



Designation: B6 – 23

American Association of State
Highway and Transportation
Officials Standard
AASHTO No: M120-77

Standard Specification for Zinc¹

This standard is issued under the fixed designation B6; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

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

1. Scope*

1.1 This specification covers zinc metal made from ore or other material by a process of distillation or by electrolysis in five grades as follows:

- 1.1.1 LME Grade
- 1.1.2 Special High Grade
- 1.1.3 High Grade
- 1.1.4 Intermediate Grade
- 1.1.5 Prime Western Grade

NOTE 1—Certain continuous galvanizing grades are specified in Specification B852. Other continuous galvanizing and controlled lead grades are not included in this specification but are covered by specific user purchasing specifications.

1.2 This specification does not cover zinc produced by “sweating” or remelting of secondary zinc.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered 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 Safety Data Sheet (SDS) for this product/material as provided by the manufacturer, to establish appropriate safety, health, and environmental practices, and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

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 April 1, 2023. Published April 2023. Originally approved in 1911. Last previous edition approved in 2018 as B6 – 18. DOI: 10.1520/B0006-23.

2. Referenced Documents

2.1 The following documents of the issue in effect on the date of material purchase form a part of this specification to the extent referenced herein.

2.2 *ASTM Standards:*²

B852 Specification for Continuous Galvanizing Grade (CGG) Zinc Alloys for Hot-Dip Galvanizing of Sheet Steel

B897 Specification for Configuration of Zinc and Zinc Alloy Jumbo, Block, Half Block, and Slab Ingot

B899 Terminology Relating to Non-ferrous Metals and Alloys

B914 Practice for Color Codes on Zinc and Zinc Alloy Ingot for Use in Hot-Dip Galvanizing of Steel

B949 Specification for General Requirements for Zinc and Zinc Alloy Products

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

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

E536 Test Methods for Chemical Analysis of Zinc and Zinc Alloys

2.3 *ISO Standards:*³

ISO 3815-1 Zinc and zinc alloys — Part 1: Analysis of solid samples by optical emission spectrometry

ISO 3815-2 Zinc and zinc alloys — Part 2: Analysis by inductively coupled plasma optical emission spectrometry

3. Terminology

3.1 Terms shall be defined in accordance with Terminology B899.

3.2 *Definitions of Terms Specific to This Standard:*

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 Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

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

3.2.1 *LME Grade, n*—a grade of zinc containing a minimum of 99.995 % zinc, with controlled impurity levels, as specified in **Table 1**.

3.2.2 *Special High Grade, n*—a high purity grade of zinc containing a minimum of 99.990 % zinc, with controlled impurity levels, as specified in **Table 1**.

3.2.3 *High Grade, n*—a grade of zinc containing a minimum of 99.95 % zinc, with controlled impurity levels, as specified in **Table 1**.

3.2.4 *Intermediate Grade, n*—a grade of zinc containing a minimum of 99.5 % zinc, with controlled impurity levels, as specified in **Table 1**.

3.2.5 *Prime Western Grade, n*—a grade of zinc containing 0.5 % to 1.4 % lead, a minimum of 98.5 % zinc, with controlled impurity levels, as specified in **Table 1**.

3.3 Abbreviations:

3.3.1 *LME*—LME Grade Zinc

3.3.2 *SHG*—Special High Grade Zinc

3.3.3 *HG*—High Grade Zinc

3.3.4 *IG*—Intermediate Grade Zinc

3.3.5 *PWG*—Prime Western Grade Zinc

4. Ordering Information

4.1 See Specification **B949**.

5. Materials and Manufacture

5.1 The manufacturer shall use care to have each lot of zinc metal be as uniform in quality as possible.

6. Chemical Requirements

6.1 The zinc metal shall conform to the requirements prescribed in **Table 1**.

6.2 See Specification **B949**.

7. Sizes and Shapes

7.1 Zinc metal may be ordered in slab, as specified in Specification **B897**.

7.2 Zinc metal may be ordered in jumbos or blocks, as specified in Specification **B897**.

7.3 Zinc metal may also be ordered in anodes or other shapes.

8. Appearance

8.1 The zinc metal shall be reasonably free of surface corrosion and adhering foreign matter.

9. Sampling for Chemical Analysis

9.1 See Specification **B949**.

10. Methods of Chemical Analysis

10.1 In case of disagreement, results secured by an approved method or a method mutually agreed upon by both parties shall be the basis of acceptance. Approved methods include Test Methods **E536**, ISO 3815-1 and ISO 3815-2.

NOTE 2—Test Methods **E536** is directly applicable, in an unmodified form, only to alloys 3, 5, and 7. ISO 3815-1 and ISO 3815-2 are generic methods applied to zinc and zinc alloys. Each of the methods may be modified and formatted for the alloy to be assayed. An experienced chemist, using suitable and/or traceable standards along with valid quality assurance techniques, will be able to perform and validate the methods and demonstrate acceptable precision and accuracy.

11. Rejection and Rehearing

11.1 See Specification **B949**.

12. Investigation of Claims

12.1 See Specification **B949**.

13. Settlement of Claims

13.1 See Specification **B949**.

14. Product Identification Marking and Packaging

14.1 See Specification **B949**.

15. Keywords

15.1 high grade zinc; intermediate grade zinc; LME grade zinc; prime western zinc; special high grade zinc; zinc; zinc metal

TABLE 1 Chemical Requirements

NOTE 1—The following applies to all specified limits in this table: For purposes of determining conformance with this specification, an observed value obtained from analysis shall be rounded off “to the nearest unit” in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding method of Practice **E29**.

Grade [UNS] ^A	Color Code ^B	Composition, %							
		Lead	Iron max	Cadmium max	Alumi- num max	Copper max	Tin max	Total Non-Zinc max	Zinc, min by difference
LME Grade (LME) [Z12002]	White	0.003 max	0.002	0.003	0.001	0.001	0.001	0.005	99.995
Special High Grade ^C (SHG) [Z13001]	Yellow	0.003 max	0.003	0.003	0.002	0.002	0.001	0.010	99.990
High Grade (HG) [Z14003]	Green	0.03 max	0.02	0.01	0.01	0.002	0.001	0.05	99.95
Intermediate Grade (IG) [Z16005]	Blue	0.45 max	0.05	0.01	0.01	0.20	...	0.5	99.5
Prime Western Grade (PWG) [Z18005]	Black	0.5–1.4	0.05	0.20	0.01	0.10	...	1.5	98.5

^A UNS designations were established in accordance with Practice **E527**.

^B Refer to Practice **B914**.

^C For London Metal Exchange (LME) purposes, Special High Grade zinc must be 99.995 % minimum zinc content by difference, corresponding to LME Grade in ASTM Specification **B6**.

SUMMARY OF CHANGES

Committee B02 has identified the location of selected changes to this standard since the last issue (B6 – 18) that may impact the use of this standard. (Approved April 1, 2023.)

(1) Revised 7.1.

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