

TUNGSTEN

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

Domestic Production and Use: One mine in California produced tungsten concentrates in 2011. 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. More than 50 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 2011 was \$980 million.

<u>Salient Statistics—United States:</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011^e</u>
Production:					
Mine	W	W	W	W	W
Secondary	4,330	4,790	3,550	5,880	10,000
Imports for consumption:					
Concentrate	3,880	3,990	3,590	2,740	3,800
Other forms	9,050	9,060	6,410	9,690	9,300
Exports:					
Concentrate	109	496	38	276	50
Other forms	5,950	5,480	2,730	4,350	6,900
Government stockpile shipments:					
Concentrate	1,740	1,470	688	2,060	1,200
Other forms	31	51	12	(1)	50
Consumption:					
Reported, concentrate	W	W	W	4,840	W
Apparent, ^{2,3} all forms	13,300	13,800	11,600	15,600	18,200
Price, concentrate, dollars per mtu WO ₃ , ⁴ average:					
U.S. spot market, Platts Metals Week	189	184	151	183	250
European market, Metal Bulletin	165	164	150	150	150
Stocks, industry, yearend:					
Concentrate	W	W	W	W	W
Other forms	1,970	2,240	2,210	2,500	2,800
Net import reliance ⁵ as a percentage of apparent consumption	67	60	68	63	36

Recycling: In 2011, the tungsten contained in scrap consumed by processors and end users represented approximately 55% of apparent consumption of tungsten in all forms.

Import Sources (2007–10): Tungsten contained in ores and concentrates, intermediate and primary products, wrought and unwrought tungsten, and waste and scrap: China, 44%; Bolivia, 8%; Canada, 8%; Germany, 7%; and other, 33%.

<u>Tariff: Item</u>	<u>Number</u>	<u>Normal Trade Relations⁶</u>
Ore	2611.00.3000	<u>12-31-11</u> 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).

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Government Stockpile:

Material	Stockpile Status—9-30-11 ⁷			
	Uncommitted inventory	Authorized for disposal	Disposal plan FY 2011	Disposals FY 2011
Metal powder	160	160	136	11
Ores and concentrates	15,800	15,800	3,630	1,180

Events, Trends, and Issues: World tungsten supply is dominated by Chinese production and exports. China's Government regulates its tungsten industry by limiting the number of exploration, mining, and export licenses; limiting or forbidding foreign investment; imposing constraints on mining and processing; establishing quotas on production and exports; adjusting export quotas to favor value-added downstream materials and products; and imposing export taxes on tungsten materials. China is the world's largest tungsten consumer, and since 2008 the amount of tungsten consumed domestically has exceeded the amount exported. To conserve its resources and meet increasing domestic demand, the Chinese Government was expected to continue to limit tungsten production and exports and increase tungsten imports. Scrap was also an important source of tungsten raw material in China.

In 2011, Chinese domestic consumption continued to rise, U.S. apparent consumption increased, and Japanese imports were expected to be similar to those of 2010. Tight supplies of tungsten concentrates in China, combined with strong demand, resulted in higher prices for tungsten concentrates in China and the United States. Prices of such downstream products as ferrotungsten and ammonium paratungstate were significantly higher in 2011 compared with those of 2010.

Estimated U.S. net import reliance for tungsten decreased in 2011 compared with net import reliance for recent years owing to a significant increase in estimated scrap consumption (secondary production).

World Mine Production and Reserves: Reserves for "Other countries" was revised upward based on company and Government data.

	Mine production		Reserves ⁸
	2010	2011 ^e	
United States	W	W	140,000
Austria	1,000	1,100	10,000
Bolivia	1,200	1,200	53,000
Canada	420	2,000	120,000
China	59,000	60,000	1,900,000
Portugal	1,200	1,300	4,200
Russia	2,800	3,100	250,000
Other countries	<u>3,200</u>	<u>3,400</u>	<u>600,000</u>
World total (rounded)	³ 68,800	³ 72,000	3,100,000

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), 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 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.

^eEstimated. W Withheld to avoid disclosing company proprietary data.

¹Less than one-half unit.

²The sum of U.S. net import reliance and secondary production, as estimated from scrap consumption.

³Excludes U.S. mine production.

⁴A metric ton unit (mtu) of tungsten trioxide (WO₃) contains 7.93 kilograms of tungsten.

⁵Defined as imports – exports + adjustments for Government and industry stock changes.

⁶No tariff for Canada and Mexico. Tariffs for other countries for some items may be eliminated under special trade agreements.

⁷See Appendix B for definitions.

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