TITANIUM AND TITANIUM DIOXIDE[1]

(Data in metric tons unless otherwise noted)

Domestic Production and Use: Titanium sponge metal was produced by two operations in Nevada and 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, used the Armstrong method to produce high-purity titanium for use in electronics. The operations in Nevada, with an estimated capacity of 12,600 tons per year, used the Kroll method, the dominant process of titanium sponge production for use in aerospace, industrial, and all other applications. A third facility, in Rowley, UT, with an estimated capacity of 10,900 tons per year, was using the Kroll method until it was idled and placed on care-and-maintenance status in 2016 owing to market conditions.

In 2019, an estimated 80% of titanium metal was used in aerospace applications; the remaining 20% was used in armor, chemical processing, marine hardware, medical implants, power generation, and consumer and other applications. Assuming an average purchase price of $9.10 per kilogram, the value of sponge metal consumed was about $320 million.

In 2019, titanium dioxide (TiO_2) pigment production, by four companies operating five facilities in four States, was valued at about $3.0 billion. The estimated end-use distribution of TiO_2 pigment consumption was paints (including lacquers and varnishes), 59%; plastics, 20%; paper, 5%; and other, 16%. Other uses of TiO_2 included catalysts, ceramics, coated fabrics and textiles, floor coverings, printing ink, and roofing granules.

Salient Statistics—United States:	**2015**	**2016**	**2017**	**2018**	**2019[e]**
Titanium sponge metal:					
Production	W	W	W	W	W
Imports for consumption	20,700	16,200	24,100	23,700	27,000
Exports	1,700	724	3,130	533	1,000
Consumption, reported	31,200	34,100	37,400	35,200	35,000
Price, dollars per kilogram, yearend	9.40	9.50	9.10	9.20	9.20
Stocks, industry, yearend[e]	25,000	25,100	13,200	10,700	11,000
Employment, number[e]	300	150	150	150	150
Net import reliance[2] as a percentage of reported consumption	61	45	88	73	86
Titanium dioxide pigment:					
Production	1,220,000	1,240,000	1,260,000	1,150,000	1,100,000
Imports for consumption	221,000	247,000	239,000	269,000	240,000
Exports	649,000	651,000	634,000	529,000	400,000
Consumption, apparent[3]	792,000	840,000	870,000	893,000	900,000
Producer price index (1982=100), yearend[4]	176	175	205	205	207
Employment, number[e]	3,110	3,110	3,110	3,050	3,050
Net import reliance[2] as a percentage of apparent consumption	E	E	E	E	E

Recycling: About 62,000 tons of titanium scrap metal was consumed in 2019—50,000 tons by the titanium industry, 10,000 tons by the steel industry, 500 tons by the superalloy industry, and the remainder in other industries.

Import Sources (2015–18): Sponge metal: Japan, 86%; Kazakhstan, 8%; Ukraine, 4%; China, 1%; and Russia, 1%. Titanium dioxide pigment: Canada, 35%; China, 25%; Germany, 9%; Mexico, 4%; and other, 27%.

Tariff: Item	**Number**	**Normal Trade Relations 12–31–19**
Titanium oxides (unfinished TiO_2 pigments)	2823.00.0000	5.5% ad val.
TiO_2 pigments, 80% or more TiO_2	3206.11.0000	6.0% ad val.
TiO_2 pigments, other	3206.19.0000	6.0% ad val.
Ferrotitanium and ferrosilicon titanium	7202.91.0000	3.7% ad val.
Unwrought titanium metal	8108.20.0010	15.0% ad val.
Titanium waste and scrap metal	8108.30.0000	Free.
Other titanium metal articles	8108.90.3000	5.5% ad val.
Wrought titanium metal	8108.90.6000	15.0% ad val.

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TITANIUM AND TITANIUM DIOXIDE

Depletion Allowance: Not applicable.

Government Stockpile: None.

Events, Trends, and Issues: Domestic consumption of titanium sponge in 2019 was essentially unchanged compared with that of 2018. Increased imports outpaced increased exports of titanium sponge leading to an increase in net import reliance to 86%. Japan and Kazakhstan were the leading import sources for titanium sponge. Domestic production of TiO_2 pigment in 2019 was estimated to be about 1.1 million tons, a decrease from that of 2018. Although heavily reliant on imports of titanium mineral concentrates, the United States was a net exporter of TiO_2 pigments.

Following a settlement reached with the U.S. Federal Trade Commission, a leading global producer of titanium minerals and pigments based in the United States acquired the second-ranked global producer of titanium pigments headquartered in Saudi Arabia. One key requirement of the approval was the divesture of two titanium pigment plants in Ashtabula, OH.

In Yanbu, Saudi Arabia, a new titanium sponge operation was being commissioned, but was delayed by technical issues. The new facility was jointly owned by companies based in Saudi Arabia and Japan and was expected to produce up to 15,600 tons per year of titanium sponge.

World Sponge Metal Production and Sponge and Pigment Capacity:

	Sponge production		Capacity 2019[5]	
	2018	2019[e]	Sponge	Pigment
United States	W	W	13,100	1,370,000
Australia	—	—	—	260,000
Canada	—	—	—	104,000
China[e]	75,000	84,000	117,000	3,250,000
Germany	—	—	—	472,000
India	250	250	500	108,000
Japan[e]	49,000	54,000	68,800	314,000
Kazakhstan[e]	16,000	20,000	31,000	1,000
Mexico	—	—	—	300,000
Russia[e]	44,000	44,000	46,500	55,000
Saudi Arabia	—	—	15,600	210,000
Ukraine[e]	8,000	9,000	12,000	120,000
United Kingdom	—	—	—	315,000
Other countries	—	—	—	784,000
World total (rounded)	[6]192,000	[6]210,000	305,000	7,660,000

World Resources: 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.

[e]Estimated. E Net exporter. W Withheld to avoid disclosing company proprietary data. — Zero.
[1]See also Titanium Mineral Concentrates.
[2]Defined as imports – exports.
[3]Defined as production + imports – exports.
[4]U.S. Department of Labor, Bureau of Labor Statistics.
[5]Yearend operating capacity.
[6]Excludes U.S. production.