

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 2004, an estimated 60% of the titanium metal was used in aerospace applications. The remaining 40% was used in armor, chemical processing, marine, medical, power generation, sporting goods, and other nonaerospace applications. The value of sponge metal consumed was about \$190 million, assuming an average selling price of \$8.50 per kilogram.

In 2004, titanium dioxide (TiO₂) pigment, valued at about \$2.9 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) 56%; plastic and rubber, 23%; paper, 16%; 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:	2000	2001	2002	2003	2004^e
Titanium sponge metal:					
Production	W	W	W	W	W
Imports for consumption	7,240	13,300	10,700	9,590	12,300
Exports	1,930	2,170	2,810	5,000	2,500
Shipments from Government stockpile excesses	4,900	7,640	5,400	6,820	5,060
Consumption, reported	18,200	26,200	17,300	16,800	22,400
Price, dollars per kilogram, yearend	9.37	7.89	8.02	6.50	8.50
Stocks, industry yearend ^e	5,010	6,340	11,700	8,180	4,000
Employment, number ^e	300	300	300	300	300
Net import reliance ² as a percentage of reported consumption	72	67	46	89	85
Titanium dioxide:					
Production	1,400,000	1,330,000	1,410,000	1,420,000	1,430,000
Imports for consumption	218,000	209,000	231,000	240,000	265,000
Exports	464,000	415,000	540,000	584,000	590,000
Consumption, apparent	1,150,000	1,100,000	1,120,000	1,060,000	1,120,000
Price, rutile, list, dollars per pound, yearend	1.01	1.05	0.90	0.88	0.93
Stocks, producer, yearend	141,000	159,000	145,000	156,000	146,000
Employment, number ^e	4,600	4,600	4,500	4,500	4,400
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 17,000 tons in 2004. Estimated use of titanium as scrap and ferrotitanium by the steel industry was about 7,000 tons; by the superalloy industry, 1,200 tons; and, in other industries, 800 tons. Old scrap reclaimed totaled about 500 tons.

Import Sources (2000-03): Sponge metal: Kazakhstan, 46%; Japan, 42%; Russia, 10%; and other, 2%. Titanium dioxide pigment: Canada, 29%; Germany, 12%; France, 8%; China, 7%; and other, 44%.

Tariff:	Item	Number	Normal Trade Relations
			12-31-04
	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. For fiscal year 2005, the remaining inventory of sponge is planned for disposal.

Material	Stockpile Status—9-30-04 ³				Disposal plan FY 2004	Disposals FY 2004
	Uncommitted inventory	Committed inventory	Authorized for disposal			
Titanium sponge	2,520	1,870	2,520		6,350	5,570

Events, Trends, and Issues: Domestic production of TiO₂ pigment was 1.43 million tons, a slight increase compared with that of 2003. Global production of TiO₂ was an estimated 4.50 million tons, a 3% increase compared with that of 2003. Owing to poor demand for anatase-grade pigment, the sulfate-process TiO₂ pigment plant at Savannah, GA, was idled. At the same facility, the chloride-process capacity was being increased through process improvements.

Driven by soaring demand from commercial aircraft and military markets, domestic consumption of titanium sponge metal in 2004 increased an estimated 33% compared with that of 2004. Imports of titanium sponge metal increased by an estimated 28%. Published prices for titanium sponge, ingot, and mill products increased significantly. Efforts to develop a low-cost method for producing titanium metal were ongoing.

In China, plans were underway to increase both TiO₂ pigment and titanium metal production capacity. At yearend, construction was completed to raise sponge capacity at the Zunyi facility to 5,000 tons per year. China's total sponge capacity was expected to reach 10,000 tons per year by 2010.

World Sponge Metal Production and Sponge and Pigment Capacity:

	Sponge production		Capacity 2004 ⁴	
	2003	2004 ^e	Sponge	Pigment
United States	W	W	8,940	1,520,000
Australia	—	—	—	213,000
Belgium	—	—	—	100,000
Canada	—	—	—	81,000
China ^e	4,100	4,400	7,200	500,000
Finland	—	—	—	120,000
France	—	—	—	225,000
Germany	—	—	—	413,000
Italy	—	—	—	80,000
Japan	18,900	23,500	31,000	317,000
Kazakhstan ^e	12,500	16,500	22,000	1,000
Mexico	—	—	—	120,000
Russia ^e	23,000	26,000	26,000	20,000
Spain	—	—	—	80,000
Ukraine ^e	6,750	7,150	8,000	120,000
United Kingdom	—	—	—	330,000
Other countries	—	—	—	641,000
World total (rounded)	⁵ 65,300	⁵ 78,000	100,000	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, leucosene, 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. 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.