

TITANIUM MINERAL CONCENTRATES¹

(Data in thousand metric tons of contained TiO₂ unless otherwise noted)

Domestic Production and Use: Two firms produced ilmenite and rutile concentrates from surface mining operations in Florida and Virginia. In Georgia, one operation produced heavy mineral concentrate that was used by one of the Florida operations to produce ilmenite and rutile concentrates. The value of titanium mineral concentrates consumed in the United States in 2006 was about \$500 million. The major coproduct of mining from ilmenite and rutile deposits was zircon. About 95% of titanium mineral concentrates was consumed by domestic titanium dioxide (TiO₂) pigment producers. The remaining 5% of consumption was used in welding rod coatings and for manufacturing carbides, chemicals, and metal.

Salient Statistics—United States:	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006^e</u>
Production ² (ilmenite and rutile, rounded)	300	300	300	300	300
Imports for consumption:					
Ilmenite and slag	599	569	535	660	660
Rutile, natural and synthetic	368	397	337	342	350
Exports, ^e all forms	2	7	6	14	16
Consumption, reported:					
Ilmenite and slag ³	951	959	1,080	^e 994	1,000
Rutile, natural and synthetic	452	453	414	^e 394	400
Price, dollars per metric ton, yearend:					
Ilmenite, bulk, minimum 54% TiO ₂ , f.o.b. Australia	93	90	81	80	80
Rutile, bulk, minimum 95% TiO ₂ , f.o.b. Australia	450	430	455	470	465
Slag, 80%-95% TiO ₂ ⁴	340-527	385-444	347-466	390-555	413-550
Stocks, mine, consumer, yearend:					
Ilmenite	197	200	299	NA	NA
Rutile	75	74	70	NA	NA
Employment, mine and mill, number ^e	349	344	300	286	248
Net import reliance ⁵ as a percentage of reported consumption	74	68	58	71	71

Recycling: None.

Import Sources (2002-05): South Africa, 48%; Australia, 34%; Canada, 10%; Ukraine, 4%; and other, 4%.

Tariff: Item	Number	Normal Trade Relations
		<u>12-31-06</u>
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: Domestic consumption of titanium mineral concentrates was estimated to have increased moderately. Cost-cutting measures were expected to idle mining operations in Green Cove Springs, FL, and Lulaton, GA, by yearend. The Green Cove Springs operation had been in production since 1972, while the Lulaton operation was started in 2004. The closures will leave the United States with mining operations in Stony Creek, VA, and Starke, FL.

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The global supply of titanium mineral concentrates was estimated to have increased 5% compared with that of 2005. In the Murray Basin, Australia, several mineral sands projects were under development, and the Douglas and Mindari mineral sands projects neared completion. In Canada, upgraded slag capacity was expected to be raised to 375,000 tons per year from 325,000 tons per year by yearend. In China, a 100,000-ton-per-year slag operation was expected to be operational by 2008. In Madagascar, construction at the Fort Dauphin minerals sands project was underway with 750,000 tons per year of mineral sands capacity expected in 2008. Mine production at the Moma mineral sands project in Mozambique was expected to begin in January 2007. Moma's production capacity is expected to reach 800,000 tons per year of ilmenite, 56,000 tons per year of zircon, and 21,000 tons per year of rutile. The first of two dredges was refurbished and commissioned at the Sierra Rutile mine in Sierra Leone. The second dredge is scheduled for start-up in 2007 and is expected to raise capacity to 200,000 tons of heavy minerals per year. The Sierra Rutile mine has been idle since 1995.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ⁶	Reserve base ⁶
	2005	2006 ^e		
Ilmenite:				
United States ²	7300	7300	6,000	59,000
Australia	1,180	1,210	130,000	160,000
Brazil	130	130	12,000	12,000
Canada ⁸	731	780	31,000	36,000
China	450	475	200,000	350,000
India	297	297	85,000	210,000
Mozambique	—	—	16,000	21,000
Norway ⁸	381	381	37,000	60,000
South Africa ⁸	867	893	63,000	220,000
Ukraine	218	273	5,900	13,000
Vietnam	95	64	5,200	7,500
Other countries	136	144	15,000	78,000
World total (ilmenite, rounded)	4,800	5,000	610,000	1,200,000
Rutile:				
United States	(⁹)	(⁹)	400	1,800
Australia	163	171	19,000	31,000
Brazil	3	3	3,500	3,500
India	18	20	7,400	20,000
Mozambique	—	—	480	570
Sierra Leone	—	80	2,500	3,600
South Africa	105	108	8,300	24,000
Ukraine	57	62	2,500	2,500
Other countries	—	—	8,100	17,000
World total (rutile, rounded)	⁹ 351	⁹ 444	52,000	100,000
World total (ilmenite and rutile, rounded)	5,200	5,400	660,000	1,300,000

World Resources: Ilmenite supplies about 90% of the world's demand for 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 TiO₂ pigment, titanium metal, and welding rod coatings.

^eEstimated. NA Not available. — Zero.

¹See also Titanium and Titanium Dioxide.

²Rounded to nearest 0.1 million tons to avoid disclosing company proprietary data.

³Excludes ilmenite used to produce synthetic rutile.

⁴Landed duty-paid value based on U.S. imports for consumption.

⁵Defined as imports – exports + adjustments for Government and industry stock changes.

⁶[See Appendix C for definitions.](#)

⁷Includes rutile.

⁸Mine production is primarily used to produce titaniferous slag.

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