

## TITANIUM MINERAL CONCENTRATES<sup>1</sup>

(Data in thousand metric tons of contained TiO<sub>2</sub> unless otherwise noted)

**Domestic Production and Use:** Two firms produced ilmenite and rutile concentrates from surface-mining operations in Florida and Virginia. The value of titanium mineral concentrates consumed in the United States in 2009 was about \$460 million. Zircon was a coproduct of mining from ilmenite and rutile deposits. About 94% of titanium mineral concentrates was consumed by domestic titanium dioxide (TiO<sub>2</sub>) pigment producers. The remaining 6% was used in welding rod coatings and for manufacturing carbides, chemicals, and metal.

<b>Salient Statistics—United States:</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009<sup>e</sup></b>
Production <sup>2</sup> (rounded)	300	300	300	200	200
Imports for consumption	1,000	1,030	1,220	1,110	810
Exports, <sup>e</sup> all forms	14	21	6	7	11
Consumption, estimated	1,390	1,510	1,600	1,420	1,100
Price, dollars per metric ton, yearend:					
Ilmenite, bulk, minimum 54% TiO <sub>2</sub> , f.o.b. Australia	80	80	80	111	70
Rutile, bulk, minimum 95% TiO <sub>2</sub> , f.o.b. Australia	470	475	488	525	530
Slag, 80%-95% TiO <sub>2</sub> <sup>3</sup>	390-555	402-454	418-457	393-407	411-455
Stocks, mine, consumer, yearend	NA	NA	NA	NA	NA
Employment, mine and mill, number <sup>e</sup>	286	246	225	144	182
Net import reliance <sup>4</sup> as a percentage of estimated consumption	71	67	76	78	73

**Recycling:** None.

**Import Sources (2005-08):** South Africa, 51%; Australia, 28%; Canada, 15%; Ukraine, 2%; and other, 4%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
		<b>12-31-09</b>
Synthetic rutile	2614.00.3000	Free.
Ilmenite and ilmenite sand	2614.00.6020	Free.
Rutile concentrate	2614.00.6040	Free.
Titanium slag	2620.99.5000	Free.

**Depletion Allowance:** Ilmenite and rutile; 22% (Domestic), 14% (Foreign).

**Government Stockpile:** None.

**Events, Trends, and Issues:** In conjunction with production of TiO<sub>2</sub> pigment and metal, domestic consumption of titanium mineral concentrates was estimated to have decreased significantly. While mining continued at Starke, FL, and Stony Creek, VA, reprocessing mine tailings at Green Cove Springs, FL, ceased. At the Stony Creek mining operation, development of the Brink deposit was completed, and production began in the second quarter of 2009.

As a consequence of a global decline in construction and production of durable goods, consumption of titanium mineral concentrates was estimated to have decreased significantly compared with that of 2008.

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In Madagascar, production of ilmenite commenced at Fort Dauphin and was expected to increase to 750,000 tons per year when market conditions improved. Ilmenite was shipped from Madagascar to be used at the TiO<sub>2</sub> slag operations in Sorel, Quebec, Canada. In response to uncertain market conditions, mining and TiO<sub>2</sub> slag operations in Canada were temporarily idled for 3 months during the year. In the Eucla Basin, South Australia, production commenced at the Jacinth-Ambrosia Mine. Capacity at the Jacinth-Ambrosia Mine was expected to include 160,000 tons per year of ilmenite and 30,000 tons per year of rutile. In Victoria and New South Wales, Australia, mining and processing operations commenced at the Murray Basin Stage 2 project. In the first half of 2009, new Government policies were implemented in Vietnam to stop ilmenite exports, control illegal mining, and promote the development of upgraded products. In June, however, the export ban in Vietnam was temporarily lifted to support domestic mining companies hurt by global economic conditions.

**World Mine Production and Reserves:** The reserves estimate for Sierra Leone was revised based on information derived from industry reports.

	Mine production		Reserves <sup>5</sup>
	2008	2009 <sup>e</sup>	
<b>Ilmenite:</b>			
United States <sup>2</sup>	<sup>6</sup> 200	<sup>6</sup> 200	6,000
Australia	1,320	1,210	130,000
Brazil	54	50	43,000
Canada <sup>7</sup>	850	600	31,000
China	600	600	200,000
India	432	380	85,000
Madagascar	—	60	40,000
Mozambique	197	200	16,000
Norway <sup>7</sup>	410	370	37,000
South Africa <sup>7</sup>	1,050	1,000	63,000
Ukraine	300	270	5,900
Vietnam	330	200	1,600
Other countries	55	50	26,000
World total (ilmenite, rounded)	5,800	5,190	680,000
<b>Rutile:</b>			
United States	( <sup>8</sup> )	( <sup>8</sup> )	400
Australia	309	293	22,000
Brazil	2	2	1,200
India	20	18	7,400
Mozambique	6	6	480
Sierra Leone	75	60	2,800
South Africa	121	100	8,300
Ukraine	57	50	2,500
Other countries	—	—	400
World total (rutile, rounded)	<sup>9</sup> 590	<sup>9</sup> 529	45,000
World total (ilmenite and rutile, rounded)	6,390	5,720	730,000

**World Resources:** Ilmenite accounts for about 91% of the world's consumption of titanium minerals. World resources of anatase, ilmenite, and rutile total more than 2 billion tons.

**Substitutes:** Ilmenite, leucoxene, rutile, slag, and synthetic rutile compete as feedstock sources for producing TiO<sub>2</sub> pigment, titanium metal, and welding-rod coatings.

<sup>e</sup>Estimated. NA Not available. — Zero.

<sup>1</sup>See also Titanium and Titanium Dioxide.

<sup>2</sup>Rounded to one significant digit to avoid disclosing company proprietary data.

<sup>3</sup>Landed duty-paid value based on U.S. imports for consumption.

<sup>4</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>5</sup>See [Appendix C for definitions](#). Reserve base estimates were discontinued in 2009; see [Introduction](#).

<sup>6</sup>Includes rutile.

<sup>7</sup>Mine production is primarily used to produce titaniferous slag.

<sup>9</sup>U.S. rutile production is included with ilmenite to avoid disclosing company proprietary data.