

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. A fourth operation was expected to be commissioned in Rowley, UT, by yearend. Ingot was produced by 10 operations in 8 States. Numerous firms consumed ingot to produce wrought products and castings. In 2009, 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 \$310 million, assuming an average selling price of \$12.90 per kilogram.

In 2009, titanium dioxide (TiO₂) pigment, which was valued at about \$2.7 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), 59%; plastic, 25%; 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:	2005	2006	2007	2008	2009^e
Titanium sponge metal:					
Production	W	W	W	W	W
Imports for consumption	15,800	24,400	25,900	23,900	17,000
Exports	1,910	1,380	2,000	2,370	1,000
Shipments from Government stockpile excesses	2,510	—	—	—	—
Consumption, reported	26,100	28,400	33,700	W	24,000
Price, dollars per kilogram, yearend	17.28	20.62	14.76	15.64	12.90
Stocks, industry yearend ^e	4,330	8,240	7,820	14,200	14,000
Employment, number ^e	300	350	400	350	300
Net import reliance ² as a percentage of reported consumption	73	67	72	W	67
Titanium dioxide:					
Production	1,310,000	1,370,000	1,440,000	1,350,000	1,150,000
Imports for consumption	341,000	288,000	221,000	183,000	170,000
Exports	524,000	581,000	682,000	733,000	630,000
Consumption, apparent	1,130,000	1,080,000	979,000	800,000	690,000
Producer price index, yearend	172	165	162	170	162
Stocks, producer, yearend	NA	NA	NA	NA	NA
Employment, number ^e	4,300	4,300	4,300	4,200	3,800
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 2009. Estimated use of titanium as scrap and ferrotitanium by the steel industry was about 9,000 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 (2005-08): Sponge metal: Kazakhstan, 52%; Japan, 34%; China, 5%; Ukraine, 5%; and other, 4%. Titanium dioxide pigment: Canada, 35%; China, 13%; Germany, 7%; United Kingdom, 5%; and other, 40%.

Tariff:	Item	Number	Normal Trade Relations
			12-31-09
	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: Owing to greatly reduced demand from the construction and automotive industries, global production of titanium dioxide pigment decreased significantly compared with that in 2008. Domestic production of TiO₂ pigment was an estimated 1.2 million tons, a significant decrease compared with that of 2008. In 2009, numerous TiO₂ pigment plants were closed or temporarily idled. In Savannah, GA, a 110,000-ton-per-year TiO₂ pigment plant was idled. In Baltimore, MD, a 50,000-ton-per-year plant was closed. In the United Kingdom, the idle 40,000-ton-per-year Grimsby plant was permanently closed, and the Stallingborough plant was idled for 2 months. In Ukraine, TiO₂ pigment production was limited because fuel supplies were interrupted. In January, one of the leading global producers of TiO₂ pigment filed for bankruptcy protection. In August, a “stalking horse” asset and equity purchase agreement was made forming a floor bid to sell substantially all its assets to another leading producer. However, competitive bids were being pursued, and an auction was scheduled to be held by yearend. In China, TiO₂ pigment capacity was expected to increase to 2.7 million tons by the end of 2010.

Delays in aircraft construction and the global economic slowdown in 2009 resulted in a significant drop in titanium sponge metal production, lower prices, and delayed capacity expansions. In Albany, OR, a titanium sponge facility was temporarily idled in July to adjust production to market conditions. In Hamilton, MS, construction of a 9,070-ton-per-year sponge plant remained on hold. In Rowley, UT, construction of a new 10,900-ton-per-year sponge plant was completed. In Japan, the commissioning of a 12,000-ton-per-year sponge plant was delayed until April 2010. In Russia, an expansion of titanium metal production capacity to 44,000 tons per year was delayed until 2014. Work toward an alternative commercial process for the production of titanium metal was ongoing. In Illinois, a titanium powder plant using the Armstrong process was under construction.

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

	Sponge production		Capacity 2009 ³	
	2008	2009 ^e	Sponge	Pigment
United States	W	W	24,000	1,480,000
Australia	—	—	—	241,000
Belgium	—	—	—	74,000
Canada	—	—	—	90,000
China ^e	49,600	35,000	78,000	1,100,000
Finland	—	—	—	130,000
France	—	—	—	125,000
Germany	—	—	—	440,000
Italy	—	—	—	80,000
Japan	40,900	30,000	46,400	309,000
Kazakhstan ^e	25,400	17,000	26,000	1,000
Mexico	—	—	—	130,000
Russia ^e	29,500	22,000	38,000	20,000
Spain	—	—	—	80,000
Ukraine ^e	9,930	6,400	10,000	120,000
United Kingdom	—	—	—	300,000
Other countries	—	—	—	900,000
World total (rounded)	⁴ 155,000	⁴ 110,000	222,000	5,620,000

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 definitions.