



Standard Practice for Drying of Metal Bearing Ores, Concentrates, and Related Metallurgical Materials for the Determination of Mercury¹

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1. Scope

1.1 This practice covers the sample drying step for the determination of mercury in ores, concentrates, and related metallurgical materials.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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 establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

[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](#)

[E877 Practice for Sampling and Sample Preparation of Iron Ores and Related Materials for Determination of Chemical Composition and Physical Properties](#)

[E882 Guide for Accountability and Quality Control in the Chemical Analysis Laboratory](#)

2.2 Other Documents:³

[ISO 9599 Copper, Lead, and Zinc Sulfide Concentrates—Determination of Hygroscopic Moisture in the Analysis Sample-Gravimetric Method](#)

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.

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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.

³ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva 20, Switzerland, <http://www.iso.ch>.

[ISO 12743 Copper, Lead, and Zinc Sulfide Concentrates—Sampling Procedures for the Determination of Metal and Moisture Content](#)

[ISO 10251 Copper, Lead, and Zinc Sulfide Concentrates—Determination of Mass Loss of Bulk Material on Drying](#)

3. Terminology

3.1 *Definitions*—For definitions of terms used in this Practice, refer to Terminology [E135](#).

4. Summary of Practice

4.1 Test samples for be used for mercury determination are dried at 60 °C.

5. Significance and Use

5.1 This practice is primarily to be used to dry samples for the determination of mercury test portions, and it should not be used for the determination of sample moisture content. Most sample preparation methods prescribe drying the samples at 105 °C, until a constant mass is obtained. The moisture content is determined as the percentage mass loss on drying. However, since mercury can volatilize from samples at the normally utilized temperature, samples that are to be used for mercury determination shall be dried at 60 °C (see Practice [E877](#), ISO 9599, ISO 12743, and ISO 10251).

5.2 It is assumed that all who use this practice 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 [E882](#).

6. Apparatus

6.1 *Drying Oven*, ventilated with forced circulation of air, regulated at a temperature of 60 °C ± 2 °C.

6.2 *Top-Loading Balance*, minimum precision of 0.01 %.

6.3 *Drying Trays*, capable of holding at least a 1 kg sample, spread no thicker than 3 cm deep.

7. Hazards

7.1 For precautions to be observed in this practice, refer to Practices [E50](#).

7.2 Mercury can form vapors at low temperatures. Mercury vapors can be hazardous to your health. Perform method in ventilated areas or wear special health protection equipment.

8. Procedure

8.1 Remove a representative laboratory sample, 500 g minimum, from the gross sample.

8.2 Place the laboratory sample into a drying tray and level to approximately 3 cm.

8.3 Weigh to within 0.01 g on the top loading balance.

8.4 Place the tray and test portion into the drying oven and dry at 60 °C for at least 16 h.

NOTE 1—Once the drying period has commenced, no other wet samples

should be placed into the same drying oven.

8.5 Remove the tray and laboratory sample from the oven and weigh. Dry the tray and laboratory sample for an additional 4 h. Remove from the oven and weigh again. Repeat this step as necessary until two successive determinations of the mass of the tray plus dried laboratory sample agree within 0.2 % percent relative. (See ISO 9599, ISO 12743, and ISO 10251.)

NOTE 2—Any crusts or cakes that form on the laboratory sample after initial drying should be broken up to enable easier release of moisture.

8.6 Prepare the dried test sample for the determination of mercury according to the appropriate technique.

9. Keywords

9.1 drying; mercury; moisture; sample preparation

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