

TITANIUM AND TITANIUM DIOXIDE¹

(Data in metric tons unless otherwise specified)

Domestic Production and Use: Titanium sponge metal was produced by one operation in Utah. Production data were withheld to avoid disclosing company proprietary data. The facility in Salt Lake City, UT, with an estimated capacity of 500 tons per year, produced titanium that was further refined for use in electronics. A second sponge facility in Henderson, NV, with an estimated capacity of 12,600 tons per year, was idled since 2020 owing to market conditions. A third facility, in Rowley, UT, with an estimated capacity of 10,900 tons per year, has remained idle since 2016.

Although detailed 2023 consumption data were withheld to avoid disclosing proprietary data, the majority of titanium metal was used in aerospace applications, and the remainder was used in armor, chemical processing, marine hardware, medical implants, power generation, and consumer other applications. The value of imported sponge was about \$420 million, a significant increase compared with \$273 million in 2022.

In 2023, titanium dioxide (TiO₂) pigment production, by four companies operating five facilities in four States, was valued at about \$3 billion. The leading uses of TiO₂ pigment were, in descending order, paints (including lacquers and varnishes), plastics, and paper. Other uses of TiO₂ pigment included catalysts, ceramics, coated fabrics and textiles, floor coverings, printing ink, and roofing granules.

Salient Statistics—United States:	2019	2020	2021	2022	2023^e
Titanium sponge metal:					
Production	W	W	W	W	W
Imports for consumption ^e	30,000	19,200	16,000	30,900	42,000
Exports	869	711	117	105	200
Consumption, apparent ²	W	W	³ 15,900	³ 30,800	³ 42,000
Consumption, reported	W	W	W	W	W
Price, dollars per kilogram ⁴	10.70	10.60	11.20	11.10	12
Stocks, industry, yearend ^e	W	W	W	W	W
Employment, number ^e	150	150	20	20	20
Net import reliance ⁵ as a percentage of apparent consumption	>50	>50	>95	>95	>95
TiO ₂ pigment:					
Production	1,000,000	1,000,000	1,150,000	1,150,000	920,000
Imports for consumption	226,000	262,000	251,000	265,000	240,000
Exports	401,000	386,000	494,000	378,000	280,000
Consumption, apparent ²	825,000	880,000	906,000	1,040,000	880,000
Price, dollars per metric ton ⁴	2,750	2,710	2,920	3,450	3,300
Employment, number ^e	3,050	3,100	3,200	3,200	3,200
Net import reliance ⁵ as a percentage of apparent consumption	E	E	E	E	E

Recycling: Owing to limited responses from voluntary surveys, consumption data for titanium scrap metal for the titanium metal industry were withheld. Consumption data for titanium scrap for the steel, superalloy, and other industries were not available.

Import Sources (2019–22): Sponge metal: Japan, 86%; Kazakhstan, 10%; Saudi Arabia, 2%; Ukraine, 1%; and other, 1%. TiO₂ pigment: Canada, 45%; China, 10%; Germany, 8%; Spain, 5%; and other, 32%.

Tariff:	Item	Number	Normal Trade Relations 12–31–23
	Titanium oxides (unfinished TiO ₂ pigments)	2823.00.0000	5.5% ad valorem.
	TiO ₂ pigments, 80% or more TiO ₂	3206.11.0000	6% ad valorem.
	TiO ₂ pigments, other	3206.19.0000	6% ad valorem.
	Ferrotitanium and ferrosilicon titanium	7202.91.0000	3.7% ad valorem.
	Unwrought titanium metal	8108.20.0000	15% ad valorem.
	Titanium waste and scrap metal	8108.30.0000	Free.
	Other titanium metal articles	8108.90.3000	5.5% ad valorem.
	Wrought titanium metal	8108.90.6000	15% ad valorem.

Depletion Allowance: Not applicable.

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Government Stockpile:⁶

<u>Material</u>	<u>FY 2023</u>		<u>FY 2024</u>	
	<u>Potential acquisitions</u>	<u>Potential disposals</u>	<u>Potential acquisitions</u>	<u>Potential disposals</u>
Titanium	15,000	—	15,000	—

Events, Trends, and Issues: The Salt Lake City, UT, plant was the only active domestic producer of titanium sponge, and the Salt Lake City operations primarily supported the production of electronic-grade materials. Consequently, U.S. producers of titanium ingot and downstream products were reliant on imports of titanium sponge and scrap. Demand from the aerospace and other industries resulted in a 35% increase in imports compared with those in 2022, a record-high 42,000 tons. Japan (77%), Saudi Arabia (13%), and Kazakhstan (9%) were the leading import sources for titanium sponge in 2023.

U.S. imports of titanium scrap were about 26,000 tons. The United Kingdom (16%), France, Germany, and Japan (13% each), Canada (9%), and Mexico (7%) were the leading import sources for titanium waste and scrap in 2023. In 2023, the annual average duty-paid unit value of scrap imports was about \$9.30 per kilogram compared with \$7.90 per kilogram in 2022. China led a global increase in sponge production and capacity. Sponge production in Zaporozhye, Ukraine, was idled because of the conflict with Russia. Although limited data were available for 2023, in 2022, global imports of unwrought and wrought titanium metal from Russia were 4,000 and 14,000 metric tons, respectively.

Domestic production of TiO₂ pigment in 2023 was an estimated 920,000 tons. Although heavily reliant on imports of titanium mineral concentrates, the United States was a net exporter of TiO₂ pigments. Owing to reduced global and domestic demand, both exports and imports of TiO₂ pigments decreased in 2023. China continued an unprecedented expansion in TiO₂ production and capacity.

World Sponge Metal Production and Sponge and Pigment Capacity:

	<u>Sponge production^e</u>		<u>Capacity, 2023⁷</u>	
	<u>2022</u>	<u>2023</u>	<u>Sponge</u>	<u>Pigment</u>
United States	W	W	500	1,360,000
Australia	—	—	—	260,000
Canada	—	—	—	108,000
China	180,000	220,000	260,000	5,500,000
Germany	—	—	—	339,000
India	300	300	500	91,000
Japan	47,000	60,000	65,200	322,000
Kazakhstan	15,000	14,000	26,000	—
Mexico	—	—	—	350,000
Russia	20,000	20,000	46,500	55,000
Saudi Arabia	9,700	12,000	15,600	200,000
Ukraine	1,000	—	—	122,000
United Kingdom	—	—	—	315,000
Other countries	—	—	—	820,000
World total (rounded)	⁸ 270,000	⁸ 330,000	410,000	9,800,000

World Resources:⁹ Resources of titanium minerals are discussed in the Titanium Mineral Concentrates chapter.

Substitutes: Few materials possess titanium metal's strength-to-weight ratio and corrosion resistance. In high-strength applications, titanium competes with aluminum, composites, intermetallics, steel, and superalloys. Aluminum, nickel, specialty steels, and zirconium alloys may be substituted for titanium for applications that require corrosion resistance. Ground calcium carbonate, precipitated calcium carbonate, kaolin, and talc compete with titanium dioxide as a white pigment.

^eEstimated. E Net exporter. W Withheld to avoid disclosing company proprietary data. — Zero.

¹See also the Titanium Mineral Concentrates chapter.

²Defined as production + imports – exports.

³Excludes domestic production of sponge in Utah.

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

⁵Defined as imports – exports.

⁶See Appendix B for definitions.

⁷Yearend operating capacity.

⁸Excludes U.S. production.

⁹See Appendix C for resource and reserve definitions and information concerning data sources.