Designation: A 958 – 00

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

This standard is issued under the fixed designation A 958; 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 classes are covered and are designated by chemical composition as shown in Table 1.

1.3 Options for tensile properties are shown in Tables 2 and 3.

1.4 *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 958 and SI units for material ordered to Specification A 958.*

## 2. Referenced Documents

2.1 *ASTM Standards:*

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products[2]

A 488/A 488M Practice for Steel Castings, Welding, Qualification of Procedures and Personnel[2]

A 781/A 781M Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use[2]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[3]

## 3. General Conditions for Delivery

3.1 Material furnished to this specification shall conform to the requirements of Specification A 781/A 781M, including any supplementary requirements that are indicated in the purchase order. Failure to comply with the general requirements of Specification A 781/A 781M constitutes nonconformance with this specification. In case of conflict between the requirements of this specification and Specification A 781/A 781M, this specification shall prevail.

## 4. Ordering Information

4.1 Orders for material under this specification should include the following information.

4.1.1 Quantity,

4.1.2 Specification, including year and date of issue,

4.1.3 Grade and class of steel,

4.1.4 Description of the casting by pattern number or drawing (Dimensional tolerances should be included on the casting drawing.),

4.1.5 Options in the specification, and

4.1.6 Supplementary requirements desired, including standards of acceptance.

[1] This specification is under the jurisdiction of ASTM Committee A01 on Ferrous Metals and is the direct responsibility of Subcommittee A01.18 on Castings.

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

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

**TABLE 1 Chemical Composition, Weight Percent**

NOTE 1—Values are maximum unless a range is given.

| Grade | C | Mn | P | S | Si | Ni | Cr | Mo |
|---|---|---|---|---|---|---|---|---|
| SC 1020 | 0.18/0.23 | 0.40/0.80 | 0.040 | 0.040 | 0.30/0.60 | - | - | - |
| SC 1025 | 0.22/0.28 | 0.40/0.80 | 0.040 | 0.040 | 0.30/0.60 | - | - | - |
| SC 1030 | 0.28/0.34 | 0.50/0.90 | 0.040 | 0.040 | 0.30/0.60 | - | - | - |
| SC 1040 | 0.37/0.44 | 0.50/0.90 | 0.040 | 0.040 | 0.30/0.60 | - | - | - |
| SC 1045 | 0.43/0.50 | 0.50/0.90 | 0.040 | 0.040 | 0.30/0.60 | - | - | - |
| SC 4130 | 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 | 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 | 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 | 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 | 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 | 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 | 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 |

**TABLE 2 Tensile Requirements**

| Class | 65/35 | 70/36 | 80/40 | 80/50 | 90/60 | 105/85 | 115/95 | 130/115 | 135/125 | 150/135 | 160/145 | 165/150 | 210/180 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tensile, ksi | 65 | 70 | 80 | 80 | 90 | 105 | 115 | 130 | 135 | 150 | 160 | 165 | 210 |
| Tensile, (MPa) | (450) | (485) | (550) | (550) | (620) | (725) | (795) | (895) | (930) | (1035) | (1105) | (1140) | (1450) |
| Yield, ksi | 35 | 36 | 40 | 50 | 60 | 85 | 95 | 115 | 125 | 135 | 145 | 150 | 180 |
| Yield, (MPa) | (240) | (250) | (275) | (345) | (415) | (585) | (655) | (795) | (860) | (930) | (1000) | (1035) | (1240) |
| Elongation in 2 in. or 50 mm, min, % | 24 | 22 | 18 | 22 | 18 | 17 | 14 | 11 | 9 | 7 | 6 | 5 | 4 |
| Reduction of Area, % | 35 | 30 | 30 | 35 | 35 | 35 | 30 | 25 | 22 | 18 | 12 | 10 | 8 |



**TABLE 3 Tensile Requirements/Grade Suitability**

| Class | 65/35 | 70/36 | 80/40 | 80/50 | 90/60 | 105/85 | 115/95 | 130/115 | 135/125 | 150/135 | 160/145 | 165/150 | 210/180 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | | | | | | | | | | | | | |
| SC 1020 | X[A] | X | | | | | | | | | | | |
| SC 1025 | X | X | | | | | | | | | | | |
| SC 1030 | X | X | X | X | | | | | | | | | |
| SC 1040 | X[B] | X | X | X | X | | | | | | | | |
| SC 1045 | X[B] | X[B] | X | X | X | X | X | | | | | | |
| SC 4130 | X[B] | X[B] | X | X | X | X | X | X | X | X | | | |
| SC 4140 | X[B] | X[B] | X[B] | X[B] | X | X | X | X | X | X | X | X | |
| SC 4330 | X[B] | X[B] | X[B] | X[B] | X | X | X | X | X | X | X | X | X |
| SC 4340 | X[B] | X[B] | X[B] | X[B] | X[B] | X | X | X | X | X | X | X | X |
| SC 8620 | X[B] | X[B] | X | X | X | X | X | | | | | | |
| SC 8625 | X[B] | X[B] | X | X | X | X | X | X | X | | | | |
| SC 8630 | X[B] | X[B] | X | X | X | X | X | X | X | X | | | |



[A] "X" denotes that the properties may be achieved by at least one of the heat treatments referenced in 5. The effect of section thickness should be considered in making grade selections. The heat treatment requirements do not imply that all section thicknesses will be through hardened.

[B] These grades are likely to significantly exceed the minimum strength levels, therefore, problems may be experienced when trying to produce castings to low hardness values.

## 5. Heat Treatment

5.1 All castings shall receive a heat treatment indicated in Table 4. Preliminary heat treatment prior to final heat treatment as well as multiple tempering is permitted.