ASTM INTERNATIONAL

Designation: F1513 – 99 (Reapproved 2011)

Standard Specification for
Pure Aluminum (Unalloyed) Source Material for Electronic Thin Film Applications[1]

This standard is issued under the fixed designation F1513; 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.

1. Scope

1.1 This specification covers pure aluminum metal (unalloyed) for use in evaporation sources and sputtering targets. This material is intended as a raw material for electronic applications. The material is used as-supplied in some cases (for example, as *e*-beam evaporation sources). In other instances it may be remelted, alloyed, cast and processed by the purchaser to make finished products (for example, sputtering targets).

1.2 This specification sets purity grade levels, physical attributes, analytical methods, and packaging.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards:*[2]
D1971 Practices for Digestion of Water Samples for Determination of Metals by Flame Atomic Absorption, Graphite Furnace Atomic Absorption, Plasma Emission Spectroscopy, or Plasma Mass Spectrometry

3. Terminology

3.1 *material lot*—material melted and cast from one crucible charge.

4. Classification

4.1 Grades of aluminum are defined in Table 1. Impurity contents are reported in parts per million by weight (wt ppm).

4.2 Purity and total metallic impurity levels are based upon elements listed in Table 2.

5. Ordering Information

5.1 Orders for pure aluminum source material shall include the following:

5.1.1 Grade (4.1),

5.1.2 Configuration (8.1 and 8.2),

5.1.3 Whether or not certification is required (12.1), and

5.1.4 Whether or not a sample representative of the finished product is required to be provided by the supplier to the purchaser.

6. Impurities

6.1 The minimum suite of metallic impurity elements to be analyzed is defined in Table 2. Acceptable analysis methods and detection limits are specified in Section 11. Elements not detected will be counted and reported as present at the detection limit. Additional elements may be analyzed and reported, as agreed upon between the supplier and the purchaser, but these shall not be counted in defining the grade designation.

6.2 Nonmetallic elements to be analyzed and reported are *C, H, O, N*, and *S* .

6.3 Acceptable limits and analytical techniques for particular elements in critical applications shall be as agreed upon between the supplier and the purchaser.

6.4 Fluorine and chlorine may be important impurities in some applications. Acceptable limits and analytical techniques shall be agreed upon between the supplier and the purchaser.

7. Grain Size

7.1 Grain size and measurement method for grain size shall be agreed upon between the supplier and the purchaser.

8. Dimensions

8.1 Each product shall conform to an appropriate engineering drawing, as agreed upon between the supplier and the purchaser.

8.2 Nominal dimensions, tolerances, and other attributes shall be agreed upon between the supplier and the purchaser.