

# TUNGSTEN

(Data in metric tons of tungsten content unless otherwise noted)

**Domestic Production and Use:** There has been no known domestic commercial production of tungsten concentrates since 2015. Approximately six companies in the United States used chemical processes to convert tungsten concentrates, ammonium paratungstate (APT), tungsten oxide, and (or) scrap to tungsten metal powder, tungsten carbide powder, and (or) tungsten chemicals. Nearly 60% of the tungsten used in the United States was used in cemented carbide parts for cutting and wear-resistant applications, primarily in the construction, metalworking, mining, and oil and gas drilling industries. The remaining tungsten was used to make various alloys and specialty steels; electrodes, filaments, wires, and other components for electrical, electronic, heating, lighting, and welding applications; and chemicals for various applications. The estimated value of apparent consumption in 2020 was approximately \$500 million.

<b><u>Salient Statistics—United States:</u></b>	<b><u>2016</u></b>	<b><u>2017</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020<sup>e</sup></u></b>
Production:					
Mine	—	—	—	—	—
Secondary	W	W	W	W	W
Imports for consumption:					
Concentrate	3,580	3,920	4,050	2,760	2,000
Other forms <sup>1</sup>	6,300	9,780	10,400	11,100	9,000
Exports:					
Concentrate	183	532	284	584	300
Other forms <sup>2</sup>	3,200	3,010	3,210	2,780	2,500
Shipments from Government stockpile:					
Concentrate	—	1,460	1,180	663	700
Other forms	—	—	—	—	20
Consumption:					
Reported, concentrate	W	W	W	W	W
Apparent, <sup>3</sup> all forms	W	W	W	W	W
Price, <sup>4</sup> concentrate, average U.S. spot market, dollars per metric ton unit of tungsten trioxide <sup>5</sup>	148	245	326	270	270
Stocks, industry, concentrate and other forms, yearend	W	W	W	W	W
Net import reliance <sup>6</sup> as a percentage of apparent consumption	>25	>50	>50	>50	>50

**Recycling:** The estimated quantity of secondary tungsten produced and the amount consumed from secondary sources by processors and end users in 2020 were withheld to avoid disclosing company proprietary data.

**Import Sources (2016–19):** Tungsten contained in ores and concentrates, intermediate and primary products, wrought and unwrought tungsten, and waste and scrap: China, 32%; Bolivia, 9%; Germany, 9%; Austria, 5%; and other, 45%.

<b><u>Tariff:</u></b>	<b><u>Item</u></b>	<b><u>Number</u></b>	<b><u>Normal Trade Relations</u></b> <b><u>12–31–20</u></b>
	Ores	2611.00.3000	Free.
	Concentrates	2611.00.6000	37.5¢/kg tungsten content.
	Tungsten oxides	2825.90.3000	5.5% ad val.
	Ammonium tungstates	2841.80.0010	5.5% ad val.
	Tungsten carbides	2849.90.3000	5.5% ad val.
	Ferrotungsten	7202.80.0000	5.6% ad val.
	Tungsten powders	8101.10.0000	7.0% ad val.
	Tungsten waste and scrap	8101.97.0000	2.8% ad val.

**Depletion Allowance:** 22% (domestic), 14% (foreign).

**Government Stockpile:**<sup>7</sup>

<b>Material</b>	<b>FY 2020</b>			<b>FY 2021</b>	
	<b>Inventory as of 9–30–20</b>	<b>Potential acquisitions</b>	<b>Potential disposals</b>	<b>Potential acquisitions</b>	<b>Potential disposals</b>
Metal powder	107	—	125	—	125
Ores and concentrates	7,660	—	1,360	—	1,360
Tungsten alloys, gross weight <sup>8</sup>	6	5	—	5	—

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**Events, Trends, and Issues:** World tungsten supply was dominated by production in China and exports from China. China's Government regulated its tungsten industry by limiting the number of mining and export licenses, imposing quotas on concentrate production, and placing constraints on mining and processing. In 2020, production of tungsten concentrate outside China was expected to remain at less than 20% of world production. Scrap continued to be an important source of raw material for the tungsten industry worldwide.

China was the world's leading tungsten consumer. Analysts forecast global tungsten consumption in 2020 will be less than that in 2019 as a result of the impacts of the global COVID-19 pandemic on the global economy and industrial production, particularly tungsten consuming end-use sectors such as the automotive, commercial aerospace, and oil and gas drilling industries. The decrease in tungsten consumption in 2020 is expected to result in a market surplus. During March and April 2020, most prices of tungsten concentrates and downstream tungsten materials decreased in response to reduced demand; prices then stabilized or gradually trended upward as the year progressed.

**World Mine Production and Reserves:** Reserves for Mongolia and Russia were revised based on Government reports.

	Mine production		Reserves <sup>9</sup>
	2019	2020 <sup>e</sup>	
United States	—	—	NA
Austria	892	890	10,000
Bolivia	1,060	1,400	NA
China	69,000	69,000	1,900,000
Korea, North	1,130	500	29,000
Mongolia	1,900	1,900	4,300
Portugal	518	680	3,100
Russia	2,200	2,200	400,000
Rwanda	900	1,000	NA
Spain	603	800	54,000
Vietnam	4,500	4,300	95,000
Other countries	1,070	1,000	880,000
World total (rounded)	83,800	84,000	3,400,000

**World Resources:**<sup>9</sup> World tungsten resources are geographically widespread. China ranks first in the world in terms of tungsten resources and reserves and has some of the largest deposits. Canada, Kazakhstan, Russia, and the United States also have significant tungsten resources.

**Substitutes:** Potential substitutes for cemented tungsten carbides include cemented carbides based on molybdenum carbide, niobium carbide, or titanium carbide; ceramics; ceramic-metallic composites (cermets); and tool steels. Most of these options reduce, rather than replace, the amount of tungsten used. Potential substitutes for other applications are as follows: molybdenum for certain tungsten mill products; molybdenum steels for tungsten steels, although most molybdenum steels still contain tungsten; lighting based on carbon nanotube filaments, induction technology, and light-emitting diodes for lighting based on tungsten electrodes or filaments; depleted uranium or lead for tungsten or tungsten alloys in applications requiring high density or the ability to shield radiation; and depleted uranium alloys or hardened steel for cemented tungsten carbides or tungsten alloys in armor-piercing projectiles. In some applications, substitution would result in increased cost or a loss in product performance.

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

<sup>1</sup>Includes ammonium and other tungstates; ferrotungsten; tungsten carbides; tungsten metal powders; tungsten oxides, chloride, and other tungsten compounds; unwrought tungsten; wrought tungsten forms; and tungsten waste and scrap.

<sup>2</sup>Includes ammonium and other tungstates, ferrotungsten, tungsten carbides, tungsten metal powders, unwrought tungsten, wrought tungsten forms, and tungsten waste and scrap.

<sup>3</sup>Defined as mine production + secondary production + imports – exports + adjustments for Government and industry stock changes.

<sup>4</sup>Source: Platts Metals Week.

<sup>5</sup>A metric ton unit of tungsten trioxide contains 7.93 kilograms of tungsten.

<sup>6</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>7</sup>See Appendix B for definitions.

<sup>8</sup>Inventory includes tungsten alloys and tungsten-rhenium metal; potential acquisitions are tungsten-rhenium metal only.

<sup>9</sup>See Appendix C for resource and reserve definitions and information concerning data sources.