

# Mineral Industry Surveys

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## VANADIUM IN JUNE 2019

Reported domestic consumption of vanadium in June 2019 was 4% more than that of the previous month and slightly less than that of June 2018. Consumer stocks of all forms of vanadium were 226 metric tons (t) at the end of June, an increase from 185 t at yearend 2018 (table 1).

According to CRU Group (2019), U.S. ferrovanadium (FeV) prices ranged from \$17.675 to \$18.938 per pound of contained vanadium in June 2019, compared with \$19.972 to \$21.750 per pound in May 2019. European FeV prices ranged from \$34.713 to \$37.188 per kilogram of contained vanadium in June 2019, compared with \$36.611 to \$39.200 per kilogram in May 2019. CRU Group discontinued publishing U.S. vanadium pentoxide (V<sub>2</sub>O<sub>5</sub>) prices from July 2017 onward. The Chinese V<sub>2</sub>O<sub>5</sub> prices ranged from \$10.000 to \$10.500 per pound of contained vanadium in June 2019, compared with \$10.333 to \$10.944 per pound in May 2019 (fig. 1).

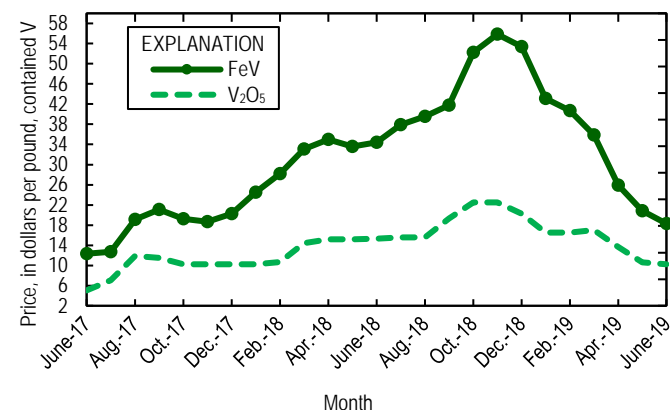


Figure 1. Average monthly prices for FeV and V<sub>2</sub>O<sub>5</sub> from June 2017 through June 2019. Prices for FeV are United States prices, and prices for V<sub>2</sub>O<sub>5</sub> are United States prices in June 2017 and Chinese prices from July 2017 through June 2019. Source: CRU Group.

**Reference Cited**

CRU Group, 2019, Noble alloys and minor metals prices: CRU Group, July 31. (Accessed August 15, 2019, via <http://www.crugroup.com/>.)

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TABLE 1  
U.S. CONSUMPTION AND CONSUMER STOCKS OF VANADIUM, BY FORM<sup>p,1</sup>

(Kilograms, contained vanadium)

|   | 2019                |                      |             |         |              |         |
|---|---------------------|----------------------|-------------|---------|--------------|---------|
|   | May                 |                      | June        |         | January–June |         |
|   | Consumption         | Stocks               | Consumption | Stocks  | Consumption  | Stocks  |
| Ferrovandium <sup>2</sup>                               | 212,000             | 184,000              | 221,000     | 188,000 | 1,320,000    | 188,000 |
| Vanadium-aluminum<br>alloy and other forms <sup>3</sup> | 21,000 <sup>r</sup> | 37,600 <sup>r</sup>  | 21,000      | 37,600  | 126,000      | 37,600  |
| Total   | 233,000             | 221,000 <sup>r</sup> | 242,000     | 226,000 | 1,450,000    | 226,000 |

<sup>p</sup>Preliminary. <sup>r</sup>Revised.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown. Includes estimates.

<sup>2</sup>Includes other vanadium-iron-carbon alloys as well as vanadium oxides added directly to steel.

<sup>3</sup>Includes vanadium-aluminum alloy, other vanadium alloys, vanadium metal, vanadium pentoxide, vanadates, chlorides, and other specialty chemicals.

TABLE 2  
U.S. CONSUMPTION OF VANADIUM, BY END USE<sup>1</sup>

(Kilograms, contained vanadium)

|  | 2019    |         |                  |
|--|---------|---------|------------------|
|  | May     | June    | January–<br>June |
| Steel:                                     |         |         |                  |
| Carbon                                     | W       | W       | W                |
| Full alloy                                 | 101,000 | 101,000 | 604,000          |
| High-strength low-alloy                    | W       | W       | W                |
| Stainless and heat resisting               | 4,930   | 4,930   | 29,600           |
| Tool                                       | W       | W       | W                |
| Total steel                                | 106,000 | 106,000 | 634,000          |
| Superalloys                                | W       | W       | W                |
| Miscellaneous and unspecified <sup>2</sup> | W       | W       | W                |
| Total                                      | 233,000 | 242,000 | 1,450,000        |

<sup>1</sup>Revised. W Withheld to avoid disclosing company proprietary data; included in "Total."

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown. Includes estimates.

<sup>2</sup>Includes cast irons, alloys excluding steel and superalloys, chemical and ceramic uses, and other miscellaneous and unspecified uses.

TABLE 3  
U.S. IMPORTS FOR CONSUMPTION OF VANADIUM PRODUCTS<sup>1</sup>

(Kilograms, unless otherwise specified)

| Material                                   | HTS <sup>2</sup> code         | 2019         |                  |                   |              |                  |                   |              |                  |                   |
|--|-------------------------------|--------------|------------------|-------------------|--------------|------------------|-------------------|--------------|------------------|-------------------|
|  |                               | May          |                  |                   | June         |                  |                   | January–June |                  |                   |
|  |                               | Gross weight | Contained weight | Value (thousands) | Gross weight | Contained weight | Value (thousands) | Gross weight | Contained weight | Value (thousands) |
| Vanadium bearing ash and residues          | 2620.40.0030,<br>2620.99.1000 | 1,830,000    | 207,000          | \$6,150,000       | 1,350,000    | 131,000          | \$4,590,000       | 10,800,000   | 1,070,000        | \$43,800,000      |
| Chemical compounds:                        |                               |              |                  |                   |              |                  |                   |              |                  |                   |
| Vanadium pentoxide (anhydride)             | 2825.30.0010                  | 335,000      | 314,000          | 11,000,000        | 444,000      | 420,000          | 9,980,000         | 2,090,000    | 2,020,000        | 74,100,000        |
| Vanadium oxides and hydroxides, other      | 2825.30.0050                  | 40,000       | 22,800           | 1,480,000         | --           | --               | --                | 129,000      | 82,200           | 5,660,000         |
| Vanadium sulfates                          | 2833.29.3000                  | 2,770        | 1,730            | 16,600            | 2,130        | 1,330            | 12,800            | 4,900        | 3,060            | 29,400            |
| Vanadates                                  | 2841.90.1000                  | 450          | 206              | 18,900            | 11,800       | 6,590            | 321,000           | 90,600       | 54,000           | 2,670,000         |
| Ferrovandium                               | 7202.92.0000                  | 282,000      | 200,000          | 10,400,000        | 324,000      | 211,000          | 13,200,000        | 1,950,000    | 1,330,000        | 113,000,000       |
| Vanadium metal, including waste and scrap  | 8112.92.7000                  | 3,020        | 2,360            | 115,000           | 1,010        | 1,010            | 84,100            | 35,600       | 26,300           | 2,710,000         |
| Vanadium and articles thereof <sup>3</sup> | 8112.99.2000                  | 23,200       | 16,100           | 1,640,000         | 45,200       | 29,700           | 2,760,000         | 143,000      | 97,400           | 9,480,000         |
| Total                                      |                               | 2,520,000    | 764,000          | 30,900,000        | 2,170,000    | 801,000          | 31,000,000        | 15,200,000   | 4,690,000        | 251,000,000       |

-- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Harmonized Tariff Schedule of the United States.

<sup>3</sup>Aluminum-vanadium master alloy consisting of 35% aluminum and 64.5% vanadium.

Source: U.S. Census Bureau.

TABLE 4  
U.S. IMPORTS AND EXPORTS OF FERROVANADIUM, OTHER OXIDES AND HYDROXIDES OF VANADIUM,  
AND VANADIUM PENTOXIDE (ANHYDRIDE)<sup>1,2</sup>

(Kilograms, gross and contained weight)

| Country or locality                                   | HTS <sup>3</sup> code | 2019                |                     |              |                  |              |                  |
|---|-----------------------|---------------------|---------------------|--------------|------------------|--------------|------------------|
|   |                       | May                 |                     | June         |                  | January–June |                  |
|   |                       | Gross weight        | Contained weight    | Gross weight | Contained weight | Gross weight | Contained weight |
| <b>Imports for consumption:</b>                       |                       |                     |                     |              |                  |              |                  |
| Vanadium pentoxide (anhydride) <sup>4</sup>           | 2825.30.0010          |                     |                     |              |                  |              |                  |
| Brazil  |                       | 60,000              | 59,600              | 200,000      | 199,000          | 1,100,000    | 1,100,000        |
| China   |                       | 22,700              | 11,800              | 55,900       | 33,300           | 81,900       | 47,000           |
| South Africa  |                       | 242,000             | 233,000             | 188,000      | 187,000          | 769,000      | 753,000          |
| Other [5 countries and (or) localities]               |                       | 10,000 <sup>r</sup> | 10,000 <sup>r</sup> | --           | --               | 131,000      | 122,000          |
| Total   |                       | 335,000             | 314,000             | 444,000      | 420,000          | 2,090,000    | 2,020,000        |
| Other oxides and hydroxides of vanadium, South Africa | 2825.30.0050          |                     |                     |              |                  |              |                  |
| South Africa  |                       | 40,000              | 22,800              | --           | --               | 129,000      | 82,200           |
| Ferrovandium  | 7202.92.0000          |                     |                     |              |                  |              |                  |
| Austria   |                       | 87,700              | 63,100              | 107,000      | 79,700           | 412,000      | 303,000          |
| Canada  |                       | 115,000             | 90,600              | 131,000      | 88,400           | 886,000      | 684,000          |
| Japan   |                       | 40,000              | 20,600              | 30,000       | 15,600           | 230,000      | 118,000          |
| Ukraine   |                       | --                  | --                  | 55,000       | 27,700           | 265,000      | 133,000          |
| Other [5 countries and (or) localities]               |                       | 39,700 <sup>r</sup> | 25,300 <sup>r</sup> | --           | --               | 161,000      | 90,900           |
| Total   |                       | 282,000             | 200,000             | 324,000      | 211,000          | 1,950,000    | 1,330,000        |
| <b>Exports:</b>                                       |                       |                     |                     |              |                  |              |                  |
| Vanadium pentoxide (anhydride) <sup>4</sup>           | 2825.30.0010          |                     |                     |              |                  |              |                  |
| China   |                       | --                  | --                  | 7,660        | NA               | 7,660        | NA               |
| Saudi Arabia  |                       | --                  | --                  | 1,530        | NA               | 1,530        | NA               |
| Other [4 countries and (or) localities]               |                       | 22,000 <sup>r</sup> | NA                  | --           | --               | 113,000      | NA               |
| Total   |                       | 22,000              | XX                  | 9,190        | XX               | 122,000      | XX               |
| Other oxides and hydroxides of vanadium               | 2825.30.0050          |                     |                     |              |                  |              |                  |
| China   |                       | --                  | --                  | 18,800       | NA               | 18,800       | NA               |
| Netherlands   |                       | 39,100              | NA                  | 54,600       | NA               | 93,700       | NA               |
| Other [3 countries and (or) localities]               |                       | 571 <sup>r</sup>    | NA                  | --           | --               | 77,500       | NA               |
| Total   |                       | 39,700              | XX                  | 73,400       | XX               | 190,000      | XX               |
| Ferrovandium  | 7202.92.0000          |                     |                     |              |                  |              |                  |
| Canada  |                       | 803                 | 602                 | 316          | 238              | 43,300       | 32,400           |
| Colombia  |                       | 5,000               | 3,750               | 5,000        | 3,750            | 11,800       | 8,850            |
| Other [3 countries and (or) localities]               |                       | 23,700 <sup>r</sup> | 15,000 <sup>r</sup> | --           | --               | 229,000      | 152,000          |
| Total   |                       | 29,500              | 19,300              | 5,320        | 3,990            | 284,000      | 193,000          |

<sup>1</sup>Revised. NA Not available. XX Not applicable. -- Zero.

<sup>2</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>3</sup>Presentation of monthly data is based on the quantities (gross weight or contained weight) of the five leading countries and (or) localities in June.

<sup>4</sup>Harmonized Tariff Schedule of the United States.

<sup>5</sup>May include catalysts containing vanadium pentoxide.

Source: U.S. Census Bureau.

TABLE 5  
U.S. IMPORTS AND EXPORTS OF ALUMINUM VANADIUM MASTER ALLOY, VANADIUM BEARING ASH AND RESIDUES,  
VANADIUM SULFATES, VANADATES, VANADIUM METAL, AND U.S. IMPORTS OF SLAG<sup>1,2</sup>

(Kilograms, gross and contained weight)

| Country or locality  | HTS <sup>3</sup> code         | 2019                |                     |              |                  |              |                  |
|--|-------------------------------|---------------------|---------------------|--------------|------------------|--------------|------------------|
|  |                               | May                 |                     | June         |                  | January–June |                  |
|  |                               | Gross weight        | Contained weight    | Gross weight | Contained weight | Gross weight | Contained weight |
| <b>Imports for consumption:</b>  |                               |                     |                     |              |                  |              |                  |
| Slag, from the manufacture of iron and steel                                     | 2619.00.9000                  |                     |                     |              |                  |              |                  |
| Canada   |                               | 38,400              | NA                  | 55,500,000   | NA               | 76,400,000   | NA               |
| Korea, Republic of   |                               | --                  | --                  | 164          | NA               | 164          | NA               |
| Other [4 countries and (or) localities]  |                               | 38,100 <sup>r</sup> | NA                  | --           | --               | 340,000      | NA               |
| Total  |                               | 76,500              | XX                  | 55,500,000   | XX               | 76,800,000   | XX               |
| Vanadium bearing ash and residues  | 2620.40.0030,<br>2620.99.1000 |                     |                     |              |                  |              |                  |
| Canada   |                               | 1,380,000           | 135,000             | 1,320,000    | 129,000          | 9,960,000    | 975,000          |
| Curacao  |                               | 391,000             | 44,000              | 27,700       | 2,330            | 560,000      | 62,900           |
| Other [2 countries and (or) localities]  |                               | 58,700 <sup>r</sup> | 28,000 <sup>r</sup> | --           | --               | 231,000      | 36,000           |
| Total  |                               | 1,830,000           | 207,000             | 1,350,000    | 131,000          | 10,800,000   | 1,070,000        |
| Sulfates, China  | 2833.29.3000                  | 2,770               | 1,730               | 2,130        | 1,330            | 4,900        | 3,060            |
| Vanadates  | 2841.90.1000                  |                     |                     |              |                  |              |                  |
| Japan  |                               | 50                  | 33                  | 50           | 39               | 331          | 186              |
| South Africa   |                               | --                  | --                  | 6,080        | 4,320            | 16,300       | 10,800           |
| United Kingdom   |                               | --                  | --                  | 5,700        | 2,230            | 5,700        | 2,230            |
| Other [3 countries and (or) localities]  |                               | 400 <sup>r</sup>    | 173 <sup>r</sup>    | --           | --               | 68,200       | 40,800           |
| Total  |                               | 450                 | 206                 | 11,800       | 6,590            | 90,600       | 54,000           |
| Vanadium metal, including waste and scrap,<br>and Aluminum-vanadium master alloy | 8112.92.7000,<br>8112.99.2000 |                     |                     |              |                  |              |                  |
| China  |                               | 6,000               | 4,310               | 8,000        | 5,160            | 21,900       | 15,600           |
| France   |                               | 6                   | 6                   | 10           | 8                | 16           | 14               |
| Germany  |                               | 340                 | 273                 | 1,000        | 1,000            | 22,400       | 15,400           |
| Russia   |                               | 19,900              | 13,900              | 37,200       | 24,500           | 115,000      | 76,000           |
| Other [5 countries and (or) localities]  |                               | --                  | --                  | 1            | 1                | 20,100       | 16,700           |
| Total  |                               | 26,200              | 18,500              | 46,200       | 30,700           | 179,000      | 124,000          |
| <b>Exports:</b>  |                               |                     |                     |              |                  |              |                  |
| Vanadium bearing ash and residues  | 2620.50.0030,<br>2620.99.1000 |                     |                     |              |                  |              |                  |
| France   |                               | 236,000             | NA                  | 161,000      | NA               | 627,000      | NA               |
| Germany  |                               | 159,000             | NA                  | 260,000      | NA               | 452,000      | NA               |
| Mexico   |                               | --                  | --                  | 41,700       | --               | 54,400       | NA               |
| Total  |                               | 395,000             | XX                  | 462,000      | XX               | 1,130,000    | XX               |
| Vanadium metal, including waste and scrap,<br>and Aluminum-vanadium master alloy | 8112.92.7000,<br>8112.99.2000 |                     |                     |              |                  |              |                  |
| Germany  |                               | --                  | --                  | 2,460        | NA               | 2,460        | NA               |
| Other [9 countries and (or) localities]  |                               | 2,750 <sup>r</sup>  | NA                  | --           | --               | 26,300       | NA               |
| Total  |                               | 2,750               | XX                  | 2,460        | XX               | 28,800       | XX               |

<sup>r</sup>Revised. NA Not available. XX Not applicable. -- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Presentation of monthly data is based on the quantities (gross weight or contained weight) of the five leading countries and (or) localities in June.

<sup>3</sup>Harmonized Tariff Schedule of the United States.

Source: U.S. Census Bureau.