

## TUNGSTEN

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

**Domestic Production and Use:** A mine in California produced tungsten concentrates in 2009. Approximately eight companies in the United States processed tungsten concentrates, ammonium paratungstate, tungsten oxide, and/or scrap to make tungsten powder, tungsten carbide powder, and/or tungsten chemicals. Nearly 60 industrial consumers were surveyed on a monthly or annual basis. Data reported by these consumers indicated that more than one-half of the tungsten consumed in the United States was used in cemented carbide parts for cutting and wear-resistant materials, primarily in the construction, metalworking, mining, and oil- and gas-drilling industries. The remaining tungsten was consumed to make tungsten heavy alloys for applications requiring high density; electrodes, filaments, wires, and other components for electrical, electronic, heating, lighting, and welding applications; steels, superalloys, and wear-resistant alloys; and chemicals for various applications. The estimated value of apparent consumption in 2009 was \$400 million.

<b>Salient Statistics—United States:</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009<sup>e</sup></b>
Production:					
Mine	—	—	W	W	W
Secondary	4,670	4,490	4,330	4,790	4,000
Imports for consumption:					
Concentrate	2,080	2,290	3,880	3,990	3,800
Other forms	9,070	9,700	9,050	9,060	6,300
Exports:					
Concentrate	52	130	109	496	16
Other forms	5,890	6,310	5,950	5,480	2,600
Government stockpile shipments:					
Concentrate	2,310	3,120	1,740	1,470	250
Other forms	404	16	31	51	11
Consumption:					
Reported, concentrate	W	W	W	W	W
Apparent, <sup>1</sup> all forms	11,700	13,300	13,300	13,800	10,800
Price, concentrate, dollars per mtu WO <sub>3</sub> , <sup>2</sup> average:					
U.S. spot market, Platts Metals Week	146	200	189	184	150
European market, Metal Bulletin	123	166	165	164	150
Stocks, industry, yearend:					
Concentrate	W	W	W	W	W
Other forms	2,300	2,110	1,980	2,200	2,750
Net import reliance <sup>3</sup> as a percentage of apparent consumption	68	67	68	60	63

**Recycling:** In 2009, the tungsten contained in scrap consumed by processors and end users represented approximately 37% of apparent consumption of tungsten in all forms.

**Import Sources (2005-08):** Tungsten contained in ores and concentrates, intermediate and primary products, wrought and unwrought tungsten, and waste and scrap: China, 43%; Germany, 10%; Canada, 9%; Bolivia, 7%; and other, 31%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations<sup>4</sup> 12-31-09</b>
Ore	2611.00.3000	Free.
Concentrate	2611.00.6000	37.5¢/kg tungsten content.
Tungsten oxide	2825.90.3000	5.5% ad val.
Ammonium tungstate	2841.80.0010	5.5% ad val.
Tungsten carbide	2849.90.3000	5.5% ad val.
Ferrotungsten	7202.80.0000	5.6% ad val.
Tungsten powders	8101.10.0000	7.0% ad val.

**Depletion Allowance:** 22% (Domestic), 14% (Foreign).

## TUNGSTEN

### Government Stockpile:

Material	Stockpile Status—9-30-09 <sup>5</sup>			
	Uncommitted inventory	Authorized for disposal	Disposal plan FY 2009	Disposals FY 2009
Metal powder	172	172	136	11
Ores and concentrates	19,700	19,700	3,630	250

**Events, Trends, and Issues:** World tungsten supply was dominated by Chinese production and exports. China's Government limited the number of exploration and mining licenses for tungsten, restricted the amounts of tungsten that could be produced and exported, imposed constraints on mining and processing tungsten ores, continued to shift the balance of export quotas to favor value-added downstream tungsten materials and products, and adjusted export taxes on tungsten materials. The growth in China's economy during the past decade has resulted in China becoming the world's largest tungsten consumer. To conserve its resources and meet increasing domestic demand, the Chinese Government was expected to continue to limit tungsten production and exports and to increase imports of tungsten. In addition, the Chinese tungsten industry was investing in mine development projects outside China and developing technologies to increase the use of tungsten scrap and the processing of underutilized ores.

In late 2008, in response to global economic conditions, Chinese tungsten mines in Hunan and Jiangxi Provinces reportedly suspended production. In 2009, to help domestic producers, the Chinese Government decreased export taxes on some tungsten materials and encouraged local governments to offer loans to producers in exchange for tungsten concentrates and products. The sole Canadian tungsten mine was placed on care-and-maintenance status in October. Economic conditions were expected to delay the startup of some proposed new tungsten mine production. In recent years, the tungsten industry has increased its monitoring of proposed legislation and scientific research regarding the impact of tungsten on human health and the environment.

**World Mine Production and Reserves:** Production for Canada was revised downward to represent tungsten content of concentrates. Reserves for Canada were revised based on company data; reserves for Portugal were revised based on Government data.

	Mine production		Reserves <sup>6</sup>
	2008	2009 <sup>e</sup>	
United States	W	W	140,000
Austria	1,100	1,000	10,000
Bolivia	1,100	900	53,000
Canada	2,300	2,000	110,000
China	43,500	47,000	1,800,000
Portugal	850	850	4,200
Russia	3,000	2,400	250,000
Other countries	4,100	3,700	400,000
World total (rounded)	755,900	758,000	2,800,000

**World Resources:** 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 and titanium carbide, ceramics, ceramic-metallic composites (cermets), diamond tools, and tool steels. Potential substitutes for other applications are as follows: molybdenum for certain tungsten mill products; molybdenum steels for tungsten steels; lighting based on carbon nanotube filaments, induction technology, and light-emitting diodes (LEDs) for lighting based on tungsten electrodes or filaments; depleted uranium for tungsten alloys or unalloyed tungsten in weights and counterweights; and depleted uranium alloys 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. W Withheld to avoid disclosing company proprietary data. — Zero.

<sup>1</sup>The sum of U.S. net import reliance and secondary production, as estimated from scrap consumption.

<sup>2</sup>A metric ton unit (mtu) of tungsten trioxide (WO<sub>3</sub>) contains 7.93 kilograms of tungsten.

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

<sup>4</sup>No tariff for Canada and Mexico. Tariffs for other countries for some items may be eliminated under special trade agreements.

<sup>5</sup>See Appendix B for definitions.

<sup>6</sup>See Appendix C for definitions. Reserve base estimates were discontinued in 2009; see Introduction.

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