

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. The value of titanium mineral concentrates consumed in the United States in 2002 was about \$450 million. The major coproduct of mining from ilmenite and rutile deposits was zircon. About 97% of titanium mineral concentrates was consumed by domestic TiO₂ pigment producers. The remainder was used in welding rod coatings and for manufacturing carbides, chemicals, and metal.

Salient Statistics—United States:	1998	1999	2000	2001	2002^e
Production ² (ilmenite and rutile, rounded)	400	300	300	300	300
Imports for consumption:					
Ilmenite and slag	732	776	647	737	750
Rutile, natural and synthetic	365	324	413	303	361
Exports, ^e all forms	38	6	12	5	6
Consumption, reported:					
Ilmenite and slag ³	980	963	919	856	890
Rutile, natural and synthetic	392	413	497	448	466
Price, dollars per metric ton:					
Ilmenite, bulk, 54% TiO ₂ , f.o.b. Australian ports	77	98	94	100	93
Rutile, yearend, bulk, f.o.b. Australian ports	500	473	485	475	450
Slag: ^e					
80% TiO ₂ , f.o.b. Sorel, Quebec	338	390	362	335	344
85% TiO ₂ , f.o.b. Richards Bay, South Africa	385	406	425	419	432
Stocks, mine, consumer, yearend:					
Ilmenite	270	343	262	221	220
Rutile	111	96	101	118	120
Employment, mine and mill, number ^e	490	450	470	360	360
Net import reliance ⁴ as a percentage of reported consumption	76	75	79	78	82

Recycling: None.

Import Sources (1998-2001): South Africa, 46%; Australia, 32%; Canada, 14%; Ukraine, 4%; and other, 4%.

Tariff: Item	Number	Normal Trade Relations 12/31/02
Synthetic rutile	2614.00.3000	Free.
Ilmenite and ilmenite sand	2614.00.6020	Free.
Rutile concentrate	2614.00.6040	Free.
Titanium slag	2620.90.5000	Free.

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

Government Stockpile: None.

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Events, Trends, and Issues: Owing to a slowing world economy, global consumption of titanium concentrates was estimated to have decreased moderately in 2002 compared with that of 2001. Increased production of titanium dioxide pigment resulted in an estimated 4% increase in domestic consumption of titanium mineral concentrates compared with that of 2000. The United States continued its reliance on imported mineral concentrates primarily from Australia, Canada, and South Africa. In 2002, imports of titanium concentrates increased an estimated 7% compared with those of 2001.

In 2002, numerous projects were underway to develop new sources of titanium mineral concentrates. In the United States, feasibility studies were being conducted at the Camden, TN, and Limon, CO, deposits. In Canada, a bulk sampling program was in progress at Truro, Nova Scotia. The first phase of a bankable feasibility study was completed at the Corridor Sands project in Mozambique. If completed, Corridor Sands would produce 1 million tons per year of titanium slag. In Australia, a host of projects primarily located in the Murray Basin were in various stages of development. Mine construction was expected to begin on the Moma project in Mozambique. If completed, the Moma project would produce 625,000 tons per year of ilmenite and 12,500 tons per year of rutile.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ⁵	Reserve base ⁵
	2001	2002 ^e		
Ilmenite:				
United States ²	⁶ 300	⁶ 300	7,000	59,000
Australia	1,150	1,100	⁷ 200,000	⁷ 250,000
Canada ⁸	950	950	31,000	36,000
India	232	250	30,000	38,000
Norway ⁸	338	350	40,000	40,000
South Africa ⁸	960	950	63,000	220,000
Ukraine	252	250	5,900	13,000
Other countries	<u>391</u>	<u>390</u>	<u>49,000</u>	<u>84,000</u>
World total (ilmenite, may be rounded)	4,600	4,500	420,000	730,000
Rutile:				
United States	(⁹)	(⁹)	400	1,800
Australia	225	220	⁷ 22,000	⁷ 34,000
India	16	15	6,600	7,700
South Africa	110	105	8,300	24,000
Ukraine	56	56	2,500	2,500
Other countries	<u>4</u>	<u>4</u>	<u>8,000</u>	<u>17,000</u>
World total (rutile, rounded)	¹⁰ 410	¹⁰ 400	48,000	87,000
World total (ilmenite and rutile, rounded)	5,000	4,900	470,000	820,000

World Resources: Ilmenite supplies about 90% of the world's demand for titanium minerals. World ilmenite resources total about 1 billion tons of titanium dioxide. Identified world resources of rutile (including anatase) total about 230 million tons of contained TiO₂.

Substitutes: Ilmenite, leucosene, rutile, slag, and synthetic rutile compete as feedstock sources for producing TiO₂ pigment, titanium metal, and welding rod coatings. In the future, commercial processes may be developed to use anatase and perovskite.

^eEstimated.

¹See also Titanium and Titanium Dioxide.

²Production rounded to one significant digit to avoid disclosing company proprietary data.

³Excludes ilmenite used to produce synthetic rutile.

⁴Defined as imports - exports + adjustments for Government and industry stock changes.

⁵See Appendix C for definitions.

⁶Includes rutile to avoid disclosing company proprietary data.

⁷Derived from data published by the Australian Geological Survey Organisation.

⁸Mine production is primarily used to produce titaniferous slag. Reserves and reserve base are ilmenite.

⁹Included with ilmenite to avoid disclosing company proprietary data.

¹⁰Excludes U.S. production.