



Designation: E 88 – 91 (Reapproved 1996)

# Standard Practice for Sampling Nonferrous Metals and Alloys in Cast Form for Determination of Chemical Composition<sup>1</sup>

This standard is issued under the fixed designation E 88; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice covers the sampling, for the determination of chemical composition (Note 1) of nonferrous metals and alloys in cast form for remelting or mechanical working.

1.1.1 Refer to Practice E 255 for copper and copper alloys.

NOTE 1—The selection of correct portions of material and the preparation of a representative sample from such portions are necessary prerequisites to every analysis, the analysis being of no value unless the sample actually represents the average composition of the material from which it was selected.

1.2 When agreed upon between the purchaser and the manufacturer, the heat sample and analysis may be accepted as representative of the composition of the metal. In such cases, each lot must be properly identified with the heats from which it was made.

1.3 This practice is intended to cover the general principles of sampling applicable to nonferrous metals in cast form and is not intended to supersede or replace existing specification requirements for sampling of a particular material.

1.4 The values stated in inch-pound units are to be regarded as the standard.

1.5 *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:*

E 255 Practice for Sampling Copper and Copper Alloys for Determination of Chemical Composition<sup>2</sup>

## 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *portion*—the term “portion” is used in this practice to designate the selected ingots, slabs, etc., from which the sample is prepared.

3.1.2 *sample*—the term “sample” is used in this practice to

designate the final form of the material submitted for analysis (drillings, millings, etc.). A representative sample may best be defined as a small part containing the same components in the same proportions as they occur in the relatively large mass of the original lot or lots of material.

## 4. Selection of Portion

4.1 A portion representative of the total shipment or lot shall be taken for sampling. This portion shall be so selected that a minimum wastage of material is incurred, consistent with the required accuracy in sampling.

4.2 The number of ingots, slabs, etc., selected to constitute this portion shall comply with the requirements of the ASTM specifications covering that particular material.

## 5. Preparation of Sample

5.1 Machinable materials shall be sampled by drilling, milling, or sawing. Materials that are too difficult to machine may be ground or crushed.

5.2 Machinable materials in form of bar, billet, ingot, slab, cake, etc., shall be sampled by drilling five holes approximately 1.27 cm ( $\frac{1}{2}$  in.) in diameter at points equally spaced between the ends of the pieces along a diagonal line. The drilling shall be through the total thickness and, if necessary, drilled from both directions, top and bottom.

5.3 Alternatively, any of the forms mentioned in 5.2 may be milled or sawed at similar points through a section from side to center or through an entire cross-section of the piece.

5.4 Materials too difficult to be machined, commonly in lump form, shall be reduced in size by passing through a jaw or roll crusher or broken in a mortar to a particle size that will pass a No. 14 (1.40-mm) sieve.

## 6. Details of Sampling

6.1 The ingots, slabs, etc., selected for the preparation of the sample for chemical analysis, when testing for compliance with specifications, shall be cleaned, if necessary, to remove scale, dirt, oil, grease, etc.

6.2 The saw, drills, cutter, or other tools used for sampling shall be thoroughly cleaned prior to use. Depth of cut, speed of cutting, etc., shall be so regulated that excessive heating and consequent oxidation of the sample shall be avoided.

6.3 The chips obtained by milling, drilling, etc., should preferably be uniformly small in size. Very fine dust-like

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee E-1 on Analytical Chemistry for Metals, Ores, and Related Materials and is the direct responsibility of Subcommittee E01.05 on Zn, Sn, Pb, Cd, Be, and Other Metals.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 03.05.