



Designation: E 32 – 86 (Reapproved 1996)^{€1}

Standard Practices for Sampling Ferrous Alloys and Steel Additives for Determination of Chemical Composition¹

This standard is issued under the fixed designation E 32; 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 (€) indicates an editorial change since the last revision or reapproval.

€¹ NOTE—Keywords were added in June 1996.

1. Scope

1.1 These practices include procedures for the sampling of the various ferrous alloys and steel additives, either before or after shipment from the plants of the manufacturers. They are designed to give results representative of each lot that will be comparable with the manufacturer's guaranteed analysis for the same lot. For check analysis, the purchaser may use any sampling procedure he desires, but the analytical results obtained on such samples shall not be a basis for complaint or rejection, unless the procedure followed is of an accuracy equivalent to that prescribed in these methods.

1.2 In sampling ferrous alloys and steel additives, serious errors often occur from contamination of the samples by iron from the sampling appliances. Therefore, special precautions should be observed to avoid this source of error. Metallic iron may be removed with a magnet from nonmagnetic alloys; its estimation in other alloys requires special analytical procedures (Note 1). To avoid this error, parts of crushers and pulverizing equipment contacting the samples shall be of steel or other material showing a high resistance to abrasion of the type involved.

NOTE 1—Metallic iron in ferrochromium and ferrosilicon may be determined as follows: Transfer 5 g of the sample of alloy to a 150-mL beaker, add 25 mL of HNO₃ (1 + 3), cover, boil 5 min, filter into a 250-mL beaker, and wash with hot water. Add NH₄OH in slight excess, heat to boiling, filter, and wash with hot water. Dissolve the precipitate on the paper with a minimum quantity of hot HCl (1 + 2), wash the filter with hot water, and titrate the iron by a standard procedure such as that described in Methods E 38.

1.3 The values stated in SI units are to be regarded as the standard. The inch-pound values in parenthesis are given for information only.

1.4 *This standard does not purport to address all of the safety problems, 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 applica-*

bility of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:

E 11 Specification for Wire-Cloth Sieves for Testing Purposes²

E 38 Methods for Chemical Analysis of Nickel-Chromium and Nickel-Chromium-Iron Alloys³

3. Significance and Use

3.1 These practices for the sampling of metals and alloys are primarily intended to test such materials for compliance with compositional specifications. It is assumed that all who use these methods will be trained samplers capable of performing common sampling procedures skillfully and safely.

4. Apparatus for Preparing Samples

4.1 The following equipment is required for the preparation of analytical samples of ferrous alloys:

4.1.1 *Crusher*—A strongly built jaw crusher capable of rapidly crushing 100-mm (4-in.) lumps to sizes 6.4 mm (¼ in.) and smaller shall be used. The crushing plates of this machine shall be made of a hard and abrasion-resistant steel, such as manganese steel or a properly hardened alloy or hypereutectoid carbon steel.

4.1.2 *Roll Crusher*—A roll crusher, the rolls of which are fitted with tires of hardened and tempered chromium steel to avoid iron contamination of the sample, shall be used to reduce the 6.4-mm (¼-in.) pieces to a particle size that will pass the No. 10 (2.00-mm) sieve and be retained on the No. 20 (850-µm) sieve.

4.1.3 *Riffles*—Riffles, also designated as Jones dividers, are usually preferable to the use of hand methods for dividing samples. Riffles with openings of 12.7, 25.4, 50.8, and 76.2 mm (½, 1, 2, and 3 in.) should be available; the ½-in. riffle to be used for samples containing particles up to 3.2 mm (⅛ in.) in size, the 1-in. riffle for samples containing particles up to 9.6 mm (⅜ in.), the 2-in. for samples containing particles up to 19.1 mm (¾ in.), and the 3-in. for samples containing particles

¹ These practices are under the jurisdiction of ASTM Committee E-1 on Analytical Chemistry for Metals, Ores, and Related Materials and are the direct responsibility of Subcommittee E01.01 on Iron, Steel, and Ferrous Alloys.

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² *Annual Book of ASTM Standards*, Vol 14.02.

³ Discontinued; see 1989 *Annual Book of ASTM Standards*, Vol 03.05.