

**VANADIUM STATISTICS<sup>1</sup>**  
**U.S. GEOLOGICAL SURVEY**

[All values in metric tons (t) vanadium content unless otherwise noted]

Last modification: September 27, 2012

<b>Year</b>	<b>Production</b>	<b>Imports</b>	<b>Exports</b>	<b>Stocks</b>	<b>Apparent consumption</b>	<b>Unit value (\$/t)</b>	<b>Unit value (98\$/t)</b>	<b>World production</b>
1901	6.80	NA	NA	NA	6.8	NA	NA	NA
1902	69.1	NA	68.0	NA	1.1	NA	NA	NA
1903	NA	NA	7.84	NA	4.7	NA	NA	NA
1904	NA	NA	NA	NA	8.3	NA	NA	NA
1905	NA	NA	NA	NA	12	NA	NA	NA
1906	NA	NA	NA	NA	15	NA	NA	NA
1907	18.9	NA	NA	NA	19	NA	NA	NA
1908	NA	272	NA	NA	270	NA	NA	NA
1909	NA	NA	NA	NA	200	NA	NA	NA
1910	NA	NA	NA	NA	130	2,640	46,000	NA
1911	61.2	NA	NA	NA	61	984	17,000	NA
1912	272	NA	43.0	NA	230	1,100	19,000	1,040
1913	392	NA	129	NA	260	1,750	28,800	392
1914	410	NA	165	NA	250	1,800	29,400	414
1915	569	NA	180	NA	390	1,850	29,800	1,360
1916	417	NA	435	NA	310	1,690	25,300	1,190
1917	439	NA	200	NA	240	2,400	30,600	1,260
1918	250	16.1	324	NA	270	2,440	26,300	484
1919	258	54.7	14.2	NA	300	2,480	23,400	578
1920	478	188	92.6	NA	570	2,680	21,800	1,640
1921	182	93.5	12.4	NA	260	2,880	26,200	94.4
1922	23.5	277	11.1	NA	290	3,080	29,900	70.8
1923	57.4	27.9	21.1	NA	64	3,280	31,200	NA
1924	NA	128	10.3	NA	120	3,060	29,100	NA
1925	118	233	23.3	NA	330	2,830	26,400	1,170
1926	300	880	NA	NA	1,200	4,050	37,200	1,700
1927	NA	740	NA	NA	740	3,650	34,100	2,200
1928	NA	59.0	NA	NA	59	3,820	36,400	2,810
1929	NA	1,040	NA	NA	1,000	4,000	38,100	2,810
1930	NA	105	NA	NA	110	4,050	39,700	2,190
1931	NA	NA	NA	NA	180	4,490	48,100	661
1932	245	NA	NA	NA	250	4,920	58,600	480
1933	1.10	NA	NA	NA	1.1	4,920	61,700	300
1934	5.90	104	NA	NA	110	4,780	58,200	118
1935	23.1	42.6	NA	NA	66	4,770	56,800	416
1936	63.5	156	NA	NA	220	4,750	55,700	975
1937	493	571	NA	NA	1,100	4,740	53,700	1,950
1938	732	991	NA	NA	1,700	4,720	54,600	2,590
1939	900	968	NA	NA	1,900	4,710	55,200	2,910
1940	981	1,170	NA	NA	2,200	4,690	54,600	3,020
1941	1,140	970	11.6	NA	2,100	4,330	48,000	2,770
1942	2,010	1,170	10	NA	3,200	4,330	43,300	3,870
1943	2,530	960	17.3	NA	3,500	4,920	46,400	4,380
1944	1,600	601	2.9	NA	2,200	4,720	43,700	3,500
1945	1,340	1,580	51.7	NA	2,900	4,720	42,900	2,670
1946	577	368	2.8	NA	940	4,530	37,800	1,390
1947	1,280	479	60.4	NA	1,700	4,530	33,100	1,740
1948	811	477	8.81	NA	1,300	4,720	31,900	NA
1949	3,190	250	52.3	NA	3,400	4,530	31,000	NA
1950	2,090	689	18.1	NA	2,800	4,050	27,400	NA
1951	2,800	473	27.4	NA	3,300	4,600	28,800	NA

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Year	Production	Imports	Exports	Stocks	Apparent consumption	Unit value (\$/t)	Unit value (98\$/t)	World production
1952	3,270	479	101	NA	3,600	4,920	30,200	NA
1953	4,210	326	30.2	NA	4,500	4,900	29,900	NA
1954	2,860	462	98.0	NA	3,200	4,950	30,000	NA
1955	2,980	83.9	784	256	1,540	4,920	30,000	NA
1956	3,510	NA	842	256	1,800	4,920	29,500	NA
1957	3,350	NA	454	256	1,620	5,230	30,400	NA
1958	2,750	NA	572	250	1,140	4,920	27,800	NA
1959	3,710	2.72	1,130	316	1,720	5,430	30,300	NA
1960	4,510	2.72	1,130	750	1,830	5,430	29,800	5,040
1961	4,850	NA	4,160	333	1,830	5,430	29,700	7,850
1962	4,730	NA	926	346	2,100	5,040	27,200	6,080
1963	3,500	NA	486	409	2,640	5,040	26,800	6,500
1964	3,960	10.9	1,120	674	3,220	4,530	23,800	7,170
1965	4,740	NA	842	751	1,550	4,530	23,500	8,300
1966	4,690	65.3	804	1,790	4,970	4,920	24,700	8,440
1967	4,500	38.1	715	1,080	4,760	4,920	24,000	9,610
1968	5,880	28.1	420	886	4,990	4,530	21,300	11,400
1969	5,060	2,040	261	1,370	5,580	5,940	26,400	10,300
1970	4,830	1,810	883	929	5,200	4,920	20,700	14,900
1971	4,770	2,130	236	585	4,360	11,200	45,100	15,800
1972	4,430	1,270	160	715	4,740	7,280	28,400	15,500
1973	4,410	2,570	852	3,730	5,800	7,280	26,700	16,000
1974	4,870	2,870	1,010	3,540	6,530	8,190	27,100	20,400
1975	4,410	3,840	0	4,100	4,990	8,420	25,500	21,600
1976	5,620	3,510	0	3,720	4,280	13,300	38,100	29,200
1977	4,730	3,260	472	3,960	4,770	13,700	36,800	29,000
1978	5,720	3,050	1,560	2,770	6,020	13,700	34,300	29,400
1979	6,690	3,510	1,810	3,110	6,100	14,000	31,400	37,700
1980	6,370	2,630	1,020	3,870	5,570	12,100	23,900	35,900
1981	7,500	3,410	259	4,280	6,230	12,400	22,200	35,300
1982	5,790	1,720	1,550	4,390	3,170	10,800	18,200	27,200
1983	3,020	669	1,940	4,390	2,970	13,800	22,600	27,200
1984	3,920	1,770	2,360	3,420	4,320	13,800	21,700	31,100
1985	2,450	990	1,240	2,910	4,430	13,800	20,900	31,000
1986	2,110	2,740	1,390	2,480	3,920	13,800	20,500	32,000
1987	2,280	2,570	1,310	2,060	4,220	13,800	19,800	32,000
1988	2,950	2,350	1,580	1,270	4,830	13,400	18,500	33,000
1989	2,390	4,160	3,040	1,740	4,650	24,300	31,900	33,000
1990	2,310	4,690	3,920	1,080	4,080	16,600	20,700	33,200
1991	2,250	1,620	2,860	935	3,290	11,200	13,400	26,400
1992	1,350	1,790	3,430	1,080	3,980	8,970	10,400	26,700
1993	2,870	3,190	3,100	900	3,930	5,710	6,440	2,500
1994	2,830	4,150	2,790	1,110	4,460	11,600	12,800	3,200
1995	1,990	5,100	2,240	310	4,650	11,000	11,800	3,600
1996	3,730	4,650	3,700	305	4,630	12,600	13,100	35,100
1997	W	5,640	2,420	323	4,710	15,300	15,500	37,100
1998	W	5,200	2,350	336	4,380	21,500	21,500	42,700
1999	W	5,000	1,540	348	3,840	7,830	7,660	36,300
2000	0	7,830	1,710	303	6,170	7,160	6,780	41,000
2001	0	6,140	593	251	5,600	5,390	4,960	41,800
2002	0	5,060	1,010	233	4,060	5,270	4,780	51,000

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2003	0	5,460	1,740	252	3,700	8,700	7,710	47,900
2004	0	6,650	2,520	336	4,050	23,600	20,300	51,900
2005	0	3,490	3,360	371	90	64,100	53,500	56,400
2006	0	5,420	3,880	330	1,590	30,900	25,000	57,900
2007	0	7,060	2,910	324	4,160	29,100	22,900	58,500
2008	520	8,510	3,190	335	5,820	50,800	38,500	56,400
2009	230	2,830	2,050	295	1,040	21,400	16,200	51,400
2010	1,060	7,190	3,060	248	5,000	24,500	19,000	61,200
2011	590	7,990	1,680	190	7,000	26,600	19,300	62,400

NA Not available. W Withheld to avoid disclosing company proprietary data.

<sup>1</sup>Compiled by C.A. DiFrancesco (retired), M.J. Magyar, and D.E. Polyak.

Data are calculated, estimated, or reported. See notes for more information.

## Vanadium Worksheet Notes

### Data Sources

The sources of data for the vanadium worksheet are the mineral statistics publications of the U.S. Bureau of Mines and the U.S. Geological Survey—Minerals Yearbook (MYB) and its predecessor, Mineral Resources of the United States (MR), and Mineral Commodity Summaries (MCS), and its predecessor, Commodity Data Summaries (CDS). The years of publication and corresponding years of data coverage are listed in the References section below.

### Production

Production data represents vanadium contained in mine or mill production and petroleum byproducts in the United States. Data are reported in the MR and MYB for 1901–02, 1907, 1911–23, 1925–26, and 1932–54, the CDS for 1955–77, and the MCS for 1978–96. When possible, the contained vanadium in mill recovery was used to account for vanadium from vanadium and uranium ores, as well as vanadium recovered from ferrophosphorous slag derived from domestic phosphate rock. Data were not available for 1903–06, 1908–10, 1924, 1927–31, and 2000–07. From 1955–68, data was reported as vanadium in ores and concentrates. Data for 1997–99 are withheld in order to avoid disclosing proprietary data.

### Imports

Depending on the year, import data include the amount of vanadium content in ash, ore, concentrate, residue, slag; vanadium pentoxide anhydride; other oxides and hydroxides; aluminum-vanadium master alloys, and ferrovanadium imported into the United States. From year to year or for a range of years, materials included in reported imports changed, as did the types of materials. Data are reported in some MR for 1908–31, MYB for 1932–54, the CDS for 1955–77, and the MCS for 1978–99. Data were not available for 1901–07, 1909–17, 1931–33, 1956–58, 1961–63, and 1965. Prior to 1942, data was reported as vanadium contained in ores and concentrates. Although, not specifically stated, vanadium in flue dust may have been included. From 1942–54 data was reported in the MYB as vanadium in ores, concentrates, and flues dust. From 1955–68, the MYB and CDS reported imports as vanadium in ore and concentrates, in 1969–70 as vanadium in ores, slags, and residues. The significant increase in imports from 1968–69 was a result of increasing domestic demand for application of vanadium in the domestic aerospace and steel industries. From 1971–72, imports included vanadium pentoxide (anhydride). In 1973–87, imports included ferrovanadium to the existing categories. From 1988–92, vanadium in ores, slags, residues, vanadium pentoxide (anhydride), oxides and hydroxides, aluminum vanadium master alloys (by gross weight), and ferrovanadium made up the category. In 1993, vanadium in ash was added as a replacement for ore in the ores, slags, and residues category, (1998 MCS), ore imports were added back to this category in 1994 (1999 MCS). Data for 2000 to the most recent year are unpublished revisions provided by the USGS vanadium commodity specialist.

### Exports

Export data report (when available) the total amount of vanadium contained in vanadium pentoxide anhydride, other oxides and hydroxides, aluminum-vanadium master alloys, and ferrovanadium exported from the United States. Data are from the MR for 1908–31, MYB for 1932–54, the CDS for 1955–77, and the MCS for 1978–99. Data were not available for 1901–02, 1904–11, and 1926–40. The several-fold increase in exports from 1954 to 1955 resulted from an increase in demand from Europe, coupled with the inability for African producers to expand production. The significant decrease in exports from 1968 to 1969 was a result of increasing domestic demand for application of vanadium in the domestic aerospace and steel industries. Data for 2000 to the most recent year are unpublished revisions provided by the USGS vanadium commodity specialist.

### Stocks

Stocks data report the amount of contained vanadium held in consumer stocks. Data were not available for 1900–54. Data are from the CDS for 1955–77 and the MCS for 1978 to the most recent year.

### Apparent Consumption

Apparent consumption was estimated for 1901–02, 1907–08, 1911–15, 1917, 1919–30, and 1932–54 by using the formula:

$$\text{APPARENT CONSUMPTION} = \text{PRODUCTION} + \text{IMPORTS} - \text{EXPORTS} \pm \text{CHANGES IN STOCKS.}$$

No imports, exports, or stocks data were available for 1901, 1907, 1911, and 1932–33 and were assumed zero to calculate apparent consumption to two significant figures. No imports or stocks data were available for 1902, 1912–15, and 1917. The values were assumed zero to calculate apparent consumption to two figures. Apparent consumption was estimated by interpolation for 1903–06, 1909–10, 1916, 1918, and 1931. No production, exports, or stocks data were available for 1908, and 1927–30 and were assumed equal to zero to calculate apparent consumption to two significant figures. No stocks data were available for 1919–23, 1925, and 1941–54 and were assumed equal to zero to calculate apparent consumption to two significant figures. No production or stocks data were available for 1926 and 1934–40 and were assumed zero to calculate apparent consumption to two significant figures. No exports or stocks data were available for 1924 and were assumed zero to calculate apparent consumption to two significant figures. Reported consumption was used as an estimate for apparent consumption from the MYB for 1955–85, 1987–91, and 1995–98. Estimates for 1986, 1992–94, and 1999 to the most recent year were generated from data maintained by the USGS vanadium commodity specialist.

**Unit Value (\$/t)**

Unit value is the value, in dollars, of 1 metric ton (t) of vanadium apparent consumption. Data are from the MR and MYB for 1910–12, 1915–17, 1923, 1925–26, 1930, 1932–33, 1941–52, the CDS for 1955–61, and 1964–77, and the MCS for 1978 to the most recent year. Unit value was estimated for the United States in actual dollars by using the price derived from dividing the vanadium pentoxide price by 0.5602. Unit value was interpolated for 1913–14, 1918, 1920–22, 1924, 1927–29, 1931, 1934–40, 1953–54, and 1962–63. Data were not available for 1901–09.

**Unit Value (98\$/t)**

The Consumer Price Index conversion factor, with 1998 as the base year, is used to adjust unit value in current U.S. dollars to the unit value in constant 1998 U.S. dollars. Data were not available for 1901–09.

**World Production**

World production data are for mine production of vanadium. Data are from the MR and MYB for 1912–22, 1925, 1927–31, 1934–43, 1945–47, and 1998 to the most recent year, the CDS for 1960–77, and the MCS for 1978–84 and 1990–97. Data were not available for 1901–11, 1923–24, and 1948–59. World production was interpolated to two significant figures for 1926, 1932–33, 1944, and 1985–89. World production data for 1927–31, 1997–99, and 2007 to the most recent do not contain U.S. production.

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**For more information, please contact:**

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