

## TUNGSTEN

(Data in metric tons, tungsten content, unless otherwise specified)

**Domestic Production and Use:** Tungsten has not been mined commercially in the United States since 2015. Approximately six U.S. companies had the capability to convert tungsten concentrates, ammonium paratungstate (APT), tungsten oxide, and (or) scrap to tungsten metal powder, tungsten carbide powder, and (or) tungsten chemicals. An estimated 60% of the tungsten consumed 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 remainder 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 2023 was withheld to avoid disclosing company proprietary data.

<b><u>Salient Statistics—United States:</u></b>	<b><u>2019</u></b>	<b><u>2020</u></b>	<b><u>2021</u></b>	<b><u>2022</u></b>	<b><u>2023<sup>e</sup></u></b>
Production:					
Mine	—	—	—	—	—
Secondary	W	W	W	W	W
Imports for consumption:					
Ores and concentrates	2,760	2,020	1,600	2,130	1,500
Other forms <sup>1</sup>	11,100	8,660	10,500	12,300	10,000
Exports:					
Ores and concentrates	583	480	441	614	550
Other forms <sup>2</sup>	2,780	2,470	2,970	3,680	3,300
Shipments from Government stockpile: <sup>3</sup>					
Concentrate	663	728	1,030	689	NA
Other forms	—	34	93	—	NA
Consumption:					
Reported, concentrate	W	W	W	W	W
Apparent, <sup>4</sup> all forms	W	W	W	W	W
Price, <sup>5</sup> concentrate, average in-warehouse Rotterdam, dollars per dry metric ton unit of tungsten trioxide <sup>6</sup>	198	172	225	275	260
Stocks, industry, concentrate and other forms, yearend	W	W	W	W	W
Net import reliance <sup>7</sup> as a percentage of apparent consumption	>50	>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 2023 were withheld to avoid disclosing company proprietary data.

**Import Sources (2019–22):** Ores, concentrates, and other forms:<sup>1</sup> China,<sup>8</sup> 27%; Germany, 12%; Bolivia, 9%; Vietnam, 8%; and other, 44%.

<b><u>Tariff:</u></b>	<b><u>Item</u></b>	<b><u>Number</u></b>	<b><u>Normal Trade Relations</u></b> <b><u>12–31–23</u></b>
	Ores	2611.00.3000	Free.
	Concentrates	2611.00.6000	37.5¢/kg on tungsten content.
	Tungsten oxides	2825.90.3000	5.5% ad valorem.
	Ammonium tungstates	2841.80.0010	5.5% ad valorem.
	Tungsten carbides	2849.90.3000	5.5% ad valorem.
	Ferrotungsten	7202.80.0000	5.6% ad valorem.
	Tungsten powders	8101.10.0000	7% ad valorem.
	Tungsten waste and scrap	8101.97.0000	2.8% ad valorem.

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

### **Government Stockpile:**<sup>9</sup>

<b><u>Material</u></b>	<b><u>FY 2023</u></b>		<b><u>FY 2024</u></b>	
	<b><u>Potential acquisitions</u></b>	<b><u>Potential disposals</u></b>	<b><u>Potential acquisitions</u></b>	<b><u>Potential disposals</u></b>
Ores and concentrates	—	1,130	—	907
Tungsten	—	—	266	—

## TUNGSTEN

**Events, Trends, and Issues:** World tungsten supply was dominated by production in China and exports from China. Production of tungsten concentrate outside China was estimated to have increased in 2023 but remained less than 20% of world production. The increase was from existing operations and from the restart of production from a historic mine in Australia. Additional production, primarily from mines in the Republic of Korea, Russia, Spain, and the United Kingdom, was forecast to begin within a year or two. Scrap continued to be an important source of raw material for the world tungsten industry.

Tungsten consumption is strongly influenced by economic conditions and industrial activity. China continued to be the world's leading tungsten consumer. In 2023, global tungsten consumption was forecast to decrease slightly from that in 2022.

**World Mine Production and Reserves:** Reserves for Australia, China, Portugal, Spain, Vietnam, and "Other countries" were revised based on academic, company, and Government reports.

	Mine production <sup>e</sup>		Reserves <sup>10</sup>
	2022	2023	
United States	—	—	NA
Australia	200	800	<sup>11</sup> 570,000
Austria	910	910	10,000
Bolivia	1,360	1,500	NA
China	66,000	63,000	2,300,000
Korea, North	1,520	1,700	29,000
Portugal	500	500	4,000
Russia	2,000	2,000	400,000
Rwanda	1,400	1,400	NA
Spain	800	1,500	66,000
Vietnam	4,000	3,500	74,000
Other countries	<u>1,080</u>	<u>1,100</u>	<u>950,000</u>
World total (rounded)	<u>79,800</u>	<u>78,000</u>	<u>4,400,000</u>

**World Resources:**<sup>10</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. Significant tungsten resources have been identified on every continent except Antarctica.

**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 carbide powders; tungsten metal powders; tungsten oxides, chlorides, and other tungsten compounds; unwrought tungsten; wrought tungsten forms; and tungsten waste and scrap.

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

<sup>3</sup>Defined as change in total inventory from prior yearend inventory. If negative, increase in inventory. Beginning in 2023, Government stock changes no longer available.

<sup>4</sup>Defined for 2019–22 as mine production + secondary production + imports – exports ± adjustments for Government and industry stock changes. Beginning in 2023, Government stock changes no longer included.

<sup>5</sup>Source: Argus Media Group, Argus Tungsten Analytics.

<sup>6</sup>A metric ton unit of tungsten trioxide contains 7.93 kilograms of tungsten.

<sup>7</sup>Defined for 2019–22 as imports – exports ± adjustments for Government and industry stock changes. Beginning in 2023, Government stock changes no longer included.

<sup>8</sup>Includes Hong Kong.

<sup>9</sup>See Appendix B for definitions.

<sup>10</sup>See Appendix C for resource and reserve definitions and information concerning data sources.

<sup>11</sup>For Australia, Joint Ore Reserves Committee-compliant or equivalent reserves were 220,000 tons.