual Book of ASTM Standards, Vol 03.01.

<sup>4</sup> Annual Book of ASTM Standards, Vol 03.05.

<sup>5</sup> Annual Book of ASTM Standards, Vol 03.03.

