

# Mineral Industry Surveys

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## VANADIUM IN FEBRUARY 2005

Reported domestic consumption of vanadium in February 2005 was equal to that of the previous month and was about 20% more than that of February 2004, according to the U.S. Geological Survey. Consumer stocks of vanadium, in all forms, were 398 metric tons (t) at the beginning of 2005 and 404 t at the end of February.

According to Ryan's Notes (2005b), U.S. ferrovanadium (FeV) prices ranged from \$26.188 to \$26.594 per pound of vanadium content in February, as compared with \$25.094 to \$25.750 in January. European FeV prices ranged from \$52.250 to \$54.250 per kilogram (kg) in February, as compared with \$49.125 to \$51.125 in January. Vanadium pentoxide (V<sub>2</sub>O<sub>5</sub>) prices ranged from \$10.938 to \$11.438 per pound in February as compared with \$9.875 to \$10.375 in January.

Ferrovanadium continued to be the star price performer, with prices strengthening. European prices averaged \$51/kg in February, which represented an increase of about 190% over February 2004 prices. Key producers like Treibacher Industrie AG and JSC Vanadii-Tulachermet (Vanady Tula) remained largely absent from the spot market. Treibacher ferrovanadium was well sold to steelworks and Vanady Tula continued its strategy of selling directly to end users. This compounded the limited supply situation and helped boost prices further (Metal Bulletin Research, 2005).

Vanadium producers agreed that plant and mine closures along with a surge in demand helped boost prices in 2004. With prices elevated, some producers began exploring ways to increase output. Highveld Steel and Vanadium Corp. Ltd. reported that all three of its kilns at Vanchem in South Africa operated during 2004 with stoppages only for annual maintenance. The company started a capital improvement

program aimed at upgrading plant and equipment in the kiln and oxide areas to improve efficiencies and debottleneck. Xstrata Plc told analysts that its fully-integrated Rhovan vanadium operation was well positioned to capitalize on future expansion options. Sources believe that Xstrata increased production at Rhovan to compensate for lost production when it permanently closed its Vantech vanadium pentoxide plant in South Africa in 2004. Rhovan's production capacity is about 10,000 metric tons per year (t/yr) of vanadium pentoxide and 7,800 t/yr of ferrovanadium (Ryan's Notes, 2005a).

Negotiations for the purchase of vanadium pentoxide-to-ferrovanadium converter Nikom A.S. in the Czech Republic are expected to run for several weeks, as Russian producer Vanady Tula and Glencore International AG, which markets production from Xstrata, engaged in talks with Nikom's owners. The majority of Nikom's 3,500 t/yr ferrovanadium production capacity was being used by Tula, as the company did not have sufficient conversion capacity in Russia. Anti-dumping duties placed on vanadium material imported into the United States from Russia and South Africa increased the plant's strategic significance to the vanadium market (Metal Bulletin, 2005).

### References Cited

- Metal Bulletin, 2005, Tula and Glencore in talks for Nikom: Metal Bulletin, no. 8880, February 14, p. 8.
- Metal Bulletin Research, 2005, Vanadium highlights: Metal Bulletin Research, Ferro-alloys Monthly, no. 150, February 25, p. 15.
- Ryan's Notes, 2005a, Vanadium deficit could spark more output: Ryan's Notes, v. 11, no. 7, February 14, p. 3.
- Ryan's Notes, 2005b, [untitled]: Ryan's Notes, v. 11, no. 10, March 7, p. 4.

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

(Kilograms, contained vanadium)

	2004 <sup>P</sup>		2005			
	Consumption	Stocks	January		February	
			Consumption	Stocks	Consumption	Stocks
Ferrovandium <sup>2</sup>	3,510,000	298,000	296,000	293,000	293,000	296,000
Vanadium-aluminum alloy	W	W	W	W	W	W
Other <sup>3</sup>	214,000	101,000	16,200	122,000	18,900	108,000
Total	3,730,000	398,000	312,000	415,000	312,000	404,000

<sup>P</sup>Preliminary. 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)

	2004 <sup>P</sup>	2005		
		January	February	Year to date
Steel:				
Carbon	996,000	89,600	90,000	180,000
High-strength low-alloy	1,150,000	83,100	92,200	175,000
Stainless and heat-resisting	64,500	5,360	5,360	10,700
Full alloy	1,060,000	83,100	83,500	167,000
Tool	238,000	34,500	21,900	56,500
Total steel	3,510,000	296,000	293,000	589,000
Superalloys	8,350	566	595	1,160
Miscellaneous and unspecified <sup>2</sup>	211,000	15,900	18,700	34,600
Total consumption	3,730,000	312,000	312,000	624,000

<sup>P</sup>Preliminary.

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

<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 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>				
2004	19,100	\$66,700	31,200	\$1,710,000
2005:				
January:				
Germany	--	--	303	164,000
Russia	--	--	2,810	314,000
United Kingdom	--	--	1	2,310
Total	--	--	3,110	480,000
<b>Exports:</b>				
2004	10,900,000	24,000,000	522,000	7,760,000
2005:				
January:				
Austria	--	--	32	19,800
Australia	--	--	447	20,000
Canada	291,000	715,000	408	11,000
China	1,150	15,000	--	--
France	5,070	17,300	--	--
India	12,200	60,400	--	--
Japan	6,520	28,800	10,300	202,000
Mexico	906,000	1,880,000	--	--
United Kingdom	9,680	49,000	18,800	419,000
Switzerland	--	--	2	6,900
Thailand	27,400	126,000	--	--
Total	1,260,000	2,890,000	29,900	679,000

-- 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>						
2004	3,020,000	\$62,100,000	1,040,000	\$8,600,000	120,000	\$1,650,000
2005:						
January:						
Austria	16,600	811,000	--	--	8,390	321,000
Canada	9,800	243,000	--	--	--	--
China	--	--	37,400	343,000	--	--
Czech Republic	106,000	4,910,000	--	--	--	--
Korea, Republic of	19,800	851,000	--	--	--	--
South Africa	--	--	50,200	1,270,000	--	--
Switzerland	62,700	2,980,000	--	--	--	--
Total	215,000	9,790,000	87,500	1,610,000	8,390	321,000
<b>Exports:</b>						
2004	267,000	8,770,000	240,000	2,090,000	584,000	4,140,000
2005:						
January:						
Canada	266	5,350	--	--	8,270	123,000
Russia	--	--	--	--	55,000	490,000
Venezuela	--	--	8,000	156,000	--	--
Total	266	5,350	8,000	156,000	63,300	613,000

-- 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
2004	4,260,000	\$8,520,000	11,100,000	\$2,000,000	244,000,000	\$10,400,000
2005:						
January:						
Canada	--	--	264,000	63,900	--	--
Mexico	321,000	189,000	--	--	--	--
Total	321,000	189,000	264,000	63,900	--	--

-- 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
2004	500	\$19,100	74,700	\$1,150,000
2005:				
January:				
Germany	--	--	320	21,700
Total	--	--	320	21,700

-- 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.