

Mineral Industry Surveys

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VANADIUM IN DECEMBER 2022

The amount of vanadium in U.S. imports of select vanadium products on a gross weight basis, excluding vanadium bearing ash and residues, in December 2022 was 16% less than the previous month and more than 2 times that in December 2021 (table 1). In December 2022, the leading import sources for vanadium pentoxide (V_2O_5), were South Africa and Brazil, in descending order of contained weight quantity. In December 2022, the leading import sources for ferrovanadium (FeV) were Canada, Austria, and Japan in descending order of contained weight quantity (table 2).

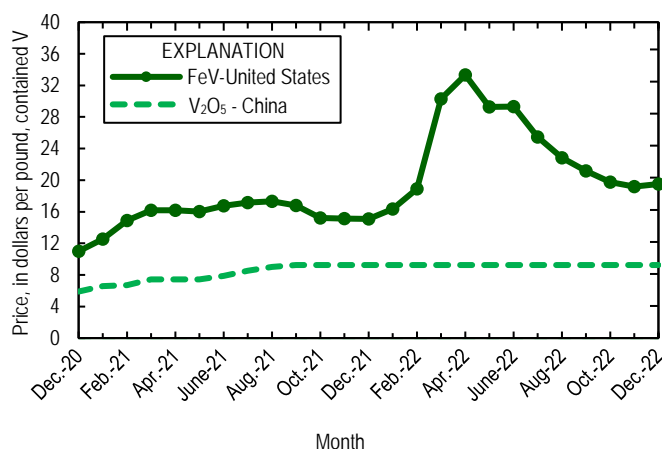


Figure 1. Average monthly prices for ferrovanadium (FeV) and vanadium pentoxide (V_2O_5) from December 2020 through December 2022. Source: CRU Group.

Prices

According to CRU Group, U.S. FeV prices ranged from \$19.100 to \$19.900 per pound of contained vanadium in December 2022 compared with \$18.800 to \$19.600 per pound in November 2022. In Europe, FeV prices ranged from \$33.000 to \$35.000 per kilogram of contained vanadium in December 2022, unchanged since September 2022. In China, V_2O_5 prices ranged from \$9.000 to \$9.500 per pound of contained vanadium in December 2022, unchanged since September 2021 (fig. 1).

Industry News

In December, Pangang Group Vanadium & Titanium Resources Co., Ltd. (China) subsidiary, Pangang Group Chengdu Vanadium & Titanium Resources Development Co., Ltd., signed an agreement to supply ammonium polyvanadate to Dalian Rongke Power Group Co., Ltd. According to the agreement, Pangang will supply 8,000 metric tons of V_2O_5 equivalent ammonium polyvanadate to Dalian Rongke in 2023. Dalian Rongke began operating the first phase of a vanadium redox flow battery (VRFB) facility in Liaoning Province with 100-megawatt/400-megawatt-hour capacity in October 2022. The power company expected to double its capacity in the next phase of the project in 2023–2024. According to analysts, China's aim to transition to renewable energy and energy storage products has prompted many companies to develop and expand VRFB capacity (Argus Media group—Metal Pages, 2022; Santos, 2022).

References Cited

Argus Media Group group—Metal Pages, 2022, China's Pangang signs vanadium supply deal with Rongke: Argus Media group—Metal Pages, December 19. (Accessed February 14, 2023, via www.argusmedia.com/.)
Santos, Beatriz, 2022, China connects world's largest redox flow battery system to grid: PV Magazine, September 29. (Accessed January 18, 2023, at <https://www.pv-magazine.com/2022/09/29/china-connects-worlds-largest-redox-flow-battery-system-to-grid/>.)

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TABLE 1
U.S. IMPORTS FOR CONSUMPTION OF VANADIUM PRODUCTS¹

(Kilograms, unless otherwise specified)

Material	HTS ² code	2022								
		November			December			January–December		
		Gross weight	Contained weight	Value (thousands)	Gross weight	Contained weight	Value (thousands)	Gross weight	Contained weight	Value (thousands)
Vanadium ores and concentrates	2615.90.6090	623,000	328,000 ³	\$2,440,000	364,000	218,000 ³	\$1,600,000	1,690,000	879,000 ⁴	\$7,190,000
Vanadium bearing ash and residues	2620.40.0030, 2620.99.1000	-- ⁴	-- ⁴	2,480,000	-- ⁴	-- ⁴	901,000	944,000	200,000 ⁴	11,300,000
Chemical compounds:										
Vanadium pentoxide (anhydride)	2825.30.0010	516,000	359,000	10,900,000	457,000	264,000	9,350,000	2,830,000	1,980,000	64,400,000
Vanadium oxides and hydroxides, other	2825.30.0050	101,000	67,000	2,960,000	20,000	13,300	433,000	337,000	222,000	9,100,000
Vanadium chlorides	2827.39.1000	18,500	18,500	340,000	19,400	19,300	369,000	68,500	67,800	1,540,000
Vanadium chloride oxides and chloride hydroxide	2827.49.1000	43,000	26,800	18,000	89,000	55,500	91,200	291,000	224,000	1,660,000
Vanadium sulfates	2833.29.3000	--	--	--	--	--	--	127,000	117,000	1,770,000
Vanadates	2841.90.1000	--	--	--	3,650	2,440	81,100	174,000	92,400	3,820,000
Hydrides and nitrides of vanadium	2850.00.2000	28,300	22,700	186,000	50,700	40,600	500,000	436,000	352,000	3,630,000
Ferrovandium	7202.92.0000	294,000	240,000	12,200,000	347,000	241,000	15,600,000	3,480,000	2,670,000	166,000,000
Vanadium metal, including waste and scrap	8112.92.7000	272	122	84,400	858	858	3,780	18,900	18,300	1,280,000
Vanadium and articles thereof ⁵	8112.99.2000	30,000	19,500	1,320,000	40,500	20,000	1,750,000	146,000	103,000	6,750,000
Total		1,650,000	XX	32,900,000	1,390,000	XX	30,700,000	10,500,000	XX	278,000,000

XX Not applicable. -- Zero.

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

²Harmonized Tariff Schedule of the United States.

³Data are in kilograms of vanadium pentoxide.

⁴U.S. Census Bureau has suppressed quantity data for some months; not included in "Total."

⁵Aluminum-vanadium master alloy consisting of 35% aluminum and 64.5% vanadium.

Source: U.S. Census Bureau.

TABLE 2
U.S. IMPORTS AND EXPORTS OF FERROVANADIUM, OTHER OXIDES AND HYDROXIDES OF VANADIUM
AND VANADIUM PENTOXIDE (ANHYDRIDE)^{1, 2}

(Kilograms, unless otherwise specified)

Country or locality		HTS ³ code	2022					
			November		December		January–December	
			Gross weight	Contained weight	Gross weight	Contained weight	Gross weight	Contained weight
Imports for consumption:								
Vanadium ores and concentrates:		2615.90.6090						
Canada			623,000	328,000 ⁴	364,000	218,000 ⁴	1,680,000	875,000 ⁴
China			--	--	4	2	8	⁴
Other [2 countries and (or) localities]			--	--	--	--	5,790	3,790 ⁴
Total			623,000	328,000 ⁴	364,000	218,000 ⁴	1,690,000	879,000 ⁴
Vanadium pentoxide (anhydride) ⁵ :		2825.30.0010						
Brazil			159,000	158,000	160,000	91,400	1,010,000	859,000
China			--	--	10,100	5,780	18,900	10,900
South Africa			352,000	197,000	287,000	166,000	1,560,000	912,000
Other [2 countries and (or) localities]			5,000 ^r	4,000 ^r	--	--	239,000	202,000
Total			516,000	359,000	457,000	264,000	2,830,000	1,980,000
Other oxides and hydroxides of vanadium:		2825.30.0050						
South Africa			100,000	66,400	20,000	13,300	200,000	133,000
Other [5 countries and (or) localities]			1,000 ^r	649 ^r	--	--	137,000	89,400
Total			101,000	67,000	20,000	13,300	337,000	222,000
Ferrovanadium:		7202.92.0000						
Austria			145,000	117,000	100,000	80,600	1,430,000	1,150,000
Canada			138,000	115,000	117,000	94,000	1,560,000	1,240,000
Japan			--	--	100,000	51,000	150,000	79,800
Latvia			--	--	28,000	15,000	152,000	87,300
South Africa			1,000	810	1,300	818	2,300	1,630
Other [5 countries and (or) localities]			10,000 ^r	7,980 ^r	--	--	185,000	113,000
Total			294,000	240,000	347,000	241,000	3,480,000	2,670,000
Exports:								
Vanadium ores and concentrates:		2615.90.6090						
Mexico			20,000	NA	--	--	283,000	NA
Other [5 countries and (or) localities]			--	--	--	--	47,900	NA
Total			20,000	XX	--	--	331,000	XX
Vanadium pentoxide (anhydride) ⁵ :		2825.30.0010						
India			NA	14,000	--	--	NA	57,500
Other [7 countries and (or) localities]			--	--	--	--	NA	85,500
Total			XX	14,000	--	--	XX	143,000
Other oxides and hydroxides of vanadium:		2825.30.0050						
Germany			NA	4,400	--	--	NA	10,700
Korea, Republic of			NA	45,200	--	--	NA	90,400
Other [7 countries and (or) localities]			--	--	--	--	NA	208,000
Total			XX	49,600	--	--	XX	309,000
Ferrovanadium:		7202.92.0000						
Colombia			--	--	85	64	1,540	1,150
Netherlands			14,000	10,500	10,700	8,000	148,000	106,000
Other [5 countries and (or) localities]			12,000 ^r	9,010 ^r	--	--	98,700	64,000
Total			26,000	19,500	10,700	8,060	248,000	171,000

¹Revised. NA Not available. XX Not applicable. -- Zero.

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

³Presentation of monthly data is based on the quantities (gross weight or contained weight) of the five leading countries or localities in December.

⁴Harmonized Tariff Schedule of the United States are imports and Schedule B of the United States are exports.

⁵Data are in kilograms of vanadium pentoxide.

⁶May include catalysts containing vanadium pentoxide.

Source: U.S. Census Bureau.

TABLE 3
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^{1,2}

(Kilograms, unless otherwise specified)

Country or locality		HTS ³ code	2022					
			November		December		January–December	
			Gross weight	Contained weight	Gross weight	Contained weight	Gross weight	Contained weight
Imports for consumption:								
Slag, from the manufacture of iron and steel:		2619.00.9000						
Canada			1,780,000	NA	943,000	NA	15,200,000	NA
Mexico			34,600	NA	194,000	NA	1,060,000	NA
United Kingdom			--	--	--	--	6,070	NA
Total			1,810,000	XX	1,140,000	XX	16,300,000	XX
Vanadium bearing ash and residues:		2620.40.0030, 2620.99.1000						
Curacao			--	--	--	--	169,000	74,700 ⁴
Russia			--	--	--	--	774,000	126,000 ⁴
Total			--	--	--	--	944,000	200,000 ⁴
Vanadium sulfates:		2833.29.3000						
Canada			--	--	--	--	1,870	1,170
China			--	--	--	--	2,650	1,760
Finland			--	--	--	--	122,000	114,000
Total			--	--	--	--	127,000	117,000
Vanadates:		2841.90.1000						
United Kingdom			--	--	3,650	2,440	14,100	9,390
Other [3 countries and (or) localities]			--	--	--	--	160,000	83,000
Total			--	--	3,650	2,440	171,000	92,400
Vanadium metal, including waste and scrap and aluminum-vanadium master alloy:		8112.92.7000, 8112.99.2000						
Canada			--	--	858	858	858	858
China			29,900	19,400	40,500	26,000	118,000	82,200
Other [7 countries and (or) localities]			376 ^r	226 ^r	--	--	46,200	38,200
Total			30,300	19,600	41,400	26,900	165,000	121,000
Exports:								
Vanadium bearing ash and residues:		2620.50.0000, 2620.99.1000						
Belgium			17,100	NA	19,600	NA	345,000	NA
France			--	--	47,100	NA	147,000	NA
Netherlands			--	--	36,200	NA	699,000	NA
Other [8 countries and (or) localities]			27,000 ^r	NA	--	--	767,000	NA
Total			44,100	XX	103,000	XX	1,960,000	XX
Vanadium bearing ash and residues:		2620.50.0000, 2620.99.1000						
Belgium			17,100	NA	19,600	NA	345,000	NA
Other [10 countries and (or) localities]			27,000 ^r	NA	--	--	1,610,000	NA
Total			44,100	XX	19,600	XX	1,960,000	XX
Hydrides and nitrides of vanadium:		2850.00.2000						
Germany			22,000	17,600	47,400	38,000	334,000	271,000
South Africa			6,080	4,800	2,980	2,350	60,700	48,000
Sweden			280	280	320	253	4,400	3,960
Other [5 countries and (or) localities]			9 ^r	8 ^r	--	--	36,800	29,200
Total			28,300	22,700	50,700	40,600	436,000	352,000
Vanadium metal, including waste and scrap and aluminum-vanadium master alloy:		8112.92.7000, 8112.99.2000						
China			170	NA	13	NA	1,280	NA
France			--	--	1,750	NA	6,590	NA
Germany			--	--	210	NA	6,650	NA
Other [10 countries and (or) localities]			--	--	--	--	43,700	NA
Total			170	XX	1,970	XX	58,200	XX

^rRevised. NA Not available. XX Not applicable. -- Zero.

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

²Presentation of monthly data is based on the quantities (gross weight or contained weight) of the five leading countries in December.

³Harmonized Tariff Schedule of the United States are imports and Schedule B of the United States are exports.

⁴Data are in kilograms of vanadium pentoxide.