**Designation: A ~~102 – 93 (Reapproved 2000)~~ 102 – 04**

# Standard Specification for Ferrovanadium[1]

This standard is issued under the fixed designation A 102; 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.

## 1. Scope*

1.1 This specification covers one grade of ferrovanadium.

1.2 The values given in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

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

Current edition approved ~~July 15, 1993.~~ May 1, 2004. Published ~~September 1993.~~ May 2004. Originally ~~published as A 102 – 25 T.~~ approved in 1925. Last previous edition approved in 1993 as A 102 – 93 (2000).

***A Summary of Changes section appears at the end of this standard.**

## 2. Referenced Documents

2.1 *ASTM Standards:* [2]

A 1025 Specification for Ferroalloys, General Requirements

E 29 Practice 365 Test Methods for Using Significant Digits in Test Data to Determine Conformance with Specifications

E 31 Methods for Chemical Analysis of Ferroalloys

E 32 Practices for Sampling Ferroalloys and Steel Additives for Determination of Chemical Composition[3]

E 365 Test Methods for Chemical Analysis of Vanadium in Ferrovanadium and Vanadium Alloying Additives

## 3. Ordering Information

3.1 OrdersGeneral Conditions for m Delivery

3.1 Materials furnisherd to this specification shall include conform to the following information:

3.1.1 Quantity,

3.1.2 Name requirements of material,

3.1.3 ASTM designation and year Specification A 1025, including any supplementary requirements that are indicated in the purchase order. Failure to comply with the general requirements of issue,

3.1.4 Size, and

3.1.5 Requirements for packaging, analysis reports, etc., as appropriate. Specification A 1025 constitutes nonconformance with this specification. In case of conflict between the requirements of this specification and Specification A 1025, this specification shall prevail.

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

## 4. Chemical Composition

4.1 The material 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 request percentage of the purchaser, the manufacturer shall furnish an analysis for any of these elements on a cumulative basis over a period mutually agreed upon by the manufac-turer and the purchaser. each element specified.

## 5. Size

5.1 The material grade is typically available in sizes as listed in Table 3 2.

5.2 The

NOTE 1—The sizes listed in Table 3 2 are typical as shipped from the manufacturer's plant. Ferrovanadium has a friability code number of "1". It is a tough material, susceptible to little, if any, breakage during shipment or handling.

## 6. Sampling

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

6.2 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.

## 7. Chemical Analysis

76.1 The chemical analysis of the material shall be made in accordance with the procedure for ferrovanadium as described in

[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*, Vol 14.02. volume information, refer to the standard's Document Summary page on the ASTM website.

**TABLE 1 Chemical Requirements**[A]

| Element | Composition, % |
|---|---|
| Vanadium,[B] | 75-85 |
| Carbon, max | 0.75 |
| Silicon, max | 1.5 |
| Aluminum | 2.0 max |
| Aluminum, max | 2.0 |
| Sulfur, max | 0.08 |
| Phosphorus, max | 0.08 |

[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 the purposes of determining the vanadium content of any shipment, vanadium shall be reported to the nearest 0.1 %, applying the same rounding procedure as prescribed in Footnote *A*.

**TABLE 2 Supplementary Chemicalzing Requirements[A,B]**

| Elsizem Rent | Maximgum Liremients Allowable, % |
|---|---|
| Chromium | 0.50 |
| Chromium | |
| Copper | 0.15 |
| Copper | 2 in. (50 mm) by down |
| Nickel | 0.10 |
| Nickel | |
| Lead | 0.020 |
| Lead | 1 in. (25 mm) by down |
| Tin | 0.050 |
| Tin | |
| Zinc | 0½.020 |
| Zinc | ½ in. (12.5 mm) by down |
| Molybdenum | 0.75 |
| Molybdenum | |
| Titanium | 0.15 |
| Nitrogen | 0.20 |
| Nogen | 0. 8 (2.36 mm) by down |

[A] See Footnote A of Table 1.

[B] The composition of the ferrovanadium 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 by the manufacturer and the purchaser.

Test Methods E 31 and E 365 or alternative methods which will yield equivalent results. For elements other than vanadium the chemical analysis shall be agreed upon by the purchaser and supplier.

76.2 If alternative methods of analysis are used, in case of discrepancy, Test Methods E 31 and E 365 shall be used for referee.

76.3 Where no method is given in Methods E 31 or E 365 for the analysis for a particular element, the analysis shall be made in accordance with a procedure agreed upon by the manufacturer and the purchaser.

**8. Inspection**

8.1 The purchaser.

## SUPPLEMENTARY REQUIREMENTS

The composition shall be further limited to the requirements of Table S1.1 in addition to those in Table 1. An analysis of each lot is not required. The manufacturer shall ~~afford~~ supply, upon request, the ~~inspector representing~~ results of an analysis for these elements on a cumulative basis over a period mutually agreed upon by the ~~purchaser all reasonable facilities, without charge~~, manufacturer and the purchaser.

## SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to ~~satisfy him~~ this standard since the last version (A 102 – 93 (2000)) that may impact the ~~material is being furnished in accordance with~~ use of this ~~specification.~~

**~~9. Rejection~~ standard.**

**~~10. Packaging~~(1)** Practice E 29, Test Methods E 31, and ~~Package Marking~~

~~10.1 The ferrovanadium 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.~~

~~10.2 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,~~ Practices E 32 were removed from 2.

*(2)* Specification A 1025 was added to 2.

*(3)* Changed Ordering Information to General Conditions for Delivery.

*(4)* Revised 4 and ~~the name, brand, or trademark of the manufacturer.~~

~~10.3 When the shipment is made in containers, each shall be marked~~ 5.

*(5)* Removed sections 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,~~ Sampling, Inspection, Rejection, and ~~net weight, and the name, brand, or trademark of the manufacturer.~~

Packaging.

*(6)* Added Supplementary Requirements section.

*(7)* Added Table S1.1.



**TABLE S1.1 Supplementary Chemical Requirements**

| Element | Maximum Limits Allowable, % |
|---|---|
| Chromium | 0.50 |
| Copper | 0.15 |
| Nickel | 0.10 |
| Lead | 0.020 |
| Tin | 0.050 |
| Zinc | 0.020 |
| Molybdenum | 0.75 |
| Titanium | 0.15 |
| Nitrogen | 0.20 |