



## Standard Specification for Rolled Zinc<sup>1</sup>

This standard is issued under the fixed designation B 69; 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.

### 1. Scope

1.1 This specification covers two types of commercial rolled zinc as described in 1.2. It should be understood that the specification is general. Any closer limitations on permissible variations shall be a matter of agreement between the supplier (manufacturer) and the purchaser.

1.2 Rolled zinc is furnished in two types as follows:

1.2.1 *Type I* - Coils or sheets cut from strip (ribbon) rolled zinc and

1.2.2 *Type II* - Zinc plates such as boiler and hull plates produced by any rolling method.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

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 issue of each of the following reference documents shall be that which is current on the date the purchase order is accepted by the supplier (manufacturer).

2.2 *ASTM Standards:*

B 899 Terminology Relating to Non-ferrous Metals and Alloys<sup>2</sup>

E 8 Test Methods for Tension Testing of Metallic Materials<sup>3</sup>

E 18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials<sup>3</sup>

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications<sup>4</sup>

E 55 Practice for Sampling Wrought Nonferrous Metals and

Alloys for Determination of Chemical Composition<sup>5</sup>

E 60 Practice for Molecular Absorption Spectrometric Methods for Chemical Analysis of Metals, Ores, and Related Materials<sup>5</sup>

E 88 Practice for Sampling Nonferrous Metals and Alloys in Cast Form for Determination of Chemical Composition<sup>5</sup>

E 384 Test Method for Microhardness of Materials<sup>3</sup>

E 527 Practice for Numbering Metals and Alloys (UNS)<sup>6</sup>

E 536 Test Method for Chemical Analysis of Zinc and Zinc Alloys<sup>7</sup>

E 634 Practice for Sampling of Zinc and Zinc Alloys for Optical Emission Spectrometric Analysis<sup>7</sup>

### 3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *coiled sheet*—sheet coils with either slit or unslit edges.

3.2.2 *flat sheet*—sheet with sheared, slit, or sawed edges that has been flattened or leveled.

3.2.3 *plate*—rolled product, rectangular in cross section and form, or thickness of more than 0.125 in. (3.175 mm) with either untrimmed, sheared or sawed edges.

3.2.4 *rolled zinc, n*—wrought zinc or zinc alloy sheet, strip, or plate produced by hot and/or cold rolling.

3.2.5 *sheet*—rolled product, rectangular in cross section and form of thickness of 0.003 in. (0.076 mm) through 0.125 in. (3.175 mm) with sheared, slit, untrimmed or sawed edges.

### 4. Ordering Information

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

4.1.1 ASTM designation and year of issue,

4.1.2 Quantity (weight),

4.1.3 Name of material (rolled zinc),

4.1.4 Type of rolled zinc,

4.1.5 Dimensions (thickness, width, length, or coil),

4.1.6 Chemical composition/alloy, and

4.1.7 Others as agreed upon between the purchaser and the supplier.

<sup>1</sup> 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.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 02.04.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 03.01.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 14.02.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 03.05.

<sup>6</sup> *Annual Book of ASTM Standards*, Vol 01.01.

<sup>7</sup> *Annual Book of ASTM Standards*, Vol 03.06.

## 5. Materials and Manufacture

5.1 The supplier (manufacturer) shall ensure that each rolled zinc product:

- (a) conforms to the chemical composition specified in the purchase order,
- (b) is free of deleterious inclusions, and
- (c) is of satisfactory appearance.

The products covered by this specification shall be produced by casting, rolling, and other processes found in a mill product plant.

## 6. Chemical Composition

6.1 *Alloys*—The material shall conform to the chemical requirements prescribed in Table 1.

## 7. Mechanical Properties

7.1 The material shall conform to the mechanical property requirements in the longitudinal rolling direction in Table 2.

7.1.1 The testing wrought zinc for determination of tensile properties shall be conducted in accordance with Test Methods E 8, with the additional recommendation that the rate of separation of the heads during a test be maintained between 0.115 to 0.135 in/in/min (0.115 to 0.135 mm/mm/min) at room temperature (68 to 75°F (20 to 24°C) suggested).

7.1.2 The testing of zinc for hardness shall be made on a Rockwell superficial hardness tester set up for the 15T scale, in accordance with Test Methods E 18, or on a microhardness tester, in accordance with Test Method E 384. Zinc is a time dependent material; therefore, the dwell time of the major load shall be specified between supplier and customer, for example, 4 to 15 s.

## 8. Dimensions and Permissible Variations

8.1 *Thickness*—The permissible variations in thickness of rolled zinc shall be as specified in Table 3, along the length of the coil shall be made within 12 in. (305 mm) of each other, nor shall measurement in any one line across the width of the coil be used as a basis of rejection.

8.2 *Width*—The permissible variations in width of all types of rolled zinc shall be as specified in Table 4.

8.3 *Length*—The permissible variations in length in all types of rolled zinc shall be as follows: sheets, strips, and plates may be ordered to exact lengths with the following variations in length permitted,  $\pm 0.125$  in. (3.2 mm), or to a tolerance range agreed to by buyer and seller.

8.4 *Sidewise Bend and Curvature (Camber)*—Type I rolled zinc in lengths over 10 ft (3048 mm) shall not exhibit sidewise bend or curvature in excess of 1 in. (25.4 mm) in any length of

TABLE 1 Chemical Composition of Rolled Zinc Alloys<sup>A</sup>

Alloy (UNS) <sup>B</sup>	Cu	Pb	Fe	Cd	Ti	Al	Sn	Mn	Mg	Zn
Rolled Special High Grade Zinc (Z13004)	0.003 max	0.003 max	0.003 max	0.003 max	...	0.002 max	0.001 max	...	...	<sup>C</sup>
Commercially Pure Rolled Zinc (Z15006)	0.08 max	0.03 max	0.02 max	0.01 max	0.02 max	0.01 max	0.003 max	...	...	<sup>C</sup>
Zinc-Low Copper Rolled Zinc Alloy (Z40101)	0.08 to 0.040	0.01 max	0.01 max	0.005 max	0.02 max	0.01 max	0.003 max	...	...	<sup>C</sup>
Zinc-High Copper Rolled Zinc Alloy (Z40301)	0.50 to 1.0	0.01 max	0.01 max	0.005 max	0.04 max	0.01 max	0.003 max	...	...	<sup>C</sup>
Zinc-Low Copper-Titanium Rolled Zinc Alloy (Z41121)	0.08 to 0.49	0.01 max	0.01 max	0.005 max	0.05 to 0.18	0.01 max	0.003 max	...	...	<sup>C</sup>
Zinc-High Copper-Titanium Rolled Zinc Alloy (Z41321)	0.50 to 1.00	0.01 max	0.01 max	0.005 max	0.08 to 0.18	0.01 max	0.003 max	...	...	<sup>C</sup>
Zinc-Lead Rolled Zinc Alloy (ZZ20301)	0.005 max	0.10 max	0.01 max	0.01 max	0.02 max	0.002 max	...	...	...	<sup>C</sup>
Zinc-Lead-Cadmium Rolled Zinc Alloy (Z21721)	0.005 max	1.0 max	0.01 max	0.07 max	0.02 max	0.002 max	...	...	...	<sup>C</sup>
Zinc-Lead-Manganese Rolled Zinc Alloy (Z24311)	0.005 max	0.03-0.08	0.01 max	0.005 max	0.02 max	0.002 max	...	0.015 max	0.0015 max	<sup>C</sup>
Zinc-Aluminum Rolled Zinc Alloy	5.0 max	0.05 max	0.1 max	0.15 max	0.2 max	1.4 to 34.0	.003 max	...	0.10 max	<sup>C</sup>

<sup>A</sup>The following applies to all specified limits in this table: For purposes of determining conformance with this specification, the observed value or calculated value obtained from analysis shall be rounded off to the nearest unit in the last right-hand place of figures used in expressing the specified limit, in accordance with the rounding method of Practice E 29.

<sup>B</sup>UNS designations were established in accordance with Practice E 527

<sup>C</sup>Zinc: balance by difference.