

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 2005, an estimated 65% of the titanium metal was used in aerospace applications. The remaining 35% was used in armor, chemical processing, marine, medical, power generation, sporting goods, and other nonaerospace applications. The value of sponge metal consumed was about \$216 million, assuming an average selling price of \$8.00 per kilogram.

In 2005, titanium dioxide (TiO₂) pigment, valued at about \$3.1 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) 54%; plastic, 27%; paper, 16%; and other, 3%. Other uses of TiO₂ included catalysts, ceramics, coated fabrics and textiles, floor coverings, printing ink, and roofing granules.

Salient Statistics—United States:	2001	2002	2003	2004	2005^e
Titanium sponge metal:					
Production	W	W	W	W	W
Imports for consumption	13,300	10,700	9,590	11,900	15,000
Exports	2,170	2,810	5,000	2,410	2,000
Shipments from Government stockpile excesses	7,640	5,400	6,820	3,910	2,510
Consumption, reported	26,200	17,300	17,100	21,200	27,000
Price, dollars per kilogram, yearend	7.89	8.02	6.50	8.50	7.90
Stocks, industry yearend ^e	6,340	11,700	8,180	7,660	7,000
Employment, number ^e	300	300	300	300	300
Net import reliance ² as a percentage of reported consumption	67	46	89	66	60
Titanium dioxide:					
Production	1,330,000	1,410,000	1,420,000	1,540,000	1,420,000
Imports for consumption	209,000	231,000	240,000	264,000	330,000
Exports	415,000	540,000	584,000	635,000	560,000
Consumption, apparent	1,100,000	1,110,000	1,070,000	1,170,000	1,190,000
Price, rutile, list, dollars per pound, yearend	1.05	0.90	0.88	1.00	1.03
Stocks, producer, yearend	159,000	145,000	156,000	NA	NA
Employment, number ^e	4,600	4,500	4,500	4,400	4,300
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 24,000 tons in 2005. Estimated use of titanium as scrap and ferrotitanium by the steel industry was about 8,700 tons; by the superalloy industry, 600 tons; and, in other industries, 800 tons. Old scrap reclaimed totaled about 500 tons.

Import Sources (2001-04): Sponge metal: Kazakhstan, 49%; Japan, 39%; Russia, 10%; and other, 2%. Titanium dioxide pigment: Canada, 29%; Germany, 11%; France, 9%; China, 7%; and other, 44%.

Tariff:	Item	Number	Normal Trade Relations 12-31-05
	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 continued the sale of titanium sponge held in the Government stockpile. In fiscal year 2006, the remaining inventory of sponge will be exhausted.

Material	Uncommitted inventory	Stockpile Status—9-30-05 ³		Disposal plan FY 2005	Disposals FY 2005
		Committed inventory	Authorized for disposal		
Titanium sponge	679	—	679	6,350	1,845

Events, Trends, and Issues: In August, hurricanes disrupted production at two TiO₂ pigment plants in Mississippi. Although one plant was restarted in October, the other affected plant remained idle for the rest of the year. Domestic production of TiO₂ pigment was an estimated 1.42 million tons, an 8% decrease compared with that of 2004. Global production of TiO₂ was estimated to have increased slightly compared with that of 2004. A U.S. TiO₂ pigment producer announced plans to construct a 200,000-ton-per-year TiO₂ pigment plant near Dongying, China, by 2010.

Driven by rising demand from commercial aircraft and military markets, domestic production and consumption of titanium sponge metal continued to rise in 2005. Fueled by increased demand, U.S. titanium producers announced several plans to expand production capacity. In Henderson, NV, plans were underway to increase titanium sponge capacity to 12,600 tons per year by 2007. A 3,400-ton-per-year sponge plant at Albany, OR, was being refurbished and was expected to be operational by the second half of 2006. In Japan, sponge capacity was being increased to 39,000 tons per year by April 2006. Sponge capacity in Russia was expected to rise to 32,000 tons per year by 2007. Efforts to develop a low-cost method for producing titanium metal were ongoing.

World Sponge Metal Production and Sponge and Pigment Capacity:

	Sponge production		Capacity 2005 ⁴	
	2004	2005 ^e	Sponge	Pigment
United States	W	W	8,940	1,580,000
Australia	—	—	—	241,000
Belgium	—	—	—	74,000
Canada	—	—	—	90,000
China ^e	4,800	6,500	9,500	500,000
Finland	—	—	—	130,000
France	—	—	—	225,000
Germany	—	—	—	440,000
Italy	—	—	—	80,000
Japan	23,100	29,000	37,000	317,000
Kazakhstan ^e	16,500	19,000	22,000	1,000
Mexico	—	—	—	125,000
Russia ^e	23,000	25,000	28,000	20,000
Spain	—	—	—	80,000
Ukraine ^e	7,500	8,100	8,100	120,000
United Kingdom	—	—	—	290,000
Other countries	—	—	—	670,000
World total (rounded)	⁵ 75,000	⁵ 88,000	110,000	5,000,000

World Resources:⁶ Resources and reserves of titanium minerals are discussed in Titanium Mineral Concentrates. The commercial feedstock sources for titanium are ilmenite, leucoxene, rutile, slag, and synthetic rutile.

Substitutes: There are few materials that possess titanium metal's strength to weight ratio and corrosion resistance. In high-strength applications, titanium competes with aluminum, composites, intermetallics, steel, and superalloys. For applications that require corrosion resistance, aluminum, nickel, specialty steels, and zirconium alloys may be substituted for titanium. Ground calcium carbonate, precipitated calcium carbonate, kaolin, and talc compete with titanium dioxide as a white pigment.

^eEstimated. E Net exporter. NA Not available. 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.