TITANIUM MINERAL CONCENTRATES[1]

(Data in thousand metric tons of contained TiO_2 unless otherwise noted)

Domestic Production and Use: Two firms produced ilmenite and rutile concentrates from surface-mining operations in Florida and Georgia. Based on reported data through September 2016, the estimated value of titanium mineral concentrates consumed in the United States in 2016 was $560 million. Zircon was a coproduct of mining from ilmenite and rutile deposits. About 90% of titanium mineral concentrates were consumed by domestic titanium dioxide (TiO_2) pigment producers. The remaining 10% was used in welding-rod coatings and for manufacturing carbides, chemicals, and metal.

Salient Statistics—United States:	2012	2013	2014	2015	2016[e]
Production[2] (rounded)	200	200	100	200	100
Imports for consumption	1,110	1,190	1,110	1,010	970
Exports[e], all forms	26	7	1	1	4
Consumption, estimated	1,390	1,390	1,190	1,210	1,070
Price, dollars per metric ton:					
Ilmenite, bulk, minimum 54% TiO_2, f.o.b. Australia[3]	300	265	155	110	105
Rutile, bulk, minimum 95% TiO_2, f.o.b. Australia[3]	2,200	1,250	950	840	725
Slag, 80%–95% TiO_2[4]	694–839	538–777	720–762	727–753	661–697
Employment, mine and mill, number[e]	195	195	144	214	155
Net import reliance[5] as a percentage of estimated consumption	78	86	92	83	91

Recycling: None.

Import Sources (2012–15): South Africa, 34%; Australia, 32%; Canada, 16%; Mozambique, 12%; and other, 6%.

Tariff: Item	Number	Normal Trade Relations 12–31–16
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: Consumption of titanium mineral concentrates is tied to production of TiO_2 pigments that are primarily used in paint, paper, and plastics. Domestic consumption of titanium mineral concentrates in 2016 was estimated to have decreased by about 12% from that of 2015.

Domestic mining and production of titanium concentrates took place at one mine near Starke, FL, and one mine near Nahunta, GA. Production decreased significantly because operations ceased at two mines in Virginia where reserves were exhausted during 2015. The operator of the mine near Nahunta, GA, announced a slowdown of production and curtailment of construction at a second mine site in Brantley County owing to a continued flat demand for zircon concentrates and a decrease in coproduct titanium mineral concentrates sales. Prices for titanium mineral concentrates decreased slightly throughout the year, remaining at about one-third the price of record-high values set in 2012. U.S. imports of ores and concentrates decreased by about 4% from those of 2015. At the end of 2016, the mine in Georgia was returning to full capacity in anticipation of an increase in demand. A major global producer of titanium concentrates was expecting increased demand owing to restocking by pigment producers and sustained price increases of titanium pigment.

Several new offshore projects experienced their first full year of production. In late 2015, production began at the Fairbreeze Mine in South Africa where production was projected to be 25,000 and 220,000 tons per year of rutile and titanium slag, respectively. At the Keysbrook Mine in Western Australia, production was expected to be 67,000 tons per year of high-titanium leucoxene.

Prepared by **George M. Bedinger [(703) 648–6183, gbedinger@usgs.gov]**

TITANIUM MINERAL CONCENTRATES

World Mine Production and Reserves: Reserves for China were revised based on data reported by the National Bureau of Statistics of China.

	Mine production		Reserves[6]
	2015	2016[e]	
Ilmenite:			
United States[2, 7]	200	100	2,000
Australia	720	720	150,000
Brazil	48	50	43,000
Canada[8]	595	475	31,000
China	850	800	220,000
India	180	200	85,000
Kenya	267	280	54,000
Madagascar	140	140	40,000
Mozambique	460	490	14,000
Norway	258	260	37,000
Russia	116	40	NA
Senegal	257	260	NA
South Africa[8]	1,280	1,300	63,000
Ukraine	375	350	5,900
Vietnam	360	300	1,600
Other countries	77	90	26,000
World total (ilmenite, rounded)	6,190	5,860	770,000
Rutile:			
United States	(9)	(9)	(9)
Australia	380	350	27,000
India	18	18	7,400
Kenya	71	80	13,000
Madagascar	5	5	NA
Sierra Leone	113	120	NA
South Africa	67	65	8,300
Ukraine	90	90	2,500
Other countries	14	15	400
World total (rutile, rounded)[9]	760	743	59,000
World total (ilmenite and rutile, rounded)	6,940	6,600	830,000

World Resources: Ilmenite accounts for about 89% 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_2 pigment, titanium metal, and welding-rod coatings.

[e]Estimated. NA Not available.
[1]See also Titanium and Titanium Dioxide.
[2]Rounded to one significant digit to avoid disclosing company proprietary data.
[3]Source: Industrial Minerals; yearend average of high-low price.
[4]Landed duty-paid value based on U.S. imports for consumption. Data series revised to reflect annual average price range of significant importing countries.
[5]Defined as imports – exports.
[6]See Appendix C for resource and reserve definitions and information concerning data sources.
[7]Includes rutile.
[8]Mine production is primarily used to produce titaniferous slag.
[9]U.S. rutile production and reserves data are included with ilmenite.