

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 and Utah. Ingot was produced by 10 operations in 8 States. Numerous firms consumed ingot to produce wrought products and castings. In 2011, an estimated 66% of the titanium metal was used in aerospace applications. The remaining 34% was used in armor, chemical processing, marine, medical, power generation, sporting goods, and other nonaerospace applications. The value of sponge metal consumed was about \$515 million, assuming an average selling price of \$10.50 per kilogram.

In 2011, titanium dioxide (TiO₂) pigment, which was valued at about \$3.8 billion, was produced by four companies at six facilities in five States. The estimated use of TiO₂ pigment by end use was paint (includes lacquers and varnishes), 57%; plastic, 27%; paper, 10%; and other, 6%. Other uses of TiO₂ included catalysts, ceramics, coated fabrics and textiles, floor coverings, printing ink, and roofing granules.

Salient Statistics—United States:	2007	2008	2009	2010	2011^e
Titanium sponge metal:					
Production	W	W	W	W	W
Imports for consumption	25,900	23,900	16,600	20,500	32,000
Exports	2,000	2,370	820	293	200
Consumption, reported	33,700	W	W	34,900	49,000
Price, dollars per kilogram, yearend	14.76	15.64	15.58	10.74	10.30
Stocks, industry yearend ^e	7,820	14,200	15,300	10,500	8,500
Employment, number ^e	400	350	300	300	300
Net import reliance ² as a percentage of reported consumption	72	W	W	72	69
Titanium dioxide:					
Production	1,440,000	1,350,000	1,230,000	1,320,000	1,420,000
Imports for consumption	221,000	183,000	175,000	204,000	180,000
Exports	682,000	733,000	649,000	758,000	815,000
Consumption, apparent	979,000	800,000	757,000	767,000	785,000
Producer price index, yearend	162	170	164	194	252
Stocks, producer, yearend	NA	NA	NA	NA	NA
Employment, number ^e	4,300	4,200	3,800	3,400	3,400
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 27,000 tons in 2011. Estimated use of titanium as scrap and ferrotitanium by the steel industry was about 10,000 tons; by the superalloy industry, 1,000 tons; and in other industries, 1,000 tons. Old scrap reclaimed totaled about 1,000 tons.

Import Sources (2007–10): Sponge metal: Kazakhstan, 51%; Japan, 37%; China, 5%; Russia, 4%; and other, 3%. Titanium dioxide pigment: Canada, 41%; China, 13%; Germany, 6%; Finland, 6%; and other, 34%.

Tariff:	Item	Number	Normal Trade Relations
			12-31-11
	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.
	Unwrought titanium metal	8108.20.0000	15.0% ad val.
	Titanium waste and scrap metal	8108.30.0000	Free.
	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: Because TiO₂ pigment is used in paint, paper, and plastics, consumption is tied to the Gross Domestic Product (GDP). In June, the World Bank forecast domestic (2.5%) and global (4.3%) GDP growth in 2011. Increased consumption and production of TiO₂ pigment was led by China. To meet rising domestic and global TiO₂ consumption, domestic production of TiO₂ pigment increased to 1.4 million tons, an 8% increase compared with that in 2010.

In 2011, global consumption of titanium metal in commercial aerospace and industrial markets rose significantly. Increasing demand and reduced inventories brought about by production curtailments made in 2009 and 2010 caused several metal producers to increase titanium sponge production capacity. China's titanium metal and TiO₂ pigment production capacity grew most significantly.

In the United States, new titanium production capacity neared completion in Ottawa, IL. Instead of sponge produced by magnesium reduction via the Kroll process, the plant produced titanium metal powder by sodium reduction by the Armstrong process. Production capacity was expected to be 2,000 tons per year by yearend 2011. At least three other Kroll-alternative titanium technologies were in the pilot-plant stage of development.

Japan and Kazakhstan were the leading U.S. import sources of titanium sponge in 2011, and China emerged as a major import source for the first time. Increased imports of titanium sponge were led by China and Japan.

World Sponge Metal Production and Sponge and Pigment Capacity: Capacity estimates were revised based on new information from industry reports.

	Sponge production		Capacity 2011 ³	
	2010	2011 ^e	Sponge	Pigment
United States	W	W	24,000	1,470,000
Australia	—	—	—	281,000
Belgium	—	—	—	74,000
Canada	—	—	—	90,000
China ^e	57,800	60,000	114,000	2,000,000
Finland	—	—	—	130,000
France	—	—	—	125,000
Germany	—	—	—	440,000
Italy	—	—	—	80,000
Japan ^e	31,600	56,000	62,200	309,000
Kazakhstan ^e	14,500	20,700	26,000	1,000
Mexico	—	—	—	130,000
Russia ^e	25,800	40,000	46,500	20,000
Spain	—	—	—	80,000
Ukraine ^e	7,400	9,000	10,000	120,000
United Kingdom	—	—	—	300,000
Other countries	—	—	—	900,000
World total (rounded)	⁴ 137,000	⁴ 186,000	283,000	6,550,000

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.

³Yearend operating capacity.

⁴Excludes U.S. production.

⁵See Appendix C for resource/reserve definitions and information concerning data sources.