



Standard Practice for Fire Assay Silver Corrections in Analysis of Metal Bearing Ores, Concentrates, and Related Metallurgical Materials by Silver Determination in Slags and Cupels¹

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1. Scope

1.1 This practice covers the determination of silver corrections for fire assay of metal bearing ores, concentrates and related metallurgical materials using the spent slags and cupels from the fire assay process, by gravimetry and atomic absorption spectrophotometry.

1.2 The test methods appear in the following order:

	Sections
Gravimetric Method	10-11
Atomic Absorption Method	12-13

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.* (See Practices E 50 and ISO Guide 35: 1989.)

2. Referenced Documents

2.1 ASTM Standards:

D 1193 Specification for Reagent Water²

E 29 Practice 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 882 Guide for Accountability and Quality Control in the Chemical Analysis Laboratory⁴

E 1024 Guide for Chemical Analysis of Metals and Metal Bearing Ores by Flame Atomic Absorption Spectrophotometry⁴

E 1335 Test Methods for Determination of Gold in Bullion by Cupellation⁴

2.2 Other Documents:

ISO Guide 35-1989 Certification of Reference Materials—General and Statistical Principles⁵

ISO 10378:1994 Copper Sulfide Concentrates—Determination of Gold and Silver Contents—Fire Assay Gravimetric and Atomic Absorption Spectrometric Method. Bugbee, Edward, *Textbook of Fire Assaying*; Smith, E.A., *The Sampling and Assay of Precious Metals*⁶

3. Terminology

3.1 *Definitions*—For definitions of terms used in this Practice, refer to Terminology E 135.

4. Summary of Practice

4.1 In the process of fire assay fusion slags and cupels are collected, retreated and silver is determined in them to provide a correction value for the fire assay determination of silver (see Guide E 1024, Test Method E 1335, ISO 10378, Bugbee, Smith).

5. Significance and Use

5.1 These methods are primarily intended to be used for the determination of silver correction in the fire assay silver determination. Silver assays are determined by fire assay for the purpose of metallurgical exchange between seller and buyer.

5.2 It is assumed that all who use this method will be trained analysts capable of performing skillfully and safely. It is expected that work will be performed in a properly equipped laboratory under appropriate quality control practices such as those described in Guide E 882.

6. Apparatus

6.1 *Analytical Balance*, capable of weighing to 0.01 g.

6.2 *Analytical Balance*, capable of weighing to 0.001 mg.

6.3 *Assay Furnace*, capable of temperatures up to 1100°C, accurate to $\pm 5^\circ\text{C}$.

6.4 *Atomic Absorption Spectrophotometry*, AAS.

¹ This practice is under the jurisdiction of ASTM Committee E01 on Analytical Chemistry for Metals, Ores and Related Materials and is the direct responsibility of Subcommittee E01.02 on Ores, Concentrates, and Related Metallurgical Materials. Current edition approved June 10, 2003. Published July 2003.

² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Annual Book of ASTM Standards*, Vol 14.02.

⁴ *Annual Book of ASTM Standards*, Vol 03.05

⁵ Bugbee, E. E., *A Textbook of Fire Assaying*, John Wiley and Sons, Inc., Third Ed., 1946.

⁶ Smith, E. A., *The Sampling and Assay of the Precious Metals*, Charles Griffin and Co., Ltd., Second Ed., 1947.