



Designation: ~~E1916-97 (Reapproved 2004)~~ Designation: E1916 - 11

Standard Guide for Identification and/or Segregation of Mixed Lots of Metals¹

This standard is issued under the fixed designation E1916; 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 guide covers the identification or segregation, or both, of mixed metal lots under plant conditions using trained plant personnel.

1.2 The identification is not intended to have the accuracy and reliability of procedures performed in a laboratory using laboratory equipment under optimum conditions, and performed by trained chemists or technicians. The identification is not intended to establish whether a given piece or lot of metal meets specifications.

1.3 Segregation of certain metal combinations is not always possible with procedures provided in this guide and can be subject to errors.

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.*

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

E977 Practice for Thermoelectric Sorting of Electrically Conductive Materials

2.2 Other ASTM Documents and Publications:

STP98 Symposium for Rapid Identification of Metal, June 28, 1949

3. Significance and Use

3.1 Equipment and procedures described in this guide are comparative methods and are intended for identification or segregation, or both, of pieces or lots of metals that were mixed or lost their identity during certain manufacturing operations. It is presumed that all pieces or lots of metal have been previously checked and did meet applicable specifications.

3.2 The equipment and procedures described in this guide may also be suitable for identifying or segregating, or both, scrap metals. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology E135

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5. Equipment

5.1 *Optical Atomic Emission Spectroscopic or Spectrometric Equipment:*

5.1.1 Bench type spectrometers generally with two sample tables and a split viewing field where the spectrum of the unknown

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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.

piece can be visually and directly compared to that of a piece of identified metal.

4.1.2 Mobile spectrometric equipment with a remote sampling device. Two types of such units are described in 4.1.2.1 and 4.1.2.2.

4.1.2.1 Units where the particles removed by an arc or spark in the remote sampling device are conveyed to the main unit in a stream of inert gas and analyzed in the unit in a conventional way with an arc, spark, or plasma.

4.1.2.2 Units where the light generated from the arc or spark at the remote sampling device is conveyed to the main unit with fiberoptics, where it is analyzed in the conventional way.

(a) These units generally are programmed to produce an output that: (1) shows the designation of the alloy, (2) gives the approximate elemental composition of the alloy, or (3) gives a “go” or “no-go” indication based on parameters programmed by the operator.

(b) These units require careful calibration and depend on the quality and range of the reference materials used for the calibration.

4.2

5.2 X-ray Fluorescence Spectrometric Equipment:

5.2.1 The portable and mobile units are supplied with a source of radiation that can be an X-ray tube or radioactive isotopes, generally a mixture of two or more isotopes to provide a larger spectrum coverage.

5.2.1.1 These units are generally programmed to produce an output that: (1) shows the designation of the alloy, (2) gives the approximate elemental composition of the alloy, or (3) gives a “go” or “no-go” indication based on parameters programmed by the operator (see 4.1.2.2(b)).

4.3

5.3 Miscellaneous Sorting Instruments:

5.3.1 All instruments based on comparative methods require careful calibration with appropriate reference materials.

5.3.2 Thermoelectric Comparators —Instruments are based on the Seeback Effect. These instruments are not for identification of alloys, but for segregation of one metal alloy from another (See Practice E977 and Materials Research and Standards).

4.3.3

5.3.3 Eddy-current Instrumentation —These instruments are not for identification of alloys, but for segregation of identical pieces of metal of identical shape and size based on their metallurgical condition or alloy composition under certain circumstances.

4.4

5.4 Non-Instrumental Sorting Equipment:

4.4.1

5.4.1 Grinder—High speed bench or portable grindstones are frequently used for rough identification and sorting of metals by observation of the shape and color of the generated spark.

4.4.2

5.4.2 Drill Press—for identification of drill cuttings by comparison to a master set.

4.4.3

5.4.3 Magnet—for separation of magnetic and non-magnetic alloys.

4.4.4

5.4.4 Laboratory Equipment for Chemical Spot Checks—As required, generally eye-droppers, small reagent bottles, spot plates, etc., are used. All of the laboratory equipment used, such as plastic bottles, eye-droppers, etc., shall be unbreakable.

5:

6. Reagents

6.1 Chemical reagents are required if chemical spot checks are used in the identification of metal alloys, or for segregation of one alloy or one alloy group from another alloy or alloy group. The list and makeup of the reagents is given in procedures used. (Several procedures are provided in the ASM Metals Handbook, Handbook³ and the Spot Tests in Inorganic Analysis.⁴ the Spot Tests in Inorganic Analysis.)

6.2 There are several Spot-test kits on the market that supply the necessary reagents.⁵ STP-98, and Materials Research and Standards³).

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³ Materials Research and Standards, 10(11), November 1970, pp. 8-18: ASM Metals Handbook Series, Vol 11 – Failure Analysis and Prevention, available from ASM International, 9639 Kinsman Road, Materials Park, OH 44073-0002, www.asminternational.org.

⁴ ASM Metals Handbook, Vol 11, 8th Edition, available from ASM International, Materials Park, OH 44073-0002.

⁴ Fiegel, F., Spot Tests in Inorganic Analysis, 6th Ed., 1988, Elsevier Science, 655 Avenue of the Americas, New York, NY 10010, www.elsevierdirect.com.

⁵ Fiegel, F., Spot Tests in Inorganic Analysis, 5th Ed., Elsevier Science, 655 Avenue of the Americas, New York, NY 10010.

⁵ Spot-test kits are available from Koslow Scientific Co., 172 Walkers Lane, Englewood, NJ 07631, www.koslow.com.