TITANIUM AND TITANIUM DIOXIDE1

(Data in metric tons unless otherwise noted)

Domestic Production and Use: Titanium sponge metal was produced by four operations in Nevada, Oregon, and Utah. Ingot was produced by 10 operations in 8 States. Numerous firms consumed ingot to produce wrought products and castings. In 2010, an estimated 75% of the titanium metal was used in aerospace applications. The remaining 25% was used in armor, chemical processing, marine, medical, power generation, sporting goods, and other nonaerospace applications. The value of sponge metal consumed was about \$339 million, assuming an average selling price of \$11.38 per kilogram.

In 2010, titanium dioxide (TiO₂) pigment, which was valued at about \$3.0 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), 59%; plastic, 26%; paper, 9%; 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:	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010^e</u>
Titanium sponge metal:			· · · · · · · · · · · · · · · · · · ·		
Production	W	W	W	W	W
Imports for consumption	24,400	25,900	23,900	16,600	17,000
Exports	1,380	2,000	2,370	820	250
Shipments from Government stockpile exce	esses —	_		_	_
Consumption, reported	28,400	33,700	W	W	30,000
Price, dollars per kilogram, yearend	20.62	14.76	15.64	15.58	11.38
Stocks, industry yearend ^e	8,240	7,820	14,200	15,300	13,000
Employment, number ^e	350	400	350	300	300
Net import reliance ² as a percentage of					
reported consumption	67	72	W	W	64
Titanium dioxide:					
Production	1,370,000	1,440,000	1,350,000	1,230,000	1,400,000
Imports for consumption	288,000	221,000	183,000	175,000	197,000
Exports	581,000	682,000	733,000	649,000	811,000
Consumption, apparent	1,080,000	979,000	800,000	756,000	786,000
Producer price index, yearend	165	162	170	164	184
Stocks, producer, yearend	NA	NA	NA	NA	NA
Employment, number ^e	4,300	4,300	4,200	3,800	3,400
Net import reliance ² as a percentage of					
apparent consumption	E	E	E	Е	E

Recycling: New scrap metal recycled by the titanium industry totaled about 29,000 tons in 2010. 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 (2006–09): Sponge metal: Kazakhstan, 52%; Japan, 33%; Ukraine, 5%; Russia, 4%; and other, 6%. Titanium dioxide pigment: Canada, 38%; China, 13%; Germany, 7%; Finland, 6%; and other, 36%.

Tariff: Item	Number	Normal Trade Relations 12-31-10
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.

TITANIUM AND TITANIUM DIOXIDE

Events, Trends, and Issues: Because TiO_2 pigment is used in paint, paper, and plastics, consumption is tied to the Gross Domestic Product (GDP). In June, the World Bank forecast global GDP growth to be 3.3% in 2010. Recovering demand from the construction and automotive industries led to an increase in global production of TiO_2 pigment compared with that in 2009. To meet rising domestic and global TiO_2 consumption, domestic production of TiO_2 pigment was estimated to be 1.4 million tons, a 14% increase compared with that in 2009. In Australia, TiO_2 pigment capacity increased to 150,000 tons per year from 110,000 tons per year through the expansion of an existing chloride-route plant.

Increasing demand and reduced inventories brought about by production curtailments made in 2009 and 2010 allowed several metal producers to resume plans to increase titanium sponge production capacity. In Japan, sponge capacity was expected to increase to 66,000 tons per year in 2011. In Russia, sponge capacity was expected to rise to 44,000 tons per year by 2014. In China, titanium metal capacity was forecasted to increase by 100,000 tons per year beyond existing capacity, but a schedule was not available for the expansion. In India, a 500-ton-per-year titanium sponge plant was under construction at Kollam. The plant is the first of its kind in India and was to be supplied with titanium tetrachloride from an existing TiO₂ producer. 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 expected to be in the pilot-plant stage of development in 2011.

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

	Spon	Sponge production		Capacity 2010 ³	
	2009	2010 ^e	Sponge	Pigment	
United States	W	W	24,000	1,480,000	
Australia	_	_	_	281,000	
Belgium	_	_	_	74,000	
Canada	_	_	_	90,000	
China ^e	61,500	53,000	80,000	1,100,000	
Finland	_	_	_	130,000	
France	_	_	_	125,000	
Germany	_	_	_	440,000	
Italy	_	_	_	80,000	
Japan ^e	25,000	30,000	60,000	309,000	
Kazakhstan ^e	16,500	15,000	26,000	1,000	
Mexico	_	_	_	130,000	
Russia ^e	26,600	27,000	38,000	20,000	
Spain	_	_	_	80,000	
Ukraine ^e	6,830	6,500	10,000	120,000	
United Kingdom	_	_	_	300,000	
Other countries	<u>, — — — </u>			900,000	
World total (rounded)	⁴ 136,000	⁴ 132,000	238,000	5,660,000	

<u>World Resources</u>: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.

<u>Substitutes</u>: 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.