

TITANIUM AND TITANIUM DIOXIDE¹

(Data in metric tons, unless otherwise noted)

Domestic Production and Use: Titanium sponge metal was produced by two operations in Nevada and Utah. Ingot was made by the two sponge producers and by nine other firms in seven States. About 30 firms consumed ingot to produce forged components, mill products, and castings. In 2002, an estimated 65% of the titanium metal used was in aerospace applications. The remaining 35% was used in armor, chemical processing, power generation, marine, medical, sporting goods, and other nonaerospace applications. The value of sponge metal consumed was about \$148 million, assuming an average selling price of \$7.77 per kilogram. The value of ingot produced from sponge and scrap was estimated to be \$420 million.

In 2002, titanium dioxide (TiO₂) pigment, valued at about \$2.7 billion, was produced by four companies at eight facilities in seven States. Estimated use of TiO₂ pigment by end use was paint, varnishes, and lacquers, 49%; paper, 16%; plastics, 25%; and other, 10%. Other uses of TiO₂ included catalysts, ceramics, coated fabrics and textiles, floor coverings, printing ink, and roofing granules.

Salient Statistics—United States:	1998	1999	2000	2001	2002^e
Titanium sponge metal:					
Production	W	W	W	W	W
Imports for consumption	10,900	6,000	7,240	13,300	12,600
Exports	348	807	1,930	2,170	2,000
Shipments from Government stockpile excesses	1,384	515	4,870	7,640	3,340
Consumption, reported	28,200	18,100	18,200	26,200	19,000
Price, dollars per kilogram, yearend	9.70	9.37	9.37	7.89	7.77
Stocks, industry yearend ^e	10,600	7,970	5,010	6,340	10,000
Employment, number ^e	300	300	300	300	300
Net import reliance ² as a percentage of reported consumption	39	44	72	67	54
Titanium dioxide:					
Production	1,330,000	1,350,000	1,400,000	1,330,000	1,380,000
Imports for consumption	200,000	225,000	218,000	209,000	220,000
Exports	398,000	384,000	464,000	415,000	470,000
Consumption, apparent	1,140,000	1,160,000	1,150,000	1,100,000	1,160,000
Price, rutile, list, dollars per pound, yearend	0.98	1.01	1.01	1.05	1.05
Stocks, producer, yearend	103,000	137,000	141,000	159,000	130,000
Employment, number ^e	4,600	4,600	4,600	4,600	4,500
Net import reliance ² as a percentage of apparent consumption	E	E	E	E	E

Recycling: New scrap metal recycled by the titanium industry totaled about 13,300 tons in 2002. Estimated use of titanium as scrap and ferrotitanium by the steel industry was about 6,900 tons; by the superalloy industry, 830 tons; and, in other industries, 300 tons. Old scrap reclaimed totaled about 500 tons.

Import Sources (1998-2001): Sponge metal: Japan, 36%; Russia, 36%; Kazakhstan, 25%; and other, 3%. Titanium dioxide pigment: Canada, 33%; Germany, 12%; France, 8%; Spain, 6%; China, 5%; and other, 36%.

Tariff: Item	Number	Normal Trade Relations 12/31/02
Titanium oxides (unfinished TiO ₂ pigment)	2823.00.0000	5.5% ad val.
TiO ₂ pigments, 80% or more TiO ₂	3206.11.0000	6.0% ad val.
TiO ₂ pigments, other	3206.19.0000	6.0% ad val.
Ferrotitanium and ferrosilicon titanium	7202.91.0000	3.7% ad val.
Titanium waste and scrap metal	8108.30.0000	Free.
Unwrought titanium metal	8108.20.0000	15.0% ad val.
Wrought titanium metal	8108.90.6000	15.0% ad val.
Other titanium metal articles	8108.90.3000	5.5% ad val.

Depletion Allowance: Not applicable.

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Government Stockpile: The Defense National Stockpile Center (DNSC) continued to solicit offers for the sale of titanium sponge held in the Government stockpile. For fiscal year 2003, 6,350 tons of sponge is planned for disposal. In support of an armor upgrade program, DNSC provided the U.S. Army with 227 tons of titanium sponge metal. The quantities shown below include stockpile and nonstockpile-grade sponge.

Material	Stockpile Status—9-30-02 ³			Disposal plan FY 2002	Disposals FY 2002
	Uncommitted inventory	Committed inventory	Authorized for disposal		
Titanium sponge	15,300	1,160	15,300	6,350	6,570

Events, Trends, and Issues: In 2002, estimated domestic production of TiO₂ pigment was 1.38 million tons, a 4% increase compared with that of 2001. Imports of TiO₂ pigment increased by 10% compared with 2001, while exports increased 13%. Apparent consumption of pigment increased 5% and published prices of rutile-grade pigment were unchanged. Imports of titanium sponge metal decreased by an estimated 5% compared with those of 2001. Consumption of titanium sponge metal in 2002 decreased an estimated 27% compared with that of 2001.

World Sponge Metal Production and Sponge and Pigment Capacity:

	Sponge production		Capacity 2002 ⁴	
	2001	2002 ^e	Sponge	Pigment
United States	W	W	8,940	1,570,000
Australia	—	—	—	213,000
Belgium	—	—	—	100,000
Canada	—	—	—	81,000
China ^e	2,500	4,000	6,900	100,000
Finland	—	—	—	120,000
France	—	—	—	225,000
Germany	—	—	—	411,000
Italy	—	—	—	80,000
Japan	24,900	25,000	30,000	346,000
Kazakhstan ^e	14,000	14,000	22,000	1,000
Mexico	—	—	—	120,000
Russia ^e	23,000	23,000	26,000	20,000
Spain	—	—	—	65,000
Ukraine ^e	6,100	6,200	6,500	120,000
United Kingdom	—	—	—	335,000
Other countries	—	—	—	618,000
World total (rounded)	⁵ 71,000	⁵ 72,000	100,000	4,500,000

World Resources:⁶ Resources and reserves of titanium minerals (ilmenite and rutile) are discussed in Titanium Mineral Concentrates. Titanium for domestic sponge production was obtained from rutile or rutile substitutes. The feedstock sources for pigment production were ilmenite, slag, and synthetic rutile.

Substitutes: Although there are few substitutes for titanium in aircraft and space use, graphite-based materials may displace some titanium used in future military aircraft. For industrial uses, high-nickel steel, zirconium, and, to a limited extent, the superalloy metals may be substituted for titanium alloys. Ground calcium carbonate, precipitated calcium carbonate, kaolin, and talc compete with titanium dioxide as a white pigment.

^eEstimated. E Net exporter. W Withheld to avoid disclosing company proprietary data. — Zero.

¹See also Titanium Mineral Concentrates.

²Defined as imports - exports + adjustments for Government and industry stock changes.

³See Appendix B for definitions.

⁴Operating capacity.

⁵Excludes U.S. production.

⁶See Appendix C for definitions.