

## TUNGSTEN

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

**Domestic Production and Use:** The last reported U.S. production of tungsten concentrates was in 1994. In 2002, 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 70 industrial consumers were surveyed on a monthly or annual basis. Data reported by these consumers indicates that 62% of the tungsten consumed in the United States was used in cemented carbide parts for cutting and wear-resistant materials primarily in the metalworking, oil and gas drilling, mining, and construction industries. The remaining tungsten was consumed in making lamp filaments, electrodes, and other components for the electrical and electronics industries; steels, superalloys, and wear-resistant alloys; and chemicals for catalysts and pigments. The total estimated value of tungsten consumed in 2002 was \$250 million.

<b>Salient Statistics—United States:</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002<sup>e</sup></b>
Production:					
Mine	—	—	—	—	—
Secondary	3,350	4,980	5,210	5,390	4,500
Imports for consumption:					
Concentrate	4,750	2,870	2,370	2,680	3,900
Other forms	8,490	8,230	7,810	8,150	7,000
Exports:					
Concentrate	10	26	70	220	90
Other forms	3,640	2,860	2,800	4,860	3,500
Government stockpile shipments:					
Concentrate	—	(1)	1,240	2,200	1,600
Other forms	—	(1)	591	986	200
Consumption:					
Reported, concentrate	<sup>2</sup> 3,210	<sup>2</sup> 2,100	W	W	W
Apparent, all forms	12,300	12,900	14,400	14,500	12,900
Price, concentrate, dollars per mtu WO <sub>3</sub> , <sup>3</sup> average:					
U.S. spot market, Platts Metals Week	52	47	47	64	55
European market, Metal Bulletin	44	40	45	65	38
Stocks, industry, yearend:					
Concentrate	514	W	W	W	W
Other forms	2,780	2,490	2,280	2,110	1,800
Net import reliance <sup>4</sup> as a percentage of apparent consumption	77	65	66	64	70

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**Recycling:** During 2002, the tungsten content of scrap consumed by processors and end users was estimated at 4,500 tons. This represented approximately 35% of apparent consumption of tungsten in all forms.

**Import Sources (1998-2001):** Tungsten content of ores and concentrates, intermediate and primary products, wrought and unwrought tungsten, and waste and scrap: China, 48%; Russia, 16%; and other, 36%. In 2001, imports of tungsten materials from Russia decreased to 4% of total tungsten imports.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations<sup>5</sup> 12/31/02</b>
Ore	2611.00.3000	Free.
Concentrate	9902.26.1100	Free.
Ferrotungsten	7202.80.0000	5.6% ad val.
Tungsten powders	8101.10.0000	7.0% ad val.
Ammonium tungstate	2841.80.0010	5.5% ad val.
Tungsten carbide	2849.90.3000	6.5% ad val.
Tungsten oxide	2825.90.3000	5.5% ad val.

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

**Government Stockpile:** Sales of National Defense Stockpile tungsten began in 1999. Included in the data listed in the table below, as of September 30, 2002, are the following quantities of uncommitted nonstockpile-grade materials authorized for disposal (tons of tungsten content): ores and concentrates, 6,410, and metal powder, 151.

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Material	Stockpile Status—9-30-02 <sup>6</sup>				
	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2002	Disposals FY 2002
Carbide powder	—	4	—	—	—
Ferrotungsten	404	83	404	136	137
Metal powder	479	11	479	136	144
Ores and concentrates	30,100	17	30,100	1,810	(7)

**Events, Trends, and Issues:** World tungsten supply continued to be dominated by Chinese production and exports. Beginning in 1999 and continuing into 2002, the Chinese Government took several steps to control the release of Chinese tungsten into the world market. A new source of tungsten concentrates became available in early 2002, when production resumed from the CanTung Mine in Canada. All production from the mine was sold under contract to two major consumers, one in the United States and one in Sweden.

The downward trend in tungsten prices that began during the second half of 2001 continued through October 2002. The price decrease was attributed to a severe reduction in demand for tungsten end products resulting from a slowing of the world economy; an increase in smuggling of nonlicensed primary tungsten materials, including tungsten concentrates, out of China; and a buildup of inventories by consumers and traders. The decrease in tungsten demand is evident from decreases in the following estimates for 2002: U.S. apparent consumption, U.S. consumption of tungsten scrap, U.S. imports of tungsten materials other than concentrates, shipments of materials from the National Defense Stockpile, and U.S. exports of tungsten materials.

**World Mine Production, Reserves, and Reserve Base:** Reserves and reserve base estimates for China have been revised based on new information from that country.

	Mine production		Reserves <sup>8</sup>	Reserve base <sup>8</sup>
	2001	2002 <sup>e</sup>		
United States	—	—	140,000	200,000
Austria	1,600	1,600	10,000	15,000
Bolivia	360	500	53,000	100,000
Brazil	14	15	8,500	20,000
Burma	71	70	15,000	34,000
Canada	—	2,500	260,000	490,000
China	37,000	37,000	1,800,000	4,200,000
Korea, North	700	700	NA	35,000
Portugal	750	800	25,000	25,000
Russia	3,500	3,200	250,000	420,000
Thailand	30	50	30,000	30,000
Other countries	180	180	310,000	630,000
World total (rounded)	44,200	46,600	2,900,000	6,200,000

**World Resources:** Although world tungsten resources are geographically widespread, China has many deposits, including some of the largest in the world. As a result, China ranks number one in terms of tungsten resources and reserves. Canada, Russia, and the United States also have significant tungsten resources.

**Substitutes:** Cemented tungsten carbide remained a primary cutting-tool insert material because of its versatility in meeting technical requirements in many turning and milling operations. However, ceramics, ceramic-metallic composites, and other materials continued to be developed and utilized as substitutes to meet the changing needs of the world market. Increased quantities of carbide cutting-tool inserts were coated with alumina, diamond, titanium carbide, and/or titanium nitride to extend the life of the inserts. Tungsten remained the preferred and essentially unsubstitutable material for filaments, electrodes, and contacts in lamp and lighting applications. However, an electrodeless, nontungsten lamp is available for commercial and industrial use.

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

<sup>1</sup>Less than ½ unit.

<sup>2</sup>Excludes 6 months of withheld data.

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

<sup>4</sup>Defined as imports - exports + adjustments for Government and industry stock changes.

<sup>5</sup>Special tariff rates apply for Canada and Mexico.

<sup>6</sup>See Appendix B for definitions.

<sup>7</sup>Quantity not reported.

<sup>8</sup>See Appendix C for definitions.