

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. Numerous firms consumed ingot to produce forged components, mill products, and castings. In 2003, an estimated 55% of the titanium metal used was in aerospace applications. The remaining 45% was used in armor, chemical processing, marine, medical, power generation, sporting goods, and other nonaerospace applications. The value of sponge metal consumed was about \$107 million, assuming an average selling price of \$6.50 per kilogram. The value of ingot produced from sponge and scrap was estimated to be \$215 million.

In 2003, titanium dioxide (TiO₂) pigment, valued at about \$2.8 billion, was produced by four companies at eight facilities in seven States. Estimated use of TiO₂ pigment by end use was paint (includes lacquers and varnishes) 53%; plastic and rubber, 27%; paper, 15%; and other, 5%. Other uses of TiO₂ included catalysts, ceramics, coated fabrics and textiles, floor coverings, printing ink, and roofing granules.

Salient Statistics—United States:	1999	2000	2001	2002	2003^e
Titanium sponge metal:					
Production	W	W	W	W	W
Imports for consumption	6,000	7,240	13,300	10,700	10,000
Exports	807	1,930	2,170	2,810	5,150
Shipments from Government stockpile excesses	515	4,900	7,640	5,400	5,490
Consumption, reported	18,100	18,200	26,200	17,300	16,500
Price, dollars per kilogram, yearend	9.37	9.37	7.89	8.02	6.50
Stocks, industry yearend ^e	7,970	5,010	6,340	11,700	10,000
Employment, number ^e	300	300	300	300	300
Net import reliance ² as a percentage of reported consumption	44	72	67	46	73
Titanium dioxide:					
Production	1,350,000	1,400,000	1,330,000	1,410,000	1,410,000
Imports for consumption	225,000	218,000	209,000	231,000	238,000
Exports	384,000	464,000	415,000	540,000	590,000
Consumption, apparent	1,160,000	1,150,000	1,100,000	1,120,000	1,070,000
Price, rutile, list, dollars per pound, yearend	1.01	1.01	1.05	0.90	0.90
Stocks, producer, yearend	137,000	141,000	159,000	137,000	130,000
Employment, number ^e	4,600	4,600	4,600	4,500	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 15,000 tons in 2003. Estimated use of titanium as scrap and ferrotitanium by the steel industry was about 5,900 tons; by the superalloy industry, 1,400 tons; and, in other industries, 650 tons. Old scrap reclaimed totaled about 500 tons.

Import Sources (1999-2002): Sponge metal: Japan, 40%; Kazakhstan, 39%; Russia, 18%; and other, 3%. Titanium dioxide pigment: Canada, 31%; Germany, 12%; France, 8%; Spain, 6%; and other, 43%.

Tariff: Item	Number	Normal Trade Relations 12/31/03
Titanium oxides (unfinished TiO ₂ pigments)	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 2004, 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—9-30-03 ³			Disposal plan FY 2003	Disposals FY 2003
	Uncommitted inventory	Committed inventory	Authorized for disposal		
Titanium sponge	8,910	1,050	8,910	6,350	6,380

Events, Trends, and Issues: Estimated domestic production of TiO₂ pigment was 1.41 million tons, nearly unchanged compared with that of 2002. Imports of TiO₂ pigment increased 3% compared with 2002, while exports increased 9%. Apparent consumption of pigment decreased 4% and published prices of rutile-grade pigment were unchanged. Capacity at several domestic TiO₂ pigment operations was being increased through process improvements. Despite a plant closure in 2001, domestic TiO₂ pigment capacity has increased by about 100,000 tons per year since 1999.

Depressed sales of commercial aircraft continued to limit demand for titanium metal. Domestic consumption of titanium sponge metal in 2003 decreased an estimated 5% compared with that of 2002. Imports of titanium sponge metal decreased by an estimated 7%. Owing in part to shipments from the Government stockpile, exports of titanium sponge increased 83%. Published prices for titanium sponge, ingot, and mill products decreased significantly. Numerous projects were underway to develop a low-cost method for producing titanium metal products.

World Sponge Metal Production and Sponge and Pigment Capacity:

	Sponge production		Capacity 2003 ⁴	
	2002	2003 ^e	Sponge	Pigment
United States	W	W	8,940	1,580,000
Australia	—	—	—	213,000
Belgium	—	—	—	100,000
Canada	—	—	—	81,000
China ^e	3,300	3,600	6,900	450,000
Finland	—	—	—	120,000
France	—	—	—	225,000
Germany	—	—	—	411,000
Italy	—	—	—	80,000
Japan	25,200	20,000	31,000	317,000
Kazakhstan ^e	14,000	12,000	22,000	1,000
Mexico	—	—	—	120,000
Russia ^e	23,000	23,000	26,000	20,000
Spain	—	—	—	80,000
Ukraine ^e	6,100	6,700	6,700	120,000
United Kingdom	—	—	—	330,000
Other countries	—	—	—	641,000
World total (rounded)	⁵ 72,000	⁵ 65,000	100,000	4,900,000

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 today, intermetallic and composite 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.