



Designation: E 1335 – 96 (Reapproved 2000)^{ε1}

Standard Test Methods for Determination of Gold in Bullion by Cupellation¹

This standard is issued under the fixed designation E 1335; 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.

ε¹ NOTE—Editorial corrections were made throughout in November 2000.

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 99.0
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
10-1620.0–99.0 % gold	
0.5–4.0 % gold	17-21

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 establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific safety hazards, see Section 9.

2. Referenced Documents

2.1 ASTM Standards:

B 562 Specification for Refined Gold²

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications³

E 50 Practices for Apparatus, Reagents, and Safety Precautions for Chemical Analysis of Metals⁴

E 135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials⁴

E 173 Practice for Conducting Interlaboratory Studies of Methods for Chemical Analysis of Metals⁵

¹ These test methods are under the jurisdiction of ASTM Committee E-1 on Analytical Chemistry for Metals, Ores, and Related Materials and are the direct responsibility of Subcommittee E01.03 on Precious Metals.

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² Annual Book of ASTM Standards, Vol 02.04.

³ Annual Book of ASTM Standards, Vol 14.02.

⁴ Annual Book of ASTM Standards, Vol 03.05.

⁵ Annual Book of ASTM Standards, Vol 03.06.

E 882 Guide for Accountability and Quality Control in the Chemical Analysis Laboratory⁶

3. Terminology

3.1 Definitions:

3.1.1 *annealing*—a thermal treatment to change the properties or grain structure of the product.

3.1.2 *cupel*—a small, shallow, porous cup, usually made of bone ash or magnesite.

3.1.3 *cupellation*—an oxidizing fusion of lead, 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.

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

3.1.5 *inquartation*—the addition of silver to an assay sample to facilitate parting.

3.1.6 *parting*—separating silver from gold by selectively dissolving the silver in acid, usually nitric acid.

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

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

3.1.9 For definitions of other terms, refer to Terminology E 135.

4. Significance and Use

4.1 These test methods are intended for the determination of the gold content of gold and silver bullion. It is assumed that all who use these test methods are trained assayers capable of performing common fire assay procedures skillfully and safely. It is expected that work will be performed in a properly equipped laboratory.

⁶ Supporting data are available from ASTM Headquarters. Request RR:E01-1010.