



Standard Specification for Ferrotungsten¹

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1. Scope

1.1 This specification covers four grades of ferrotungsten.

2. Referenced Documents

2.1 *ASTM Standards:*

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications²

E 31 Methods for Chemical Analysis of Ferroalloys³

E 32 Practices for Sampling Ferroalloys and Steel Additives for Determination of Chemical Composition³

3. Ordering Information

3.1 Orders for material under this specification shall include the following information:

3.1.1 Quantity,

3.1.2 Name of material,

3.1.3 ASTM designation and year of issue,

3.1.4 Grade,

3.1.5 Sizing, and

3.1.6 Requirements for packaging, analysis reports, and so forth, as appropriate.

3.2 Although ferrotungsten is ordered by total net weight, the customary basis of payment is per pound of contained tungsten.

4. Chemical Composition

4.1 The various grades shall conform to the requirements as to chemical composition specified in Table 1 and Table 2.

4.2 The manufacturer shall furnish an analysis of each shipment showing the elements specified in Table 1.

4.3 The values shown in Table 2 are expected maximums. Upon the request of the purchaser, the manufacturer shall furnish an analysis for any of these elements on a cumulative basis over a period mutually agreed upon between the manufacturer and the purchaser.

5. Chemical Analysis

5.1 The chemical analysis of the material shall be made in accordance with the procedure for ferrotungsten as described in Methods E 31 or alternative methods which will yield equivalent results.

5.2 If alternative methods of analysis are used, in case of discrepancy, Methods E 31 shall be used for referee.

5.3 Where no method is given in Methods E 31 for the analysis for a particular element, the analysis shall be made in accordance with a procedure agreed upon between the manufacturer and the purchaser.

6. Size

6.1 The various grades are available in the sizes listed in Table 3.

6.2 The ferrotungsten is available in various sizes such as $\frac{1}{4}$ by down (5 % maximum over $\frac{1}{4}$ in., 20 % maximum under 70 mesh), or $\frac{3}{8}$ by down (5 % maximum over $\frac{3}{8}$ in., 20 % maximum under 70 mesh). The size shall be specified on the order.

7. Sampling

7.1 The material shall be sampled in accordance with Practices E 32.

7.2 Other methods of sampling mutually agreed upon by the manufacturer and the purchaser may be used; however, in case of discrepancy, Practices E 32 shall be used for referee.

8. Inspection

8.1 The manufacturer shall afford the inspector representing the purchaser all reasonable facilities, without charge, to satisfy him that the material is being furnished in accordance with this specification.

9. Rejection

9.1 Any claims or rejections shall be made to the manufacturer within 45 days from receipt of material by the purchaser.

¹ This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.18 on Castings.

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

³ *Annual Book of ASTM Standards*, Vol 03.05.

TABLE 1 Chemical Requirements^{A,B}

Grade	Primary Compositions, max, %, Unless Otherwise Shown						
	Tungsten	Carbon	Phosphorus	Sulfur	Silicon	Molybdenum	Aluminum
A	85.0–95.0	0.050	0.010	0.020	0.10	0.20	0.10
B	75.0–85.0	0.10	0.020	0.020	0.50	0.35	0.10
C	75.0–85.0	0.60	0.060	0.050	1.0	1.0	...
D	75.0–85.0	0.60	0.060	0.050	1.0	3.0	...

^A For the purposes of determining conformance with this specification, the reported analysis shall be rounded to the nearest unit in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding method of Practice E 29.

^B For purposes of determining the tungsten content of any shipment, tungsten shall be reported to the nearest 0.1 %, applying the same rounding procedure as prescribed in Footnote A.

TABLE 2 Supplementary Chemical Requirements^{A,B}

	Manganese	Copper	Nickel	Arsenic	Antimony	Tin	Bismuth	Total: Arsenic, Antimony, Tin	Total: Arsenic Antimony, Tin, Bismuth
A	0.10	0.50	0.05	0.010	0.010	0.010	0.010	...	0.040
B	0.30	0.07	0.05	0.020	0.020	0.020	0.030	...	0.090
C	0.75	0.10	...	0.10	0.080	0.10	...	0.20	...
D	0.75	0.10	...	0.10	0.080	0.10	...	0.20	...

^A See Footnote A of Table 1.

^B The composition of the ferrotungsten shall be within these limits; however, an analysis of each lot is not required. The manufacturer shall supply upon request the results of an analysis for these elements on a cumulative basis over a period mutually agreed upon between the manufacturer and the purchaser.

TABLE 3 Size Tolerance

Size	Tolerance
¼ in. (6.3 mm) by down	5 % max retained on 6.3 mm (1¼ in.) sieve

10. Product Marking

10.1 When the shipment is made in bulk it shall be accompanied by appropriate identification showing the material, the grade designation, the ASTM designation, the size, the lot number, and the name, brand, or trademark of the manufacturer.

10.2 When the shipment is made in containers, each shall be marked on the container or on a label or tag attached thereto. The marking shall show the material, the grade designation, the ASTM designation, the size, the lot number, gross, tare, and net weight, and the name, brand, or trademark of the manufacturer.

11. Packaging and Package Marking

11.1 The ferrotungsten shall be packaged in sound containers, or shipped in bulk, in such a manner that none of the product is lost or contaminated in shipment.

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