

## 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, Georgia, and Virginia. The value of titanium mineral concentrates consumed in the United States in 2004 was about \$500 million. The major coproduct of mining from ilmenite and rutile deposits was zircon. About 97% of titanium mineral concentrates was consumed by domestic TiO<sub>2</sub> pigment producers. The remainder was used in welding rod coatings and for manufacturing carbides, chemicals, and metal.

<b>Salient Statistics—United States:</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004<sup>e</sup></b>
Production <sup>2</sup> (ilmenite and rutile, rounded)	300	300	300	300	300
Imports for consumption:					
Ilmenite and slag	647	737	599	569	560
Rutile, natural and synthetic	413	303	368	397	320
Exports, <sup>e</sup> all forms	2	5	2	7	4
Consumption, reported:					
Ilmenite and slag <sup>3</sup>	919	856	951	959	955
Rutile, natural and synthetic	497	448	452	453	400
Price, dollars per metric ton, yearend:					
Ilmenite, bulk, 54% TiO <sub>2</sub> , f.o.b. Australian ports	94	100	93	90	90
Rutile, yearend, bulk, f.o.b. Australian ports	485	475	450	430	430
Slag: <sup>e</sup>					
80%-95% TiO <sub>2</sub> , f.o.b. Sorel, Quebec	362-547	335-518	340-527	444-471	321-464
85% TiO <sub>2</sub> , f.o.b. Richards Bay, South Africa	425	419	445	409	398
Stocks, mine, consumer, yearend:					
Ilmenite	262	221	197	200	200
Rutile	101	118	75	74	75
Employment, mine and mill, number <sup>e</sup>	360	360	366	269	323
Net import reliance <sup>4</sup> as a percentage of reported consumption	79	78	74	68	65

**Recycling:** None.

**Import Sources (2000-03):** South Africa, 43%; Australia, 36%; Canada, 13%; Ukraine, 5%; and other, 3%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
		<b>12-31-04</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.

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**Events, Trends, and Issues:** Global production and consumption of titanium mineral concentrates was estimated to have decreased slightly in 2004 compared with that of 2003. Owing in part to the closure of a domestic titanium dioxide pigment plant, domestic consumption of titanium mineral concentrates decreased 4% compared with that of the previous year.

A heavy-mineral mining operation was commissioned in Lulaton, GA. The operation included a wet concentrator with a capacity to process 1,000 tons per hour of ore. Heavy-mineral concentrate from Lulaton was shipped to the Green Cove Springs, FL, mining operation for dry separation. Dredging operations at Green Cove Springs were idled while dry mining capacity was expanded.

International exploration and development for new sources of titanium minerals was underway in Australia (Coburn, Douglas, Lodlow, Poonscarie, Mindarie, Wemen), Canada (Athabasca oil sands, Truro), Madagascar (Fort-Dauphin), Mozambique (Corridor Sands, Moebase, Moma), India (Tamil Nadu), Kenya (Kwale), and South Africa (Xolobeni). In India, capacity to produce synthetic rutile was being increased by 9,000 tons per year. In Canada, plans were underway to increase capacity to upgrade sulfate-grade slag to chloride-grade slag by 95,000 tons per year. An extended shutdown was planned at the Tyssedal slag plant in Norway.

**World Mine Production, Reserves, and Reserve Base:** The reserves and reserve base estimates for Brazil, China, India, Norway, and Vietnam have been revised based on new information from those countries.

	Mine production		Reserves <sup>5</sup>	Reserve base <sup>5</sup>
	<u>2003</u>	<u>2004<sup>e</sup></u>		
<b>Ilmenite:</b>				
United States <sup>2</sup>	<sup>6</sup> 300	<sup>6</sup> 300	6,000	59,000
Australia	1,170	1,090	200,000	250,000
Brazil	82	82	12,000	12,000
Canada <sup>7</sup>	765	720	31,000	36,000
China	400	410	200,000	350,000
India	270	250	85,000	210,000
Norway <sup>7</sup>	360	350	37,000	60,000
South Africa <sup>7</sup>	1,080	1,130	63,000	220,000
Ukraine	290	290	5,900	13,000
Vietnam	97	100	2,400	5,900
Other countries	91	90	<u>21,000</u>	<u>78,000</u>
World total (ilmenite, rounded)	4,900	4,800	660,000	1,300,000
<b>Rutile:</b>				
United States	( <sup>8</sup> )	( <sup>8</sup> )	400	1,800
Australia	164	160	22,000	34,000
Brazil	2	2	3,500	3,500
India	17	15	7,400	20,000
South Africa	143	152	8,300	24,000
Ukraine	57	67	2,500	2,500
Other countries	—	—	<u>9,500</u>	<u>45,000</u>
World total (rutile, rounded)	<sup>9</sup> 380	<sup>9</sup> 400	54,000	130,000
World total (ilmenite and rutile, rounded)	5,300	5,200	720,000	1,400,000

**World Resources:** Ilmenite supplies about 90% of the world's demand for titanium minerals. World resources of anatase, rutile, and ilmenite 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. — Zero.

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

<sup>2</sup>Rounded to nearest 0.1 million ton to avoid disclosing company proprietary data.

<sup>3</sup>Excludes ilmenite used to produce synthetic rutile.

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

<sup>5</sup>See Appendix C for definitions.

<sup>6</sup>Includes rutile.

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

<sup>8</sup>Included with ilmenite to avoid disclosing company proprietary data.

<sup>9</sup>Excludes U.S. production.