

# TITANIUM AND TITANIUM DIOXIDE<sup>1</sup>

(Data in metric tons unless otherwise noted)

**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 on care-and-maintenance status since 2016.

Although detailed 2021 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, consumer, and other applications. The value of imported sponge was about \$140 million, a significant decrease compared with \$173 million in 2020.

In 2021, titanium dioxide (TiO<sub>2</sub>) pigment production, by four companies operating five facilities in four States, was valued at about \$3.2 billion. The estimated end-use distribution of TiO<sub>2</sub> pigment consumption was paints (including lacquers and varnishes), 60%; plastics, 20%; paper, 5%; and other, 15%. Other uses of TiO<sub>2</sub> included catalysts, ceramics, coated fabrics and textiles, floor coverings, printing ink, and roofing granules.

<b>Salient Statistics—United States:</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021<sup>e</sup></b>
Titanium sponge metal:					
Production	W	W	W	W	W
Imports for consumption <sup>e</sup>	23,300	23,700	30,000	19,200	14,000
Exports	3,090	533	869	711	120
Consumption, reported	37,400	35,200	W	W	W
Price, dollars per kilogram <sup>2</sup>	10.40	10.70	11.80	11.70	11.70
Stocks, industry, yearend <sup>e</sup>	13,200	10,700	W	W	W
Employment, number <sup>e</sup>	150	150	150	150	20
Net import reliance <sup>3</sup> as a percentage of reported consumption	88	73	>50	>50	>90
Titanium dioxide pigment:					
Production	1,260,000	1,150,000	1,100,000	<sup>e</sup> 890,000	1,100,000
Imports for consumption	240,000	268,000	226,000	263,000	260,000
Exports	634,000	528,000	401,000	386,000	520,000
Consumption, apparent <sup>4</sup>	870,000	893,000	930,000	770,000	840,000
Price, dollars per metric ton <sup>2</sup>	2,570	2,730	2,750	2,710	2,900
Producer price index (1982=100), yearend <sup>5</sup>	205	205	NA	NA	NA
Employment, number <sup>e</sup>	3,110	3,050	3,050	3,100	3,100
Net import reliance <sup>3</sup> as a percentage of apparent consumption	E	E	E	E	E

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

**Import Sources (2017–20):** Sponge metal: Japan, 88%; Kazakhstan, 8%; Ukraine, 3%; and other, 1%. Titanium dioxide pigment: Canada, 40%; China, 19%; Germany, 9%; Belgium, 5%; and other, 27%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations 12–31–21</b>
	Titanium oxides (unfinished TiO <sub>2</sub> pigments)	2823.00.0000	5.5% ad valorem.
	TiO <sub>2</sub> pigments, 80% or more TiO <sub>2</sub>	3206.11.0000	6.0% ad valorem.
	TiO <sub>2</sub> pigments, other	3206.19.0000	6.0% ad valorem.
	Ferrotitanium and ferrosilicon titanium	7202.91.0000	3.7% ad valorem.
	Unwrought titanium metal	8108.20.0010	15.0% 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	15.0% ad valorem.

**Depletion Allowance:** Not applicable.

**Government Stockpile:** None.

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## TITANIUM AND TITANIUM DIOXIDE

**Events, Trends, and Issues:** The 500-ton-per-year 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. Reduced demand from the aerospace and other industries resulted in a 27% decrease in imports of titanium sponge compared with those in 2020. Japan (92%) and Kazakhstan (6%) were the leading import sources for titanium sponge in 2021. U.S. imports of titanium waste and scrap were about 11,000 tons. Germany (20%), the United Kingdom (15%), Canada (13%), France (10%), and Japan (8%) were the leading import sources for titanium waste and scrap in 2021. The duty-paid unit value of scrap imports was about \$4.70 per kilogram. The U.S. Department of Commerce (DOC) led investigations under section 232 of the Trade Expansion Act of 1962 that determined titanium sponge imports into the United States threatened to impair national security. The investigation concluded that the United States was at risk of losing the remaining industrial capacity and technical knowledge related to titanium sponge production that is essential to meet national defense and critical infrastructure requirements. In October, the DOC published its findings and recommendations from the investigation in the Federal Register (86 FR 59115). Changes to existing tariff rates for titanium sponge were not recommended.

Domestic production of TiO<sub>2</sub> pigment in 2021 was estimated to be about 1.1 million tons. Although heavily reliant on imports of titanium mineral concentrates, the United States was a net exporter of TiO<sub>2</sub> pigments. After a multiyear low in 2020, exports of titanium pigments increased significantly in 2021. China's TiO<sub>2</sub> pigment production was estimated to be 3.7 million tons.

### World Sponge Metal Production and Sponge and Pigment Capacity:

	Sponge production <sup>e</sup>		Capacity, 2021 <sup>6</sup>	
	2020	2021	Sponge	Pigment
United States	W	W	500	1,370,000
Australia	—	—	—	260,000
Canada	—	—	—	104,000
China	123,000	120,000	177,000	4,000,000
Germany	—	—	—	472,000
India	250	250	500	108,000
Japan	49,200	35,000	68,800	314,000
Kazakhstan	15,000	16,000	26,000	1,000
Mexico	—	—	—	300,000
Russia	31,000	27,000	46,500	55,000
Saudi Arabia	2,800	3,700	15,600	210,000
Ukraine	5,000	5,400	12,000	120,000
United Kingdom	—	—	—	315,000
Other countries	—	—	—	784,000
World total (rounded)	<u>7230,000</u>	<u>7210,000</u>	<u>350,000</u>	<u>8,400,000</u>

**World Resources:**<sup>8</sup> Reserves and 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.

<sup>e</sup>Estimated. E Net exporter. NA Not available. W Withheld to avoid disclosing company proprietary data. — Zero.

<sup>1</sup>See also Titanium Mineral Concentrates.

<sup>2</sup>Landed duty-paid value based on U.S. imports for consumption.

<sup>3</sup>Defined as imports – exports.

<sup>4</sup>Defined as production + imports – exports.

<sup>5</sup>U.S. Department of Labor, Bureau of Labor Statistics.

<sup>6</sup>Yearend operating capacity.

<sup>7</sup>Excludes U.S. production.

<sup>8</sup>See Appendix C for resource and reserve definitions and information concerning data sources.