Designation: A 915/A 915M – 08

Standard Specification for Steel Castings, Carbon, and Alloy, Chemical Requirements Similar to Standard Wrought Grades[1]

This standard is issued under the fixed designation A 915/A 915M; 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 carbon and low alloy steel castings having chemical analyses similar to that of the standard wrought grades.

1.2 Several grades are covered and are designated by chemical composition shown in Table 1.

1.3 The values stated in either inch-pound units 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 must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification. Inch-pound units are applicable for material ordered to Specification A 915 and SI units for material ordered to Specification A 915M.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products

A 781/A 781M Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use

3. Ordering Information

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

3.1.1 Quantity,

3.1.2 Specification, including year, date, and grade,

3.1.3 Description of the casting by pattern number or drawing. Dimensional tolerances shall be included on the casting drawing,

3.1.4 Options in the specification, and

3.1.5 Supplementary requirements desired, including standards of acceptance.

4. Heat Treatment

4.1 Grades SC 1020 and SC 1025 may be supplied unheat treated or heat treated as described in 4.2.

4.2 Castings shall be heat treated either by full annealing, normalizing, normalizing and tempering, or quenching and tempering. Unless otherwise specified in the inquiry, contract, or order, the castings may be heat treated by any of these heat treatments or combination of these heat treatments at the option of the manufacturer.

4.3 Heat treatment shall be performed after the castings have been allowed to cool below the transformation range.

4.4 The furnace temperature for heat treating shall be effectively controlled by the use of recording-type pyrometers.

5. Chemical Composition

5.1 The steel shall conform to the requirements of chemical composition as prescribed in Table 1.

5.2 The product analysis tolerances given in Specification A 781/A 781M shall apply to all product analysis performed on castings supplied to this specification.

6. General Conditions for Delivery

6.1 Material furnished to this specification shall conform to the applicable requirements of Specification A 781/A 781M, including the supplementary requirements indicated on the purchaser's order.

7. Repair by Welding

7.1 Weld repairs shall be inspected to the same quality standards used to inspect the castings. When castings are produced with Supplementary Requirement S1 specified, weld repairs shall be inspected by magnetic particle examination to the same standards used to inspect the castings. When castings are produced with Supplementary Requirement S2 specified, weld repairs in which the depth of the cavity prepared for repair welding exceeds 20 % of the wall thickness or 1 in. [25 mm], whichever is smaller, or in which the cavity prepared for welding is greater than approximately 10 in.^{2} [65 cm^2], shall be radiographed to the same standards used to inspect the castings.

[1] This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.18 on 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.

***A Summary of Changes section appears at the end of this standard.**

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TABLE 1 Chemical Composition (weight, percent)

Grade	C	Mn	P, max	S, max	Si	Ni	Cr	Mo
SC 1020 (J02003)	0.18/0.23	0.40/0.80	0.040	0.040	0.30/0.60	. . .	. . .	. . .
SC 1025 (J02508)	0.22/0.28	0.40/0.80	0.040	0.040	0.30/0.60	. . .	. . .	. . .
SC 1030 (J03012)	0.28/0.34	0.50/0.90	0.040	0.040	0.30/0.60	. . .	. . .	. . .
SC 1040 (J04003)	0.37/0.44	0.50/0.90	0.040	0.040	0.30/0.60	. . .	. . .	. . .
SC 1045 (J04502)	0.43/0.50	0.50/0.90	0.040	0.040	0.30/0.60	. . .	. . .	. . .
SC 4130 (J13502)	0.28/0.33	0.40/0.80	0.035	0.040	0.30/0.60	. . .	0.80/1.10	0.15/0.25
SC 4140 (J14045)	0.38/0.43	0.70/1.10	0.035	0.040	0.30/0.60	. . .	0.80/1.10	0.15/0.25
SC 4330 (J23259)	0.28/0.33	0.60/0.90	0.035	0.040	0.30/0.60	1.65/2.00	0.70/0.90	0.20/0.30
SC 4340 (J24053)	0.38/0.43	0.60/0.90	0.035	0.040	0.30/0.60	1.65/2.00	0.70/0.90	0.20/0.30
SC 8620 (J12095)	0.18/0.23	0.60/1.00	0.035	0.040	0.30/0.60	0.40/0.70	0.40/0.60	0.15/0.25
SC 8625 (J12595)	0.23/0.28	0.60/1.00	0.035	0.040	0.30/0.60	0.40/0.70	0.40/0.60	0.15/0.25
SC 8630 (J13095)	0.28/0.33	0.60/1.00	0.035	0.040	0.30/0.60	0.40/0.70	0.40/0.60	0.15/0.25

7.2 Weld repairs shall be considered major when the depth of the cavity prepared for welding exceeds 20 % of the wall thickness or 1 in. [25 mm], whichever is smaller, or when the extent of the cavity exceeds 10 in.^{2} [65 cm^2]. Castings produced from Grades SC 1020, SC 1025, or SC 1030 which contain major weld repairs shall receive a postweld heat treatment. Castings produced from any of the other grades shall receive a postweld heat treatment regardless of weld repair size. Postweld heat treatment shall consist of a thermal stress relief or a complete reheat treatment. The postweld heat treatment shall be in accordance with the qualified weld procedure used.

8. Rejection and Rehearing

8.1 Subsequent to acceptance at the manufacturer's works, material which is found to be unacceptable as determined by requirements specified in the order may be rejected by the purchaser. The manufacturer should be notified of such rejection. If the manufacturer is dissatisfied with the results of any tests performed by the purchaser, he may make claim for a rehearing.

9. Keywords

9.1 alloy steel; carbon steel; steel castings

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall not apply unless specified in the purchase order. A list of standardized supplementary requirements for use at the option of the purchaser is included in Specification A 781/A 781M. Those which are ordinarily considered suitable for use with this specification are given below together with additional supplementary requirements that are applicable only to this specification. Other supplementary requirements enumerated in Specification A 781/A 781M may be used with this specification upon agreement between the manufacturer and purchaser.

S1. Magnetic particle examination.

S2. Radiographic examination.

S3. Liquid penetrant examination.

S4. Ultrasonic examination.

S5. Examination of weld preparation.

S6. Certification.

S7. Prior approval of major weld repairs.

S8. Marking.

S9. Charpy impact test.

S10. Hardness test.

S12. Test report.

S13. Unspecified elements.

S14. Tension test from casting.

S15. Alternate tension test coupons.

S50. Tension test.

S50.1 Tensile properties shall be determined from material representing each heat. The bar from which the test specimen is taken shall be heat treated in production furnaces to the same procedure as the castings it represents. The results shall conform to requirements agreed upon between the manufacturer and purchaser.

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S50.2 Test bars shall be poured in separately cast keel blocks similar to Fig. 1 in Specification A 781/A 781M.

S50.3 Tension test specimens may be cut from heat treated castings, or from as-cast castings if no heat treatment is specified for the castings, instead of from test bars, when agreed upon between the manufacturer and the purchaser.

S50.4 Test specimens shall be machined to the form and dimensions of the standard round 2-in. [50-mm] gage length specimen shown in Fig. 4 of Test Methods and Definitions A 370, and shall be tested in accordance with Test Methods and Definitions A 370.

S50.5 If the results of the mechanical tests for any heat, lot, or casting do not conform to the requirements agreed upon, retests are permitted as outlined in Test Methods and Definitions A 370. At the manufacturer's option, castings may be reheat-treated and retested. When castings are reheat-treated, they may not be reaustenitized more than three times without the approval of the purchaser. Testing after reheat treatment shall consist of the full number of specimens taken from locations complying with the specification or order.

S50.6 If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted from the same heat.

SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to this standard since the last issue (A 915/A 915M-93(2003)) that may impact the use of this standard. (Approved March 1, 2008.)

(*1*) Changed Fig. 6 to Fig. 4 in S50.4.

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