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Designation: B 240 – 01$^{\epsilon 1}$

Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloys in Ingot Form for Foundry and Die Castings[1]

This standard is issued under the fixed designation B 240; 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.

ϵ^1 NOTE— Paragraph 11.3 was corrected editorially and a Summary of Changes section was added in July 2001.

1. Scope*

1.1 This specification covers commercial zinc and zinc-aluminum (ZA) alloys in ingot form for remelting for the manufacture of pressure die castings and foundry castings as designated and specified in Table 1. Seven alloy compositions are specified, designated as follows:

UNS[A]	ASTM[A]	Common
Z33521	AG 40A	Alloy 3
Z33522	AG 40B	Alloy 7
Z35530	AC 41A	Alloy 5
Z35540	AC 43A	Alloy 2
Z35635		ZA-8
Z35630		ZA-12
Z35840		ZA-27

1.2 Zinc alloys Z33521, Z33522, Z35530, and Z35540 are used primarily for remelting in the manufacture of pressure die castings. Zinc-aluminum alloys Z35635, Z35630, and Z35840 are used for remelting in the manufacture of both foundry and pressure die castings. Castings made from these ingots are specified in ASTM B86, Standard Specification for Zinc and Zinc-Aluminum Alloys for Foundry and Die Castings.

1.3 The values stated in inch-pound units are to be regarded as standard.

1.4 *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 become familiar with all hazards including those identified in the appropriate Material Data Sheet for this product/material as provided by the manufacturer, to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 The following documents of the issue in effect on data of order acceptance form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards:*

B 86 Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings[2]

B 275 Practice for Codification of Certain Nonferrous Metals and Alloys, Cast and Wrought[3]

B 899 Terminology Relating to Nonferrous Metals and Alloys[2]

B 908 Practice for the Use of Color Codes for Zinc Casting Alloy Ingot[2]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[4]

E 47 Test Methods for Chemical Analysis of Zinc Die-Casting Alloys[5]

E 88 Practice for Sampling Nonferrous Metals and Alloys in Cast Form for Determination of Chemical Composition[6]

E 527 Practice for Numbering Metals and Alloys (UNS)[7]

E 536 Test Method for Chemical Analysis of Zinc and Zinc Alloys[8]

E 634 Practice for Sampling of Zinc and Zinc Alloys for Optical Emission Spectrometric Analysis[8]

2.3 *Other ASTM Document:*

Methods for Emission Spectrochemical Analysis[9]

3. Terminology

3.1 Terms shall be defined in accordance with Terminology B 899B 899.

4. Ordering Information

4.1 Orders for ingot under this specification shall include the following information:

4.1.1 Quantity in pounds,

4.1.2 Alloy (Table 1),

4.1.3 Size, if not manufacturer's standard,

[1] This specification 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 May 10, 2001. Published July 2001. Originally published as two separate Standards, B 240-49, last previous edition B 240-98$^{\epsilon 1}$ and B669-80, last previous edition B 669-97.

[2] *Annual Book of ASTM Standards*, Vol 02.04.

[3] *Annual Book of ASTM Standards*, Vol 02.02.

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

[5] Discontinued; see *1997 Annual Book of ASTM Standards*, Vol 03.05.

[6] *Annual Book of ASTM Standards*, Vol 03.05.

[7] *Annual Book of ASTM Standards*, Vol 01.01.

[8] *Annual Book of ASTM Standards*, Vol 03.06.

[9] Available from ASTM Headquarters, 1916 Race St., Philadelphia, PA 19103, PCN 03-502071-39.

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

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TABLE 1 Chemical and North American Color Code Requirements

	Z33521 (AG40A)[A,B,C,D] ALLOY 3	Z33522 (AG40B)[A,B,C,D] ALLOY 7	Z35530 (AC41A)[A,B,C,D] ALLOY 5	Z35540 (AC43A)[A,B,C,D] ALLOY 2	Z35635 [B,C,E] ZA-8	Z35630 [B,C,E] ZA-12	Z35840 [B,C,E] ZA-27
Color Code[F]	None	Brown	Black	Green	Blue	Orange	Purple
Element							
Aluminum	3.9-4.3	3.9-4.3	3.9-4.3	3.9-4.3	8.2-8.8	10.8-11.5	25.5-28.0
Magnesium	0.025-0.05	0.010-0.020	0.03-0.06	0.025-0.05	0.020-0.030	0.020-0.030	0.012-0.020
Copper	0.10 max	0.10 max	0.75-1.25	2.6-2.9	0.8-1.3	0.5-1.2	2.0-2.5
Iron, Max	0.075	0.075	0.075	0.075	0.065	0.065	0.072
Lead, Max	0.004	0.0020	0.004	0.004	0.005	0.005	0.005
Cadmium, Max	0.003	0.0020	0.003	0.003	0.005	0.005	0.005
Tin, Max	0.002	0.0010	0.002	0.002	0.002	0.002	0.002
Nickel	- - -	0.005-0.020	- - -	- - -	- - -	- - -	- - -
Zinc[G]	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder

[A]Zinc alloy ingot for die casting may contain nickel, chromium, silicon, and manganese in amounts of up to 0.02, 0.02, 0.035 and 0.05 %, respectively. No harmful effects have ever been noted due to the presence of these elements in up to these concentrations and, therefore, analyses are not required for these elements, except that nickel analysis is required for Z33522.

[B]ASTM alloy designations were established in accordance with Practice B 275. UNS assignations were established in accordance with Practice E 527. The last digit of a UNS number differentiates between alloys of similar composition. UNS designations for ingot and casting versions of an alloy were not assigned in the same sequence for all alloys.

[C]For purposes of acceptance and rejection, the observed value or calculated value obtained from analysis should be rounded to the nearest unit in the last right-hand place of figures, used in expressing the specified limit, in accordance with the rounding procedure prescribed in Practice E 29.

[D]When this material is required to conform to ISO Standard 301, the chemical limits for thallium and indium each shall not exceed 0.001 %.

[E]Zinc-aluminum ingot for foundry and pressure die casting may contain nickel, chromium, and manganese in amounts of up to 0.01 % each or 0.03 % total. No harmful effects have ever been noted due to the presence of these elements in up to these concentrations and, therefore, analyses are not required for these elements.

[F]Refer to Practice B 908B 908. *(Note: Colors indicated are for North American applications.)*

[G]Determined arithmetically by difference.

4.1.4 Specification number and date,
4.1.5 Source inspection (Section 9),
4.1.6 Marking (Section 11), and
4.1.7 Whether certification is required (Section 12).

5. Materials and Manufacturer

5.1 The material covered by this specification shall be of uniform quality and reasonably free from dross, adhering foreign matter, and surface oxide.

6. Chemical Requirements

6.1 The ingots shall conform to the requirements as to chemical composition prescribed in Table 1. Conformance shall be determined by the manufacturer by analyzing samples taken at the time the ingots are poured or samples taken from the ingots. Unless otherwise agreed in the contact or purchase order, sampling procedure will be the manufacturer's choice.

7. Sampling for Determination of Chemical Composition

7.1 In the event of a dispute, if the ingots are shipped in carload lots of the same alloy, not less than five ingots shall be taken at random from the carload for sampling. If the shipment is less than a carload lot, one sample ingot shall be taken for each 10,000 lb. (4500 kg) or fraction thereof. Either party may request that a sample be taken from each melt of 1000 lb. (450 kg) or more.

7.2 The samples for chemical analysis shall be taken by sawing, milling, or drilling in such a manner as to be representative of the average cross section of the ingot. The weight of a prepared sample shall be not less than 75 g in accordance with Practice E 88.

7.3 The saw drill, or cutter used for taking the sample shall be thoroughly cleaned. No lubricant shall be used in the operation, and the sawings or metal chips shall be carefully treated with a magnet to remove any particles or iron introduced in taking the sample by the method prescribed in 7.2.

7.4 An optional method of sampling for analysis may be by melting together representative portions of each ingot selected and then sampling the liquid composite by casting suitable specimens for either spectrographic or chemical analysis.

7.5 *Samples for Spectrochemical and Other Methods of Analysis*—Samples for spectrochemical and other methods of analysis shall be suitable for the form of material being analyzed and the type of analytical method used.

8. Methods for Chemical Analysis

8.1 The determination of chemical composition shall be made in accordance with suitable chemical (Test Methods E 536 or E 47 for tin) or other methods. In case of dispute, the results secured by Test Methods E 536 and Test Method E 47 for tin, or by a method agreed upon by both parties, shall be the basis of acceptance.

8.2 For purposes of determining compliance with specified composition limits as given in Table 1, an observed or calculated value shall be rounded to the nearest unit in the last right-hand place of figures shown in Table 1, in accordance with the rounding method of Practice E 29.

9. Source Inspection

9.1 If the purchaser desires that his representative inspect or witness the inspections and testing of the product prior to shipment, such agreement shall be made by the purchaser and producer or supplier as part of the contract or purchase order.

9.2 When such inspection or witness of inspection and testing is agreed upon, the producer or supplier shall afford the purchaser's representative all reasonable facilities to satisfy

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