



Designation: **E55–11 (Reapproved 2017) E55 – 11 (Reapproved 2022)^{ε1}**

Standard Practice for Sampling Wrought Nonferrous Metals and Alloys for Determination of Chemical Composition¹

This standard is issued under the fixed designation E55; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

^{ε1} NOTE—Editorial changes were made throughout in December 2022.

1. Scope

1.1 This practice covers the sampling, for the determination of chemical composition (**Note 1**), of nonferrous metals and alloys that have been reduced to their final form by mechanical working; that is, by such means as rolling, drawing, and extruding.

1.1.1 Refer to Practice **E255** 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 In special cases, when agreed upon by the purchaser and the manufacturer, the heat analysis may be accepted as representative of the composition of the finished product. In such cases, the identity of each heat of metal should be maintained through each stage of the manufacturing process to the final form. This method of sampling is not intended to apply under these conditions.

1.3 **Units**—The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards*:²

E135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials

E255 Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition

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 **E01.05** on Cu, Pb, Zn, Cd, Sn, Be, Precious Metals, their Alloys, and Related Metals.

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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. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, see Terminology E135.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *portion, n*—~~the~~this term “portion” is used in this practice to designate the selected pieces of material from which the sample is prepared.

3.2.2 *sample, n*—~~the~~this term “sample” is used in this practice to designate the final form of the material submitted for analysis (drillings, millings, etc.). A representative sample is defined as a small part containing the same ingredients in the same proportions as they occur in the original lot or lots of material.

4. Selection of Portion

4.1 A portion representative of the total shipment or order shall be selected at random for the final sample. These portions shall be so taken that minimum wastage of material is incurred, consistent with the required accuracy in sampling.

4.2 Quantities of material withdrawn for sampling shall comply with the requirements of the ASTM standard covering that particular material.

4.3 When portions are to be withdrawn from finished material, it is recommended that arrangements be made for excess length or amount of material to provide the necessary samples for inspection purposes.

4.4 Broken tension test specimens may be used conveniently in place of specially selected portions when such practice is agreeable to the purchaser.

5. Preparation of Sample

5.1 Samples of material too thin to be handled conveniently for machining (drilling, milling, etc.) may be prepared by clipping. Usually, clippings would be limited to material thinner than 1.02 mm (0.040 in.). Drillings, sawings, or millings shall be taken from material of heavier gage.

5.2 Rods, bars, plates, shapes, tubes, and pipes shall be sampled by milling the entire cross-section or by drilling entirely through the material at several points along ~~their~~the length. Sheets and strips may be folded once or more, by bringing the ends together and closing the bend; the portion may then be milled on the inside sheared edges or drilled entirely through the flat surface. For the lighter gages, several portions may be ~~taken and~~ stacked together before folding.

5.3 Equal weights of drillings, millings, sawings, or clippings shall be taken from each piece representing the lot of material, and these shall be combined into one sample and thoroughly mixed.

5.4 ~~In some cases~~ Sometimes, a complete section of the selected portions may be required for spectrometric examination. Sections may therefore be taken and properly marked before using the remainder of the portions for sampling operations; such sections may be supplied, together with the milled, drilled, or sawed sample, at the request of the purchaser.

6. Details of Sampling

6.1 The portions selected for the preparation of samples for chemical analysis, when testing for conformance with specifications, shall be clean and free from scale, dirt, oil, grease, etc. If necessary, the portions may be cleaned in ethyl ether or acetone, rinsed in ethanol, and dried before sampling. Scale and dirt may be removed by suitable mechanical or chemical treatment of the metal; if chemical methods of cleaning are used, however, such operations should not alter the metal surface in any way. When testing for pounds of metal contained, as in the sale of scrap, these provisions do not apply as a general rule.

6.2 The saw, drill, 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.