

ARSENIC

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

Domestic Production and Use: 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 is in compound form, principally arsenic trioxide, which is subsequently converted to arsenic acid. Production of chromated copper arsenate (CCA), a wood preservative, accounts for more than 90% of the domestic consumption of arsenic trioxide. CCA is manufactured primarily by three companies. Another company uses arsenic acid to produce arsenical herbicides. Arsenic metal is consumed in the manufacture of nonferrous alloys, principally lead alloys for use in lead-acid batteries. It is estimated that about 15 tons per year of high-purity arsenic is used in the manufacture of semiconductor material. The value of arsenic metal and compounds consumed domestically in 1988 was estimated at \$20 million.

Salient Statistics—United States:	1994	1995	1996	1997	1998^e
Imports for consumption:					
Metal	1,330	557	252	909	1,200
Compounds	20,300	22,100	21,200	22,800	28,000
Exports, metal	79	430	36	61	40
Estimated consumption ¹	21,500	22,300	21,400	23,700	29,000
Value, cents per pound, average: ²					
Metal, Chinese	40	66	40	32	40
Trioxide, Mexico	32	33	33	31	30
Net import reliance ³ as a percent of apparent consumption	100	100	100	100	100

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

Import Sources (1994-97): Metal: China, 86%; Hong Kong, 5%; Japan, 3%; and other, 6%. Trioxide: China, 50%; Chile, 22%; Mexico, 11%; and other, 17%.

Tariff: Item	Number	Normal Trade Relations (NTR) 12/31/98	Non-NTR⁴ 12/31/98
Metal	2804.80.0000	Free	13.2¢/kg.
Trioxide	2811.29.1000	Free	Free.
Sulfide	2813.90.1000	Free	Free.
Acid ⁵	2811.19.1000	2.3% ad val.	4.9% ad val.

Depletion Allowance: 14% (Domestic), 14% (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 should continue to correlate closely with the demand for new housing, and the 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.

Because of the toxicity of arsenic and its compounds, environmental regulation is expected to become increasingly stringent. This should adversely affect the demand for arsenic in the long term, but have only minor impacts in the near term.

World Production, Reserves, and Reserve Base:

	Production (Arsenic trioxide)		Reserves and reserve base⁶ (Arsenic content)
	<u>1997</u>	<u>1998^e</u>	
United States	—	—	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 at 80,000 tons.
Belgium	2,000	2,000	
Chile	6,000	6,000	
China	15,000	15,000	
France	2,500	3,000	
Ghana	4,600	5,000	
Kazakhstan	1,500	2,000	
Mexico	3,000	3,000	
Philippines	2,000	2,000	
Russia	1,500	1,500	
Other countries	<u>2,500</u>	<u>3,000</u>	
World total (rounded)	41,000	42,000	

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. A recently developed alternative, ammoniacal copper quaternary, which avoids using chrome and arsenic, has yet to gain widespread usage. Nonwood alternatives, such as concrete, steel, or plastic lumber, may be substituted in some applications for treated wood.

^eEstimated.

¹Estimated to be the same as net imports.

²Calculated from Bureau of the Census import data.

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

⁴See Appendix B.

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

⁶See Appendix D for definitions.