

**ARSENIC<sup>1</sup>**

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

**Domestic Production and Use:** Because arsenic was not recovered from domestic ores, all arsenic metal and compounds consumed in the United States were imported. Essentially all of the arsenic consumed was in compound form, principally arsenic trioxide, which was subsequently converted to arsenic acid and used in the production of wood preservatives. Arsenic metal was consumed in the manufacture of nonferrous alloys, principally lead alloys for use in lead-acid batteries. About 20 tons per year of high-purity arsenic was estimated to have been used in the manufacture of semiconductor material. The value of arsenic metal and compounds consumed domestically in 2002 was estimated to be less than \$20 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>
Imports for consumption:					
Metal	997	1,300	830	1,030	700
Compounds	29,300	22,100	23,600	23,900	25,000
Exports, metal	177	1,350	41	57	100
Estimated consumption <sup>2</sup>	30,100	22,000	24,400	24,900	25,000
Value, cents per pound, average: <sup>3</sup>					
Metal (China)	57	59	51	75	120
Trioxide (Mexico)	32	29	32	28	33
Net import reliance <sup>4</sup> 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 (1998-2001):** Metal: China, 84%; Japan, 9%; Hong Kong, 4%; and other, 3%. Trioxide: China, 53%; Chile, 26%; Mexico, 6%; and other, 15%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12/31/02</b>
Metal	2804.80.0000	Free.
Trioxide	2811.29.1000	Free.
Sulfide	2813.90.1000	Free.
Acid <sup>5</sup>	2811.19.1000	2.3% ad val.

**Depletion Allowance:** 14% (Domestic and foreign).

**Government Stockpile:** None.

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**Events, Trends, and Issues:** Because of the toxicity of arsenic and its compounds, environmental regulation will continue to be increasingly stringent, adversely affecting the long-term demand for arsenic. With the decision by the wood-preserving industry to eliminate arsenical wood preservatives from residential application by yearend 2003, the major use for arsenic is expected to decline significantly. Mitigating the pollution effects and potential health hazards of naturally occurring and anthropogenic arsenic will continue as important research and regulatory areas.

### World Production, Reserves, and Reserve Base:

	Production (arsenic trioxide)		Reserves and reserve base <sup>6</sup> (arsenic content)
	<u>2001</u>	<u>2002<sup>e</sup></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	16,000	
France	1,000	1,000	
Kazakhstan	1,500	1,500	
Mexico	2,500	2,500	
Peru	2,500	2,500	
Russia	1,500	1,500	
Other countries	<u>1,500</u>	<u>1,000</u>	
World total (may be rounded)	35,500	35,000	

**World Resources:** World resources of copper and lead contain about 11 million tons of arsenic. Substantial resources of arsenic occur in copper ores in northern Peru and the Philippines and in copper-gold ores in Chile. In addition, world gold resources, particularly in Canada, contain substantial resources of arsenic.

**Substitutes:** Substitutes for arsenic compounds exist in most of its major uses, although arsenic compounds may be preferred because of lower cost and superior performance. The wood preservatives pentachlorophenol and creosote may be substituted for chromated copper arsenate when odor and paintability are not problems and where permitted by local regulations. Ammoniacal copper quaternary, copper azole, copper citrate, and copper dimethyldithiocarbamate are some of the alternative wood preservatives available which use no arsenic. Nonwood alternatives, such as concrete, steel, or plastic lumber, may be substituted in some applications for treated wood.

<sup>e</sup>Estimated.

<sup>1</sup>Prepared by Robert G. Reese, Jr.

<sup>2</sup>Estimated to be the same as net imports.

<sup>3</sup>Calculated from U.S. Census Bureau import data.

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

<sup>5</sup>Tariff is free for Canada, Israel, Caribbean Basin countries, and designated Beneficiary Andean and developing countries.

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