

# Mineral Industry Surveys

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## VANADIUM IN DECEMBER 2003

Reported domestic consumption of vanadium in December 2003 was about 6% less than that of the previous month and was about 6% more than that of December 2002, according to the U.S. Geological Survey. Vanadium consumption from January through December was slightly less than during the same period in 2002. Consumer stocks of vanadium, in all forms, were 209 metric tons (t) at the beginning of 2003 and 238 t at the end of December.

According to Ryan's Notes (2004), U.S. ferrovanadium (FeV) prices ranged from \$5.806 to \$5.988 per pound of vanadium content in December, as compared with \$5.379 to \$5.543 in November. European FeV prices ranged from \$12.788 to \$13.600 per kilogram in December as compared with \$10.671 to \$10.943 in November. In December, vanadium pentoxide (V<sub>2</sub>O<sub>5</sub>) prices ranged from \$2.338 to \$2.388 per pound, as compared with \$2.121 to \$2.207 in November.

The prices of FeV in the United States and Europe jumped in December. In the United States, FeV spot sales were booked at \$6.20 to \$6.35 per pound, and European FeV spot prices jumped to \$14.50 per kilogram at the end of December (Ryan's Notes, 2003a). V<sub>2</sub>O<sub>5</sub> prices in the United States rose to \$2.65 to \$2.70 per pound from about \$2.30 to \$2.35 at the end of November. Stratcor increased its published price for 80% FeV to \$6.25 per pound, effective December 12, 2003 (Ryan's Notes, 2003c).

United Steel Workers union members walked off the job December 8, 2003, at the Shieldalloy Metallurgical Corporation (Shieldalloy) Cambridge, OH, ferrovanadium plant. Shieldalloy

hired temporary replacement workers and resumed operations at a reduced level on December 10. Workers were working under the provisions of a new contract offer, which had been rejected in June 2003, which required workers to pay a portion of their health care costs (Ryan's Notes, 2003b).

Xstrata plc's decision to close its Windimurra plant in Australia in January, 2003, and the imminent closure of its Vantech operation in South Africa effective January 1, 2004, reduced the available world V<sub>2</sub>O<sub>5</sub> supply by a combined 10,000 t (22 million pounds) going into 2004. These actions, coupled with Russian producer Vanady Tulacheramet's strategy of selling directly to end users and bypassing traders, have left Europe's vanadium traders searching for supplies (Metal Bulletin Research, 2003). The combined effect of these developments, and continued strong demand from Chinese buyers drove vanadium prices upward in December.

### References Cited

- Metal Bulletin Research, 2003, Vanadium highlights, US market buoyed by lower import volumes: Metal Bulletin Research, Ferro-alloys Monthly, no. 136, December 27, p. 13.
- Ryan's Notes, 2003a, Ferroalloy notes, ferrovanadium prices jumped in the US and Europe: Ryan's Notes, v. 9, no. 52, December 29, p. 2.
- Ryan's Notes, 2003b, Shieldalloy FeV plant struck: Ryan's Notes, v. 9, no. 51, December 22, p. 2.
- Ryan's Notes, 2003c, Stratcor increased its published price: Ryan's Notes, v. 9, no. 50, December 15, p. 6.
- Ryan's Notes, 2004, [untitled]: Ryan's Notes, v. 10, no. 1, January 5 p. 4.

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

(Kilograms, contained vanadium)

	2002		2003			
	Consumption	Stocks	November		December	
			Consumption <sup>r</sup>	Stocks <sup>r</sup>	Consumption	Stocks
Ferrovandium <sup>2</sup>	2,730,000	189,000	251,000	176,000	237,000	201,000
Vanadium-aluminum alloy	W	W	W	W	W	W
Other <sup>3</sup>	349,000	20,200	21,700	6,820	20,100	37,400
Total	3,080,000	209,000	273,000	183,000	257,000	238,000

<sup>r</sup> Revised. W Withheld to avoid disclosing company proprietary data; included with "Other."

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

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

<sup>3</sup>Includes other vanadium alloys, vanadium metal, vanadium pentoxide, vanadates, chlorides, other specialty chemicals, and items indicated by symbol W.

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

(Kilograms, contained vanadium)

	2002	2003		
		November	December	Year to date <sup>2</sup>
Steel:				
Carbon	731,000	79,500 <sup>r</sup>	63,200	782,000
High-strength low-alloy	900,000	78,800 <sup>r</sup>	79,000	928,000
Stainless and heat-resisting	37,500	2,290	2,290	26,800
Full alloy	748,000	62,600 <sup>r</sup>	65,900	802,000
Tool	270,000	23,200	23,400	261,000
Total steel	2,690,000	246,000 <sup>r</sup>	234,000	2,800,000
Superalloys	12,400	1,230	1,050	13,800
Miscellaneous and unspecified <sup>3</sup>	382,000	25,300 <sup>r</sup>	22,000	241,000
Total consumption	3,080,000	273,000 <sup>r</sup>	257,000	3,060,000

<sup>r</sup> Revised.

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

<sup>2</sup>Includes revisions to prior month's data.

<sup>3</sup>Includes cast irons, alloys excluding steel and superalloys, chemical and ceramic uses, and other miscellaneous and unspecified uses.

TABLE 3  
U.S. IMPORTS AND EXPORTS OF ALUMINUM-VANADIUM MASTER ALLOY AND  
VANADIUM METAL, INCLUDING WASTE AND SCRAP<sup>1</sup>

(Kilograms, gross weight)

	Aluminum-vanadium master alloy		Vanadium metal, including waste and scrap	
	Quantity	Value	Quantity	Value
<b>Imports for consumption:</b>				
2002	97,500	\$206,000	32,300	\$1,270,000
2003:				
September	38,300	97,700	8,950	117,000
October	20,100	39,800	24,100	289,000
November:				
Germany	--	--	35,900	569,000
Russia	--	--	1,010	76,100
Total	--	--	36,900	646,000
Year to date	232,000	425,000	163,000	2,560,000
<b>Exports:</b>				
2002	529,000	11,700,000	49,200	898,000
2003:				
September	754,000	1,400,000	2,100	45,000
October	828,000	1,450,000	118	127,000
November:				
Canada	32,400	64,200	--	--
Germany	--	--	100	15,500
Japan	7,070	112,000	--	--
Korea, Republic of	5,940	20,400	--	--
Mexico	745,000	1,240,000	--	--
Taiwan	7,900	32,200	--	--
Thailand	4,360	18,800	--	--
United Kingdom	26,400	138,000	501	27,300
Total	829,000	1,620,000	601	42,800
Year to date	5,800,000	14,900,000	190,000	3,800,000

-- Zero.

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

Source: U.S. Census Bureau.

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

(Kilograms, contained vanadium)

	Ferrovanadium		Vanadium pentoxide (anhydride) <sup>2</sup>		Other oxides and hydroxides of vanadium	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>Imports for consumption:</b>						
2002	2,520,000	\$19,400,000	406,000	\$1,990,000	42,300	\$560,000
2003:						
September	136,000	1,430,000	--	--	--	--
October	101,000	1,100,000	--	--	3,380	40,300
November:						
Canada	23,000	252,000	--	--	--	--
Czech Republic	32,700	354,000	--	--	--	--
Germany	--	--	128	46,600	9,870	209,000
Israel	--	--	--	--	631	68,200
South Africa	20,000	94,600	10,300	86,500	--	--
Switzerland	79,000	895,000	--	--	--	--
Total	155,000	1,600,000	10,400	133,000	10,500	277,000
Year to date	1,060,000	10,600,000	404,000	3,090,000	38,700	769,000
<b>Exports:</b>						
2002	142,000	1,550,000	91,200	568,000	203,000	1,700,000
2003:						
September	37,900	553,000	6,000	48,700	19,500	262,000
October	21,000	292,000	450	4,050	8,660	126,000
November:						
Canada	8,170	132,000	--	--	12,900	116,000
Mexico	15,000	171,000	--	--	6,700	24,000
South Africa	--	--	--	--	8,710	35,100
Total	23,100	304,000	--	--	28,300	175,000
Year to date	374,000	5,120,000	185,000	1,540,000	261,000	2,330,000

-- Zero.

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

<sup>2</sup>May include catalysts containing vanadium pentoxide.

Source: U.S. Census Bureau.

TABLE 5  
U.S. IMPORTS FOR CONSUMPTION OF VANADIUM-BEARING ASH, SLAG<sup>1</sup>

(Kilograms, contained vanadium pentoxide)

	Ash and residues		Ash and residues (not from the manufacture of iron and steel)		Slag, from the manufacture of iron and steel	
	Quantity	Value	Quantity	Value	Quantity	Value
2002	3,830,000	\$520,000	10,300,000	\$1,560,000	243,000,000	\$19,900,000
2003:						
September	1,080,000	762,000	2,130,000	352,000	29,200,000	501,000
October	472,000	123,000	1,460,000	337,000	46,600,000	588,000
November:						
Canada	--	--	1,630,000	403,000	11,300,000	597,000
Germany	--	--	--	--	33,600	58,700
Mexico	732,000	322,000	--	--	--	--
United Kingdom	--	--	18,200	28,100	--	--
Total	732,000	322,000	1,650,000	431,000	11,300,000	656,000
Year to date	4,150,000	2,700,000	13,200,000	2,870,000	264,000,000	4,550,000

-- Zero.

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

Source: U.S. Census Bureau.

TABLE 6  
U.S. IMPORTS FOR CONSUMPTION OF MISCELLANEOUS  
VANADIUM CHEMICALS<sup>1</sup>

(Kilograms, contained vanadium)

	Sulfates		Vanadates	
	Quantity	Value	Quantity	Value
2002	14,100	\$390,000	48,100	\$567,000
2003:				
September	--	--	9,260	154,000
October	--	--	6,310	88,100
November:				
Germany	--	--	207	9,350
South Africa	--	--	12,600	113,000
Total	--	--	12,800	123,000
Year to date	--	--	66,600	840,000

-- Zero.

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

Source: U.S. Census Bureau.