

RUTILE¹(Data in thousand metric tons of contained TiO₂, unless otherwise noted)

Domestic Production and Use: Rutile was produced at one mine in Florida. At two other mines in Florida, rutile was included in a bulk concentrate containing mostly ilmenite and leucoxene. The major coproduct of these mines is zircon. Synthetic rutile was produced at one plant in Alabama. The value of U.S. rutile consumption in 1996, including synthetic rutile, was about \$290 million. Two firms, with facilities in Nevada and Oregon, used titanium tetrachloride primarily made from rutile to manufacture titanium. Of 16 consuming firms, mainly in the Eastern United States, 5 companies used 95% of the rutile consumed to produce titanium dioxide (TiO₂) pigment. Welding-rod coatings and miscellaneous applications, which include fiberglass and titanium metal, consumed 5%.

Salient Statistics—United States:	1992	1993	1994	1995	1996^e
Production	W	W	W	W	W
Imports for consumption ²	299	349	311	295	353
Exports ^e	7	3	4	6	3
Shipments from Government stockpile excesses	—	1	18	17	—
Consumption: Reported ²	438	436	478	439	440
Apparent	W	W	W	W	W
Price, dollars per ton of rutile, yearend:					
Bulk, f.o.b. Australian ports	405	378	420	600	650
Stocks, mine, distributor and consumer, yearend	140	179	141	52	100
Employment, mine and mill ³ , number	400	395	400	400	400
Net import reliance ⁴ as a percent of apparent consumption	W	W	W	W	W

Recycling: None.**Import Sources (1992-95):** Australia, 56%; South Africa, 28%; Sierra Leone, 14%; and other, 2%.

Tariff: Item	Number	Most favored nation (MFN) 12/31/96	Non-MFN⁵ 12/31/96
Rutile concentrate	2614.00.6040	Free	Free.
Synthetic rutile	2614.00.3000	Free	30% ad val.

Depletion Allowance: 22% (Domestic), 14% (Foreign).**Government Stockpile:****Stockpile Status—9-30-96**

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposals Jan.-Sept. 96
Stockpile-grade rutile (gross weight)	0.01	2.07	—	—

RUTILE

Events, Trends, and Issues: In 1996, imports of rutile concentrates were estimated to have increased 20% compared with 1995. However, imports of natural rutile decreased slightly while imports of synthetic rutile increased 49%. A global shortage of natural rutile resulted in increased prices for natural and synthetic rutile concentrates.

Exploration and development of titanium mineral deposits continued in 1996. These activities were most evident in Africa, Australia, Canada, India, Indonesia, Mozambique, Russia, Ukraine, the United States, and Vietnam. Producers continued efforts to develop higher grade concentrates. In Australia, a synthetic producer initiated a project to produce an upgraded product lower in uranium and thorium content. Sierra Leone's loss as a major source of natural rutile continued to affect the global market.

Fewer environmental pollution problems are encountered when pigment is produced from rutile rather than ilmenite. The chloride process, using a rutile feed, generates about 0.2 ton of waste per ton of TiO_2 product; the sulfate process, using ilmenite, generates about 3.5 tons of waste per ton of product. Producing synthetic rutile from ilmenite results in about 0.7 ton of waste, mainly iron oxide, per ton of product. Direct chlorination of ilmenite generates about 1.2 tons of waste, mainly ferric chloride, per ton of TiO_2 .

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ⁶	Reserve base ⁶
	1995	1996 ^e		
United States	W	W	500	1,800
Australia	190	190	4,300	43,000
Brazil	2	2	40	85,000
India	13	15	6,600	7,700
Italy	—	—	—	8,800
Sierra Leone	—	—	3,100	3,100
South Africa	84	90	8,300	8,300
Sri Lanka	2	2	4,800	4,800
Ukraine	3	3	2,500	2,500
World total (may be rounded)	<u>294</u>	<u>302</u>	<u>30,000</u>	<u>170,000</u>

World Resources: Identified world resources of rutile (including anatase) total about 230 million tons of contained TiO_2 . Major rutile resources occur in Australia, India, Italy, Sierra Leone, South Africa, and the United States.

Substitutes: Ilmenite, titaniferous slag, and synthetic rutile made from ilmenite may be used instead of natural rutile for making pigment, metal, and welding-rod coatings.

^eEstimated. W Withheld to avoid disclosing company proprietary data.

¹See also Ilmenite and Titanium and Titanium Dioxide.

²Includes synthetic rutile.

³Employment at three sand deposit operations in Florida, which produced either rutile concentrate or a titanium mineral concentrate, where ilmenite and zircon were major coproducts and where employees were not assigned to specific commodities.

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

⁵See Appendix B.

⁶See Appendix C for definitions.

⁷Excludes U.S. production.