



# Standard Specification for Ferrotitanium<sup>1</sup>

This standard is issued under the fixed designation A 324; 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 approval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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

## 1. Scope

1.1 This specification covers four grades of ferrotitanium, designated A, B, C, and D.

## 2. Referenced Documents

### 2.1 ASTM Standards:

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications<sup>2</sup>

E 32 Practices for Sampling Ferrous Alloys and Steel Additives for Determination of Chemical Composition<sup>3</sup>

## 3. Ordering Information

3.1 The material furnished under this specification shall be crushed to the specified size, and mixed before packaging, so that the quality in each package is uniform with the lot.

3.2 The reported percentage of titanium as obtained by chemical analysis shall be used to determine the billing of the material to the purchaser.

## 4. Chemical Composition

4.1 The various grades shall conform to the requirements as to chemical composition prescribed in Table 1, Table 2, Table 3, and Table 4.

## 5. Chemical Analysis

5.1 The chemical analysis of the material shall be made in accordance with a procedure agreed upon between the manufacturer and the purchaser.

## 6. Sampling

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

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

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<sup>2</sup> Annual Book of ASTM Standards, Vol 14.02.

<sup>3</sup> Annual Book of ASTM Standards, Vol 03.05.

TABLE 1 Chemical Requirements<sup>A</sup>

Grade	Composition, %			
	Titanium <sup>B</sup>	Carbon, max	Silicon, max	Aluminum, max
A	65.0–75.0	0.15	0.25	0.50
B	65.0–75.0	0.20	0.25	5.0
C	35.0–45.0	0.15	5.0	8.0
D	15.0–25.0	5.0	5.0	8.0

<sup>A</sup>For purposes of determining conformance with these specifications, 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 Recommended Practice E 29.

<sup>B</sup>For purposes of determining the titanium content of any shipment, titanium shall be reported to the nearest 0.01 %, applying the same rounding procedure as prescribed in Footnote A.

## 7. Inspection

7.1 The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works that concern the sampling, packaging, and shipping of material ordered. The manufacturer shall afford the inspector all reasonable facilities, without charge, to satisfy him that the material is being furnished in accordance with this specification.

7.2 If the purchaser so elects, the material may be sampled by him at the destination, in which case at least 10 % of the shipment shall be sampled.

## 8. Rejection

8.1 Any claims or rejections based on check analysis shall be made to the manufacturer within 45 days from receipt of material by the purchaser.

## 9. Packaging

9.1 Ferrotitanium shall be packaged in sound containers in such manner that none of the metal is lost in shipment.



TABLE 2 Supplementary Chemical Requirements

Grade	Composition, % <sup>A</sup>																
	Manga- nese	Phos- phorus	Sulfur	Chro- mium	Nickel	Molyb- denum	Copper	Cobalt	Vana- dium	Lead	Arsenic	Bismuth	Tin	Zinc	Zirco- nium	Boron	Nitrogen
A	0.50	0.050	0.050	1.0	0.050	0.050	0.15	0.030	0.50	0.010	0.010	0.010	0.050	0.010	0.10	0.010	0.15
B	1.5	0.050	0.050	1.0	0.050	0.25	0.20	0.050	1.5	0.030	0.010	0.010	0.050	0.020	0.50	0.020	0.20
C	1.5	0.10	0.050	1.0	0.050	0.25	0.20	0.050	1.5	0.030	0.010	0.010	0.050	0.020	0.50	0.020	0.20
D	1.5	0.10	0.050	1.0	0.050	0.25	0.20	0.050	1.5	0.050	0.010	0.010	0.050	0.020	0.50	0.020	0.20

<sup>A</sup>Maximum limits allowable unless otherwise stated.

TABLE 3 Size Requirements (All Grades)

Category	Tolerances
2 in. (50 mm) by down	10 %, max retained on USA Standard 2 in. (50 mm) Sieve 10 %, max passing USA Standard No. 20 (850 µm) Sieve
1 in. (25 mm) by down	10 %, max retained on USA Standard 1 in. (25.0 mm) Sieve 10 %, max passing USA Standard No. 20 (850 µm) Sieve
½in. (12.5 mm) by down	10 %, max retained on USA Standard ½in. (12.5 mm) Sieve 15 %, max passing USA Standard No. 30 (600 µm) Sieve
8 M (2.36 mm) by down	10 %, max retained on USA Standard No. 8 (2.36 mm) Sieve 10 %, max passing USA Standard No. 200 (75 µm) Sieve

TABLE 4 Friability Rating

All grades	Number 3
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## **A 324 – 73 (2000)**

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