



Designation: E1335 – 08 (Reapproved 2017)

Standard Test Methods for Determination of Gold in Bullion by Fire Assay Cupellation Analysis¹

This standard is issued under the fixed designation E1335; 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 These test methods cover cupellation analysis of bullion having chemical compositions within the following limits:

| Element | Concentration Range, % |
|------------------------|-----------------------------|
| Gold | 0.5 to 4.0 and 20.0 to 99.8 |
| Silver | 1.0 to 99.5 |
| Total gold plus silver | 75.0 to 100.0 |

1.2 These test methods appear in the following order:

| | Sections |
|----------------------|----------|
| 20.0 % – 99.0 % gold | 10 – 17 |
| 0.5 % – 4.0 % gold | 18 – 23 |
| 98.9 % – 99.8 % gold | 24 – 30 |

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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 establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific safety hazards, see Section 8.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

B562 Specification for Refined Gold

¹ These test methods are under the jurisdiction of ASTM Committee E01 on Analytical Chemistry for Metals, Ores, and Related Materials and are the direct responsibility of Subcommittee E01.05 on Cu, Pb, Zn, Cd, Sn, Be, Precious Metals, their Alloys, and Related Metals.

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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.

E50 Practices for Apparatus, Reagents, and Safety Considerations for Chemical Analysis of Metals, Ores, and Related Materials

E135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials

E173 Practice for Conducting Interlaboratory Studies of Methods for Chemical Analysis of Metals (Withdrawn 1998)³

E1601 Practice for Conducting an Interlaboratory Study to Evaluate the Performance of an Analytical Method

3. Terminology

3.1 *Definitions*—For definitions of terms used in these test methods, refer to Terminology **E135**.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *anneal*—a thermal treatment to change the properties or grain structure of the product.

3.2.2 *cupel*—a small, shallow, porous cup, usually made of bone ash or from magnesium oxide.

3.2.3 *cupellation*—an oxidizing fusion of lead, sample base metals and gold, and silver in a cupel. The lead is oxidized to litharge (PbO); other base metals which may be present, such as copper and tin, are oxidized as well. The oxidized metals are absorbed into the cupel, leaving a gold and silver doré bead on the cupel surface.

3.2.4 *doré bead*—a gold and silver alloy bead which results from cupellation.

3.2.5 *inquartation*—the addition of silver to an assay sample to enable parting.

3.2.6 *part*—the separation of silver from gold by selectively dissolving the silver in acid, usually nitric acid (HNO₃).

3.2.7 *proof*—a synthetic standard having a composition similar to the test sample.

3.2.8 *proof correction*—analyzing the proof concurrently with the test sample and using the results to correct the final assay.

³ The last approved version of this historical standard is referenced on www.astm.org.