



Designation: **B29—14 B29 – 19**

## Standard Specification for Refined Lead<sup>1</sup>

This standard is issued under the fixed designation B29; 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 specification covers refined lead in pig, block, or hog form.

1.2 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.

1.3 *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 Safety Data Sheet (MSDS)(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.*

1.4 *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.*

### 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:*<sup>2</sup>

[E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)

[E37 Test Methods for Chemical Analysis of Pig Lead](#)

[E88 Practice for Sampling Nonferrous Metals and Alloys in Cast Form for Determination of Chemical Composition](#)

### 3. Ordering Information

3.1 Orders for refined lead under this specification shall include the following information: [049e44f/astm-b29-19](#)

3.1.1 ASTM designation and year of issue,

3.1.2 Quantity (weight),

3.1.3 Name of material (for example, pure lead),

3.1.4 Size and shape (see Section 6),

3.1.5 Grade (see [Table 1](#) and accompanying notes), and

3.1.6 Certification or test report if specified ([Section 13](#)).

### 4. Materials and Manufacture

4.1 Lead shall be supplied in commercial standard forms or shapes requested by the purchaser in the following grades:

4.1.1 Low bismuth low silver pure lead,

4.1.2 Extra refined pure lead,

4.1.3 Refined pure lead,

4.1.4 Pure lead, and

4.1.5 Chemical copper lead.

<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 B02.02 on Refined Lead, Tin, Antimony, and Their Alloys.

Current edition approved ~~Oct. 1, 2014~~ Aug. 1, 2019. Published ~~December 2014~~ August 2019. Originally approved in 1919. Last previous edition approved in 2009/2014 as B29B29 – 14. – 03 (2009). DOI: 10.1520/B0029-14 DOI: 10.1520/B0029-19.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

**TABLE 1 Chemical Requirements<sup>A,B</sup>**

Grade	Composition (Weight Percent)			
	Low Bismuth Low Silver Pure Lead, max <sup>C</sup>	Refined Pure Lead, max <sup>D</sup>	Pure Lead, —max	Chemical- Copper Lead <sup>E</sup>
Sb	0.0005	0.0005	0.001	0.001 max
As	0.0005	0.0005	0.001	0.001 max
Sn	0.0005	0.0005	0.001	0.001 max
Sb As and Sn	...	...	0.002	0.002 max
Cu	0.0010	0.0010	0.0015	0.040–0.080
Ag	0.0010	0.0075	0.010	0.020 max
Bi	0.0015	0.025	0.05	0.025 max
Zn	0.0005	0.001	0.001	0.001 max
Te	0.0001	0.0002	...	...
Ni	0.0002	0.0002	0.0005	0.002 max
Fe	0.0002	0.001	0.001	0.002 max
Se	...	0.0005	0.001	0.001 max
S	...	0.001	0.002	0.001 max
Al	...	0.0005	0.0005	0.0005 max
Cd	...	0.0005	0.0005	0.0003 max
Lead (min) by difference	99.995	99.97	99.94	99.90
UNS Number	L50006	L50021	L50049	L51121

**TABLE 1 Chemical Requirements<sup>A,B</sup>**

Grade	Composition (Weight Percent)				
	Low Bismuth Low Silver Pure Lead, max <sup>C</sup>	Extra Refined Pure Lead, max <sup>D</sup>	Refined Pure Lead, max <sup>E</sup>	Pure Lead, max	Chemical- Copper Lead <sup>F</sup>
Sb	0.0005	0.0005	0.0005	0.001	0.001 max
As	0.0005	0.0005	0.0005	0.001	0.001 max
Sn	0.0005	0.0005	0.0005	0.001	0.001 max
Sb As and Sn	...	...	...	0.002	0.002 max
Cu	0.0010	0.0005	0.0010	0.0015	0.040–0.080
Ag	0.0010	0.0015	0.0075	0.010	0.020 max
Bi	0.0015	0.0075	0.025	0.05	0.025 max
Zn	0.0005	0.0002	0.001	0.001	0.001 max
Te	0.0001	0.0001	0.0002	...	...
Ni	0.0002	0.0002	0.0002	0.0005	0.002 max
Fe	0.0002	0.0005	0.001	0.001	0.002 max
Se	...	0.0005	0.0005	0.001	0.001 max
S	...	0.0005	0.001	0.002	0.001 max
Al	...	0.0005	0.0005	0.0005	0.0005 max
Cd	...	0.0002	0.0005	0.0005	0.0003 max
Lead (min) by difference	99.995	99.990	99.97	99.94	99.90
UNS Number	L50006	L50008	L50021	L50049	L51121

<sup>A</sup> The following applies to all specified limits in Table 1: For the purpose of determining conformance with this specification, an observed value obtained from the 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.

<sup>B</sup> By agreement between the purchaser and the supplier, analyses may be required and limits established for elements or compounds not specified in Table 1.

<sup>C</sup> This grade is intended for chemical applications where low silver and low bismuth contents are required. This is a common primary standard.

<sup>D</sup> This grade is intended for use where a 99.990 refined lead purity is required. It meets the requirements of BS/EN PB990R.

<sup>E</sup> This grade is intended for lead acid battery applications.

<sup>F</sup> This grade is intended for applications requiring corrosion protection and formability.

4.2 The grades of lead listed in 4.1.1 – 4.1.44.1.5 shall be produced by any smelting and refining process from ore or recycled materials to meet the chemical requirements of this specification.

## 5. Composition

5.1 The lead shall conform to the requirements prescribed in Table 1 and accompanying notes.

## 6. Sizes and Shapes

6.1 Pigs shall weigh up to a nominal 110 lb (50 kg).

6.2 Blocks or hogs shall be square or oblong and weigh up to 2530 lb (1150 kg).

## 7. Appearance

7.1 The lead shall be reasonably free from surface corrosion and adhering foreign material.