

## ARSENIC

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

**Domestic Production and Use:** Because arsenic is not recovered from domestic ores, all arsenic metal and compounds consumed in the United States are imported. More than 95% of the arsenic consumed was in compound form, principally arsenic trioxide, which was subsequently converted to arsenic acid. Production of chromated copper arsenate (CCA), a wood preservative, accounted for more than 90% of the domestic consumption of arsenic trioxide; CCA was manufactured primarily by three companies. Arsenic metal was consumed in the manufacture of nonferrous alloys, principally lead alloys for use in lead-acid batteries. About 30 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 2001 was estimated to be nearly \$20 million.

<b>Salient Statistics—United States:</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001<sup>e</sup></b>
Production	—	—	—	—	—
Imports for consumption:					
Metal	909	997	1,300	830	1,200
Compounds	22,800	29,300	22,100	23,600	24,000
Exports, metal	61	177	1,350	41	60
Estimated consumption <sup>1</sup>	23,700	30,100	22,000	24,000	25,000
Value, cents per pound, average: <sup>2</sup>					
Metal (China)	32	57	59	51	50
Trioxide (Mexico)	31	32	29	32	31
Net import reliance <sup>3</sup> as a percentage of apparent 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 are processed for recovery of other metals.

**Import Sources (1997-2000):** Metal: China, 87%; Japan, 6%; Hong Kong, 4%; and other, 3%. Trioxide: China, 52%; Chile, 29%; Mexico, 6%; and other, 13%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12/31/01</b>
Metal	2804.80.0000	Free.
Trioxide	2811.29.1000	Free.
Sulfide	2813.90.1000	Free.
Acid <sup>4</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:** Wood preservatives are expected to remain the major domestic use for arsenic. As a result, the demand for arsenic in the United States probably will continue to correlate closely with demand for new housing and growth in the renovation or replacement of existing structures using pressure-treated lumber. In general, the demand for arsenic-based wood preservatives appears positive, barring greater acceptance of alternative preservatives or adverse regulatory activity.

Because of the toxicity of arsenic and its compounds, environmental regulation is expected to become increasingly stringent. This probably will adversely affect the demand for arsenic in the long term but will have only minor impacts in the near term. Mitigating the pollution effects and potential health hazards of naturally occurring and anthropogenic arsenic will continue as important research and regulatory areas. During 2001, the U.S. Environmental Protection Agency reviewed a proposed new standard for the amount of arsenic permissible in drinking water. If adopted, the new standard would reduce allowable arsenic in drinking water from the current standard of less than 50 micrograms per liter to perhaps as low as 10 micrograms per liter.

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

	<b>Production (Arsenic trioxide)</b>		<b>Reserves and reserve base<sup>5</sup> (Arsenic content)</b>
	<b>2000</b>	<b>2001<sup>e</sup></b>	
Belgium	1,500	1,500	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	8,200	8,000	
China	16,000	16,000	
France	1,000	1,000	
Kazakhstan	1,500	2,000	
Mexico	2,400	2,600	
Russia	1,500	1,500	
Other countries	<u>1,800</u>	<u>2,000</u>	
World total (may be rounded)	33,900	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 CCA 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. — Zero.

<sup>1</sup>Estimated to be the same as net imports.

<sup>2</sup>Calculated from U.S. Census Bureau import data.

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

<sup>4</sup>Tariff is free for Canada, Israel, Caribbean Basin countries, and designated Beneficiary Andean and developing countries.

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