

TITANIUM AND TITANIUM DIOXIDE¹

(Data in metric tons unless otherwise noted)

Domestic Production and Use: Titanium sponge metal was produced by three operations in Nevada, Oregon, and Utah. Ingot was produced by eight operations in eight States. Numerous firms consumed ingot to produce wrought products and castings. In 2007, an estimated 76% of the titanium metal was used in aerospace applications. The remaining 24% was used in armor, chemical processing, marine, medical, power generation, sporting goods, and other nonaerospace applications. The value of sponge metal consumed was about \$563 million, assuming an average selling price of \$15.90 per kilogram.

In 2007, titanium dioxide (TiO₂) pigment, which was valued at about \$3.6 billion, was produced by four companies at eight facilities in seven States. The estimated use of TiO₂ pigment by end use was paint (includes lacquers and varnishes), 57%; plastic, 26%; paper, 13%; and other, 4%. Other uses of TiO₂ included catalysts, ceramics, coated fabrics and textiles, floor coverings, printing ink, and roofing granules.

Salient Statistics—United States:	2003	2004	2005	2006	2007^e
Titanium sponge metal:					
Production	W	W	W	W	W
Imports for consumption	9,590	11,900	15,800	24,400	24,200
Exports	5,000	2,410	1,910	1,380	2,310
Shipments from Government stockpile excesses	6,820	3,910	2,510	—	—
Consumption, reported	17,100	21,200	26,100	28,400	35,400
Price, dollars per kilogram, yearend	6.50	8.50	9.23	13.58	16.00
Stocks, industry yearend ^e	8,180	7,660	4,330	8,240	7,600
Employment, number ^e	300	300	300	350	400
Net import reliance ² as a percentage of reported consumption	87	66	73	67	64
Titanium dioxide:					
Production	1,420,000	1,540,000	1,310,000	1,400,000	1,450,000
Imports for consumption	240,000	264,000	341,000	288,000	260,000
Exports	584,000	635,000	524,000	581,000	600,000
Consumption, apparent	1,070,000	1,170,000	1,130,000	1,110,000	1,110,000
Producer price index, yearend	144	158	172	165	163
Stocks, producer, yearend	156,000	NA	NA	NA	NA
Employment, number ^e	4,500	4,400	4,300	4,300	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 23,200 tons in 2007. Estimated use of titanium as scrap and ferrotitanium by the steel industry was about 8,300 tons; by the superalloy industry, 1,300 tons; and, in other industries, 1,700 tons. Old scrap reclaimed totaled about 600 tons.

Import Sources (2003-06): Sponge metal: Kazakhstan, 51%; Japan, 37%; Russia, 7%; Ukraine, 3%; and other, 2%. Titanium dioxide pigment: Canada, 30%; China, 12%; Germany, 9%; France, 7%; and other, 42%.

Tariff: Item	Number	Normal Trade Relations 12-31-07
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.
Other titanium metal articles	8108.90.3000	5.5% ad val.
Wrought titanium metal	8108.90.6000	15.0% ad val.

Depletion Allowance: Not applicable.

Government Stockpile: None.

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Events, Trends, and Issues: Domestic production of TiO₂ pigment was an estimated 1.45 million tons, a moderate increase compared with that of 2006. Global production of TiO₂ was estimated to have increased 2% compared with that of 2006. TiO₂ pigment capacity expansions that were underway and soon to be commissioned included those in Kwinana, Australia (50,000 tons per year), Yanbu, Saudi Arabia (92,000 tons per year), and Greatham, United Kingdom (50,000 tons per year). In New Johnsonville, TN, capacity to produce titanium tetrachloride—the chemical intermediate used to produce titanium metal, TiO₂ pigment, and other compounds—was being expanded by 45,000 tons per year. A Saudi Arabian producer of TiO₂ pigment with 100,000 tons per year of capacity acquired a U.S. TiO₂ producer with 670,000 tons per year of global capacity. The acquisition made the Saudi Arabian producer the second largest TiO₂ pigment producer in the world. A U.S.-based company planned to construct a 200,000 ton-per-year chloride-route TiO₂ pigment plant in Dongying, China, by 2010.

Domestic consumption of titanium sponge used to produce titanium ingot increased 25% compared with that of 2006. Titanium metal producers were adding capacity to keep pace with rising demand from commercial aerospace. In Albany, OR, sponge capacity was expected to reach 7,260 tons per year by yearend 2007. In Rowley, UT, a new 10,900-ton-per-year sponge plant was expected to begin producing in 2008. In Henderson, NV, sponge capacity was expected to increase to 12,600 tons per year by yearend. China's sponge capacity was expected to rise to 50,000 tons per year by 2008. Japan's sponge capacity was expected to rise to 52,000 tons per year by 2009. Russian production capacity was expected to increase to 44,000 tons per year by 2008 and 56,000 tons per year by 2012. Several concerted efforts to develop a low-cost method for producing titanium metal were ongoing.

World Sponge Metal Production and Sponge and Pigment Capacity: In 2007, capacity for China, Kazakhstan, Russia, Ukraine, and the United States was increased based on new published information and presentations.

	Sponge production		Capacity 2007 ³	
	2006	2007 ^e	Sponge	Pigment
United States	W	W	20,200	1,580,000
Australia	—	—	—	241,000
Belgium	—	—	—	74,000
Canada	—	—	—	90,000
China ^e	18,000	32,000	45,000	500,000
Finland	—	—	—	130,000
France	—	—	—	225,000
Germany	—	—	—	440,000
Italy	—	—	—	80,000
Japan	37,800	39,000	39,000	317,000
Kazakhstan ^e	23,000	25,000	26,000	1,000
Mexico	—	—	—	125,000
Russia ^e	32,000	32,000	32,000	20,000
Spain	—	—	—	80,000
Ukraine ^e	10,000	10,000	10,000	120,000
United Kingdom	—	—	—	290,000
Other countries	—	—	—	670,000
World total (rounded)	⁴ 121,000	⁴ 138,000	170,000	5,000,000

World Resources:⁵ 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. Aluminum, nickel, specialty steels, and zirconium alloys may be substituted for titanium for applications that require corrosion resistance. 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.

³Operating capacity.

⁴Excludes U.S. production.

⁵See Appendix C for definitions.