



## Designation: **B275 – 05 (Reapproved 2013) B275 – 13**

# Standard Practice for Codification of Certain Nonferrous Metals and Alloys, Cast and Wrought<sup>1</sup>

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 ( $\epsilon$ ) 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 ~~originally adopted for designating light metals and alloys, cast and wrought, and later extended to certain heavier, base-metal die-casting alloys. Those designations, which are 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 and Alloys and B07 on Light Metals and Alloys, are listed in Appendix Table X2.1.~~

1.1.1 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 the Appendix for legacy purposes.~~

1.1.2 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 This practice also provides a system for designating magnesium alloys that have been used commercially since 1952, and thus is intended to be the registration source for new magnesium alloys. A record of designations along with the established compositions is given in ~~Table X4.1.~~

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:*<sup>2</sup>

~~B37 Specification for Aluminum for Use in Iron and Steel Manufacture~~

~~B80 Specification for Magnesium-Alloy Sand Castings~~

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

~~B93/B93M Specification for Magnesium Alloys in Ingot Form for Sand Castings, Permanent Mold Castings, and Die Castings~~

~~B94 Specification for Magnesium-Alloy Die Castings~~

~~B102 Specification for Lead- and Tin-Alloy Die Castings (Withdrawn 2011)<sup>3</sup>~~

~~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:*<sup>4</sup>

~~H35.1 Alloy and Temper Designation Systems for Aluminum~~

<sup>1</sup> 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.

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<sup>2</sup> 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.

<sup>3</sup> The last approved version of this historical standard is referenced on www.astm.org.

<sup>4</sup> 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

### 3. Basis of Codification

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

NOTE 1—For aluminum and magnesium alloys, cast and wrought, standard limits for alloying elements and impurities are expressed to the following places:

Less than 0.0001 % (used only for magnesium alloys)	0.0000X
0.0001 to 0.001 %	0.000X
0.001 to 0.01 %	0.00X
0.01 to 0.10 %	
—Unalloyed aluminum made by a refining process	0.0XX
—Alloys and unalloyed aluminum or magnesium not made by a refining process	0.0X
0.10 through 0.55 %	0.XX
Over 0.55 %	0.X;X.X;XX.X

3.2 Designations shall be assigned, revised, and cancelled by Subcommittee B07.07B02.04 of ASTM Committee B07B02 on Light 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.

3.3 The temper designation, which is used for all metal forms, except ingot, follows the alloy designation and is separated with a dash.

### 4. Alloys

4.1 Designation for alloys shall consist of not more than two letters representing the alloying elements (Note 21) 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 32 and 43). 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 1—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 2—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 3—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.

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.

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 32). 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

**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	

## APPENDIXES

(Nonmandatory Information)

## X1. EXAMPLES OF CODIFICATION

X1.1 *Example 1*—For Alloy ~~CG181A~~AG40A in ~~Specification~~Specifications ~~B327B86~~ and ~~B240~~, “~~C~~”“~~A~~” represents ~~copper~~, ~~aluminum~~, the alloying element specified in the greatest amount; “~~G~~” represents magnesium, the alloying element specified in the second greatest amount; ~~184~~ indicates that the rounded mean ~~copper~~~~aluminum~~ percentage lies between ~~173~~ and ~~194~~; ~~150~~ 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 ~~CG181~~AG40.

X1.2 *Example 2*—For Alloys AZ91A, B, and C, in Specification ~~B93/B93M~~, “~~A~~” represents aluminum, the alloying element specified in the greatest amount; “~~Z~~” represents zinc, the alloying element specified in the second greatest amount; “~~9~~” indicates that the rounded mean aluminum percentage lies between 8.6 and 9.4; “~~1~~” signifies that the rounded mean of the zinc lies between 0.6 and 1.4; and “~~A~~” as the final letter indicates that this is the first alloy whose composition qualified assignment of the designation AZ91. The final serial letters B and C signify alloys subsequently developed whose specified compositions differ slightly from the first and from one another but do not differ sufficiently to effect a change in the basic designation.

**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~~. 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

[ASTM B275-13](#)<https://standards.iteh.ai/catalog/standards/sist/b355437b-87fd-48ec-8146-caa98518a61a/astm-b275-13>

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

Designation		ASTM Specifications				
Practice B275	UNS	B37	B102	B86	B240	B327
Aluminum alloy						
—850A		*	...	...	...	...
—900A		*	...	...	...	...
—920A		*	...	...	...	...
—950A		*	...	...	...	...
—980A		*	...	...	...	...
—990A		*	...	...	...	...
—CG181A		...	...	...	...	*
—G1G		...	...	...	...	*
—ZG71A		...	...	...	...	*
Lead alloy						
—Y10A		...	*	...	...	...
—YT155A		...	*	...	...	...
Tin alloy						
—CY44A		...	*	...	...	...
—PY1815A		...	*	...	...	...
—YC135A		...	*	...	...	...
Zinc alloy						
—AG41A	Z35531	...	...	*	...	...
—AG40A	Z35520	...	...	*	...	...
—AC41A	Z35530	...	...	...	*	...
—AG40A	Z33521	...	...	...	*	...
—AC43A	Z35541	...	...	*	...	...
—AG40B	Z33523	...	...	*	...	...
—AC43A	Z35540	...	...	...	*	...
—AG40B	Z33522	...	...	...	*	...

**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	...	

<sup>A</sup> Alloys appear in applicable specifications which are found in the *Annual Book of ASTM Standards*, Vol. 02.04

\* Alloys appear in applicable specifications which are found in the *Annual Book of ASTM Standards*, Vol 02.02.

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**.