Designation: B275 – 14

# Standard Practice for Codification of Certain Zinc, Tin and Lead Die Castings[1]

This standard is issued under the fixed designation B275; 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.

*This standard has been approved for use by agencies of the U.S. Department of Defense.*

## 1. Scope*

1.1 This practice covers a system for designating die casting alloys of zinc, tin and lead. Those designations currently being used in specifications under the jurisdiction of Committees B02 on Nonferrous Metals are listed in Table X2.1 in Appendix X2.

NOTE 1—The alloy designations now being used in Committee B07 specifications for aluminum and aluminum-alloy wrought and cast products conform to ANSI H35.1. Alloys formerly codified by this practice and the corresponding ANSI designations are shown in Tables X3.1 and X3.2 of Appendix X3 for legacy purposes.

NOTE 2—The alloy designations now being used in Committee B07 specifications for magnesium and magnesium-alloy wrought and cast products conform to Practice B951, as indicated in Appendix X4. Alloy designations formerly codified by this practice are no longer relevant.

1.2 The equivalent Unified Numbering System (UNS) alloy designations shown in the appendixes are in accordance with Practice E527.

## 2. Referenced Documents

2.1 The following documents form a part of this practice to the extent referenced herein:

2.2 *ASTM Standards:*[2]

B86 Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings

B102 Specification for Lead- and Tin-Alloy Die Castings (Withdrawn 2011)[3]

B240 Specification for Zinc and Zinc-Aluminum (ZA) Alloys in Ingot Form for Foundry and Die Castings

B327 Specification for Master Alloys Used in Making Zinc Die Casting Alloys

B951 Practice for Codification of Unalloyed Magnesium and Magnesium-Alloys, Cast and Wrought

E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

2.3 *ANSI Standard:*[4]

H35.1 Alloy and Temper Designation Systems for Aluminum

## 3. Basis of Codification

3.1 The designations for alloys and unalloyed metals are based on their chemical composition limits.

3.2 Designations shall be assigned, revised, and cancelled by Subcommittee B02.04 of ASTM Committee B02 on Nonferrous Metals and Alloys on written requests to its chairman. Complete chemical composition limits shall be submitted with request for assignment or revision of designations. Arbitrary assignments by other subcommittees or committees will not be recognized.

## 4. Alloys

4.1 Designation for alloys shall consist of not more than two letters representing the alloying elements (Note 3) specified in the greatest amount, arranged in order of decreasing percentages, or in alphabetical order if of equal percentages, followed by the respective percentages rounded off to whole numbers and a serial letter (Notes 4 and 5). The full name of the base metal precedes the designation, but it is omitted for brevity when the base metal being referred to is obvious.

NOTE 3—For codification, an alloying element is defined as an element (other than the base metal) having a minimum content greater than zero either directly specified or computed in accordance with the percentages specified.

NOTE 4—The serial letter is arbitrarily assigned in alphabetical sequence starting with "A" (omitting "I" and "O") and serves to differentiate otherwise identical designations. A serial letter is necessary to complete each designation.

NOTE 5—The designation of a casting alloy in ingot form is derived from the composition specified for the corresponding alloy in the form of castings. Thus, a casting ingot designation may consist of an alloy designation having one or more serial letters, one for each product composition, or it may consist of one or more alloy designations.

[1] This practice is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.04 on Zinc and Cadmium.

Current edition approved Oct. 1, 2014. Published October 2014. Originally approved in 1962. Last previous edition approved in 2013 as B275 – 13ε1. DOI: 10.1520/B0275-14.

[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.

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

[4] Available in the Related Materials section (gray pages) of the *Annual Book of ASTM Standards*, Vol 02.02.

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

4.2 The letters used to represent alloying elements shall be those in Table 1.

4.3 In rounding percentages, the nearest whole number shall be used. If two choices are possible as when the decimal is followed by a 5 only, or a 5 followed only by zeros, the nearest even whole number shall be used.

**TABLE 1 Letters Representing Alloying Elements**

| | |
|---|---|
| A—Aluminum | N—Nickel |
| B—Bismuth | P—Lead |
| C—Copper | Q—Silver |
| D—Cadmium | R—Chromium |
| E—Rare earths | S—Silicon |
| F—Iron | T—Tin |
| G—Magnesium | V—Gadolinium |
| H—Thorium | W—Yttrium |
| J—Strontium | X—Calcium |
| K—Zirconium | Y—Antimony |
| L—Lithium | Z—Zinc |
| M—Manganese | |

4.4 When a range is specified for the alloying element, the rounded mean shall be used in the designation.

4.5 When only a minimum percentage is specified for the alloying element, the rounded minimum percentage shall be used in the designation.

## 5. Unalloyed Metals

5.1 Designations for unalloyed metals consist of the specified minimum purity, all digits retained but dropping the decimal point, followed by a serial letter (Note 4). The full name of the base metal precedes the designation, but it is omitted for brevity when the base metal being referred to is obvious.

## 6. Keywords

6.1 aluminum; lead; magnesium; tin; UNS designations; zinc

# APPENDIXES

**(Nonmandatory Information)**

## X1. EXAMPLES OF CODIFICATION

X1.1 *Example 1*—For Alloy AG40A in Specifications B86 and B240, “A” represents aluminum, the alloying element specified in the greatest amount; “G” represents magnesium, the alloying element specified in the second greatest amount; 4 indicates that the rounded mean aluminum percentage lies between 3 and 5; 0 signifies the nearest whole number for magnesium percentage; and “A” as the final letter indicates that this is the first alloy qualified and assigned under the designation AG40.

## X2. DESIGNATIONS FOR METALS AND ALLOYS ASSIGNED IN CONFORMANCE WITH PRACTICE B275, FOR CODIFICATION OF CERTAIN NONFERROUS METALS AND ALLOYS

X2.1 Designations for metals and alloys assigned in conformance with Practice B275, and the ASTM specifications in which they are used, are shown in Table X2.1.

## X3. DESIGNATIONS FOR METALS AND ALLOYS FORMERLY ASSIGNED IN CONFORMANCE WITH PRACTICE B275

X3.1 Aluminum alloys no longer use the designations formerly found in Specification B275. Designations given below are for legacy purposes only. Designations assigned in conformance with this practice were used for wrought aluminum and wrought aluminum alloys in ASTM specifications prior to 1960 and for cast aluminum and aluminum alloys and ingot prior to 1974 but now designations conforming to the American National Standard Alloys and Temper Designation Systems for Aluminum (ANSI H35.1) are standard with the UNS, Practice E527 for information only. The former ASTM designations and the corresponding ANSI and UNS designations for wrought alloys are as shown in Table X3.1. Cast alloys and ingot are as shown in Table X3.2.

**TABLE X2.1 Designations Assigned for Nonferrous Metals and Alloys in Conformance with Practice B275**

| Designation | | ASTM Specifications | | | |
|---|---|---|---|---|---|
| Practice B275 | UNS | B102 | B86 | B240 | B327 |
| Lead alloy | | | | | |
| Y10A | | [A] | ... | ... | ... |
| YT155A | | [A] | ... | ... | ... |
| Tin alloy | | | | | |
| CY44A | | [A] | ... | ... | ... |
| PY1815A | | [A] | ... | ... | ... |
| YC135A | | [A] | ... | ... | ... |
| Zinc alloy | | | | | |
| AC41A | Z35533 | ... | [A] | ... | ... |
| AG40A | Z33525 | ... | [A] | ... | ... |
| AC41A | Z35532 | ... | ... | [A] | ... |
| AG40A | Z33524 | ... | ... | [A] | ... |
| AC43A | Z35545 | ... | [A] | ... | ... |
| AG40B | Z33527 | ... | [A] | ... | ... |
| AC43A | Z35544 | ... | ... | [A] | ... |
| AG40B | Z33526 | ... | ... | [A] | ... |

[A] Alloys appear in applicable specifications which are found in the *Annual Book of ASTM Standards*, Vol. 02.04

**TABLE X3.1 Wrought Aluminum Alloys**

| Designations | | | Designations | | |
|---|---|---|---|---|---|
| ANSI H35.1 | Former B275 – 63 | UNS | ANSI H35.1 | Former B275 – 63 | UNS |
| 1060 | 996A | A91060 | 5056 | GM50A | A95056 |
| 1100 | 990A | A91100 | 5083 | GM41A | A95083 |
| 2011 | CB60A | A92011 | 5086 | GM40A | A95086 |
| 2014 | CS41A | A92014 | 5154 | GR40A | A95154 |
| 2017 | CM41A | A92017 | 5254 | GR40B | A95254 |
| 2018 | CN42C | A92018 | 5454 | GM31A | A95454 |
| 2024 | CG42A | A92024 | 5456 | GM51A | A95456 |
| 2117 | CG30A | A92117 | 5652 | GR20B | A95652 |
| 3003 | M1A | A93003 | 6053 | GS11B | A96053 |
| 3004 | MG11A | A93004 | 6061 | GS11A | A96061 |
| 4032 | SG121A | A94032 | 6063 | GS10A | A96063 |
| 5005 | G1B | A95005 | 6101 | GS10B | A96101 |
| 5050 | G1A | A95050 | 7075 | ZG62A | A97075 |
| 5052 | GR20A | A95052 | | | |

**TABLE X3.2 Cast Aluminum Alloys and Aluminum Alloys in Ingot Form[A]**

| Designations | | | Designations | | |
|---|---|---|---|---|---|
| ANSI H35.1 | Former B275 – 63 | UNS | ANSI H35.1 | Former B275 – 63 | UNS |
| 201.0 | CQ51A | A02010 | 380.0 | SC84B | A03800 |
| 201.2 | CQ51A | A02012 | 380.2 | SC84C | A03802 |
| ... | CS42A[B] | ... | A380.0 | SC84A | A13800 |
| 208.0 | CS43A | A02080 | A380.1 | SC84A-B | A13801 |
| 208.1 | CS43A | A02081 | 383.0 | SC102A | A03830 |
| ... | CS66A[C] | ... | 383.1 | SC102A | A03831 |
| 222.0 | CG100A | A02220 | 384.0 | SC114A | A03840 |
| 222.1 | CG100A | A02221 | 384.1 | SC114A | A03841 |
| ... | CS72A[D] | ... | ... | SC122A[C] | ... |
| ... | CS74A[C] | ... | ... | SF101A[D] | ... |
| 238.0[E] | CS104A | A02380 | 413.0 | S12B | A04130 |
| 238.1[F] | CS104A | A02381 | 413.2 | S12C | A04132 |
| 242.0 | CN42A | A02420 | A413.0 | S12A | A14130 |
| 242.1 | CN42A | A02421 | A413.1 | S12A-B | A14131 |
| 295.0 | C4A | A02950 | 443.0 | S5B | A04430 |
| 295.1 | C4A | A02951 | 443.1 | S5B | A04431 |
| ... | SC64A[G] | ... | 443.2 | S5A | A04432 |
| ... | SC64B[G] | ... | A443.0[E] | S5B | A14430 |
| ... | SC64C[C] | ... | A443.1[F] | S5B | A14431 |
| 319.0 | SC64D | A03190 | B443.0 | S5A | A24430 |
| 319.1 | SC64D | A03191 | C443.0 | S5C | A34430 |
| 328.0 | SC82A | A03280 | C443.1 | S5C | A34431 |
| 328.1 | SC82A | A03281 | A444.0 | S7A | A14440 |
| 332.0 | SC103A | A03320 | A444.2 | S7A | A14442 |
| 332.1 | SC103A | A03321 | 512.0[E] | GS42A | A05120 |
| ... | SC104A[H] | ... | 512.2[F] | GS42A | A05122 |
| 333.0 | SC94A | A03330 | ... | GS31A[D] | ... |
| 333.1 | SC94A | A03331 | 513.0 | GZ42A | A05130 |
| 336.0 | SN122A | A03360 | 513.2 | GZ42A | A05132 |
| 336.1 | SN122A | A03361 | 514.0 | G4A | A05140 |
| 354.0 | SC92A | A03540 | 514.1 | G4A | A05141 |
| 354.1 | SC92A | A03541 | 518.0 | G8A | A05180 |
| 355.0 | SC51A | A03550 | 518.1 | G8A | A05181 |
| 355.1 | SC51A | A03551 | 520.0 | G10A | A05200 |
| 355.2 | SC51C | A03552 | 520.2 | G10A | A05202 |
| C355.0 | SC51B | A33550 | 535.0 | GM70B | A05350 |
| C355.2 | SC51B | A33552 | 535.2 | GM70B | A05352 |
| 356.0 | SC70A | A03560 | 705.0 | ZG32A | A07050 |
| 356.1 | SC70A | A03561 | 705.1 | ZG32A | A07051 |
| 356.2 | SC70C | A03562 | 707.0 | ZG42A | A07070 |
| A356.0 | SC70B | A13560 | 707.1 | ZG42A | A07071 |
| A356.2 | SC70B | A13562 | 710.0 | ZG61B | A07100 |
| A357.0 | SG71A | A03570 | 710.1 | ZG61B | A07101 |
| 359.0 | SC91A | A03590 | 711.0 | ZG60A | A07110 |
| 359.2 | SG91A | A03592 | 711.1 | ZG60A | A07111 |
| 360.0 | SG100B | A03600 | 712.0 | ZG61A | A07120 |
| 360.2 | SG100C | A03602 | 712.2 | ZG61A | A07122 |
| A360.0 | SG100A | A13600 | 713.0 | ZC81A | A07130 |
| A360.1 | SG100A-B | A13601 | 713.1 | ZC81B | A07131 |

[A] Alloys appear in applicable specifications in the *Annual Book of ASTM Standards*, Vol 02.02, except as otherwise noted.
[B] Last appeared in Specification B179 – 63.
[C] Last appeared in Specification B179 – 72.
[D] Last appeared in Specification B179 – 64.
[E] Last appeared in Specification B108 – 80.
[F] Last appeared in Specification B179 – 78.
[G] Last appeared in Specification B179 – 58.
[H] Last appeared in Specification B179 – 65.

## X4. UNALLOYED MAGNESIUM AND MAGNESIUM-ALLOYS

X4.1 Magnesium alloys no longer use the designations formerly found in Specification B275. Current designations for unalloyed magnesium and magnesium alloys, cast and wrought, are found in Practice B951.

## SUMMARY OF CHANGES

Committee B02 has identified the location of selected changes to this standard since the last issue (B275–13$^{\varepsilon 1}$) that may impact the use of this standard. (Approved October 1, 2014.)

*(1)* The title of the standard was revised to reflect the current more limited scope covering only certain zinc, tin and lead die casting designations.

*(2)* The term "die casting" is used as opposed to "die-casting."

Committee B02 has identified the location of selected changes to this standard since the last issue (B275-05(2013)) that may impact the use of this standard. (Approved December 1, 2013.)

*(1)* Jurisdiction of Practice B275 was transferred to Subcommittee B02.04 from Subcommittee B07.03.
*(2)* Change Scope to only include zinc, tin and lead alloys.
*(3)* Move all references to aluminum to nonmandatory Appendix.
*(4)* Remove all references to magnesium designations and reference Specification B951 instead.
*(5)* Update UNS numbers in Table X21.1
*(6)* Change example in Appendix X1.1 to an ally remaining in the standard.