

ARSENIC

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

Domestic Production and Use: Arsenic has not been produced in the United States since 1985, and domestic needs are satisfied by imported arsenic trioxide and arsenic metal. Arsenic trioxide is recovered from roasting arsenopyrite, the most abundant ore mineral of arsenic, as well as from copper, lead, and gold smelter flue dusts. Most of the arsenic used was in compound form as arsenic trioxide, which was then converted to arsenic acid for use in the production of chromated copper arsenate (CCA), the main preservative for wood products that are used outdoors. Arsenic trioxide is also used in fertilizers, herbicides, and insecticides. Arsenic metal is used in ammunition and solders, as an anti-friction additive to bearings, and to strengthen grids in storage batteries. Semiconductor applications in the computer and electronics industry require high-purity (99.9999%-pure) arsenic metal. The value of arsenic metal and compounds consumed domestically in 2003 was estimated to be less than \$20 million.

<u>Salient Statistics—United States:</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003^e</u>
Imports for consumption:					
Metal	1,300	830	1,030	880	1,000
Compounds	22,100	23,600	23,900	18,800	18,000
Exports, metal	1,350	41	57	100	100
Estimated consumption ¹	22,000	24,400	24,900	19,600	19,000
Value, cents per pound, average: ²					
Metal (China)	59	51	75	120	87
Trioxide (Mexico)	29	32	28	33	34
Net import reliance ³ as a percentage of estimated consumption	100	100	100	100	100

Recycling: Arsenic was not recovered from consumer end-product scrap. However, process water and contaminated runoff collected at wood treatment plants were reused in pressure treatment, and gallium arsenide scrap from the manufacture of semiconductor devices was reprocessed for gallium and arsenic recovery. Domestically, no arsenic was recovered from arsenical residues and dusts at nonferrous smelters, although some of these materials were processed for recovery of other metals.

Import Sources (1999-2002): Metal: China, 84%; Japan, 12%; Hong Kong, 2%; and other, 2%. Trioxide: China, 55%; Chile, 21%; Mexico, 5%; and other, 19%.

<u>Tariff: Item</u>	<u>Number</u>	<u>Normal Trade Relations</u>
		<u>12/31/03</u>
Metal	2804.80.0000	Free.
Trioxide	2811.29.1000	Free.
Sulfide	2813.90.1000	Free.
Acid ⁴	2811.19.1000	2.3% ad val.

Depletion Allowance: 14% (Domestic and foreign).

Government Stockpile: None.

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Events, Trends, and Issues: Research indicates that exposure to arsenic increases the risk of several types of cancer and can affect breathing and heart rhythm. Therefore, regulation of its use will continue to be increasingly stringent, and this will adversely affect the long-term demand for arsenic. With the voluntary decision by the wood-preserving industry to eliminate CCA wood preservatives from residential use by yearend 2003, arsenic consumption is expected to decline significantly in subsequent years. Mitigation of the health hazards and pollution effects of arsenic in ground water, mine drainage, and from coal burning will continue as important research and regulatory issues.

World Production, Reserves, and Reserve Base:

	Production (arsenic trioxide)		Reserves and reserve base ⁵ (arsenic content)
	<u>2002</u>	<u>2003^e</u>	
Belgium	1,000	1,000	World reserves and reserve base are thought to be about 20 and 30 times, respectively, annual world production. The reserve base for the United States is estimated to be 80,000 tons.
Chile	8,000	8,000	
China	16,000	16,500	
France	1,000	1,000	
Kazakhstan	1,500	1,500	
Mexico	2,300	2,500	
Peru	2,000	2,000	
Russia	1,500	1,500	
Other countries	<u>1,700</u>	<u>1,000</u>	
World total (rounded)	35,000	35,000	

World Resources: Approximately 11 million tons of arsenic are contained in global resources of copper and lead. Arsenic resources occur in copper ores in northern Peru and the Philippines. Copper-gold ores in Chile also contain arsenic, and arsenic is also associated with gold occurrences in Canada.

Substitutes: Substitutes for CCA include copper azole, copper citrate, alkaline copper quaternary, ammoniacal copper zinc arsenate, and ammoniacal copper quaternary. Biocides that contain silver are being studied as a possible wood preservative treatment. Concrete, steel, plasticized wood scrap, or plastic composites may be substituted for CCA-treated wood; however, arsenic compounds may be preferred because of lower cost and known performance.

^eEstimated.

¹Estimated to be the same as net imports.

²Calculated from U.S. Census Bureau import data.

³Defined as imports – exports + adjustments for Government and industry stock changes.

⁴No tariff for Canada, Israel, Caribbean Basin countries, and designated Beneficiary Andean and developing countries.

⁵See Appendix C for definitions.