



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

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 ferrovandium.
- 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.

## 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 31 Methods for Chemical Analysis of Ferroalloys<sup>3</sup>
  - E 32 Practices for Sampling Ferroalloys and Steel Additives for Determination of Chemical Composition<sup>3</sup>
  - E 365 Test Methods for Chemical Analysis of Ferrovandium and Vanadium Alloying Additives<sup>4</sup>

## 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 Size, and
  - 3.1.5 Requirements for packaging, analysis reports, etc., as appropriate.
- 3.2 Although ferrovandium 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 of the purchaser, the manufacturer shall furnish

<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.

Current edition approved July 15, 1993. Published September 1993. Originally published as A 102 – 25 T. Last previous edition A 102 – 92.

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

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

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 03.06.

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

Element	Composition, %
Vanadium, <sup>B</sup>	75-85
Carbon, max	0.75
Silicon, max	1.5
Aluminum	2.0 max
Sulfur, max	0.08
Phosphorus, max	0.08

<sup>A</sup>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.

<sup>B</sup>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.

an analysis for any of these elements on a cumulative basis over a period mutually agreed upon by the manufacturer and the purchaser.

## 5. Size

- 5.1 The material is typically available in sizes as listed in Table 3.
- 5.2 The sizes listed in Table 3 are typical as shipped from the manufacturer’s plant. Ferrovandium 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.

TABLE 2 Supplementary Chemical Requirements<sup>A,B</sup>

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

<sup>A</sup>See Footnote A of Table 1.

<sup>B</sup>The composition of the ferrovandium 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.

**TABLE 3 Typical Sizing Requirements**

Size Requirements
2 in. (50 mm) by down
1 in. (25 mm) by down
½ in. (12.5 mm) by down
No. 8 (2.36 mm) by down

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

7.1 The chemical analysis of the material shall be made in accordance with the procedure for ferrovanadium as described in Methods E 31 and E 365 or alternative methods which will yield equivalent results.

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

7.3 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.

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).*

## 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.

## 10. Packaging 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, and the name, brand, or trademark of the manufacturer.

10.3 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.