

## THALLIUM

(Data in kilograms of thallium content, unless otherwise noted)

**Domestic Production and Use:** Thallium is a byproduct metal recovered in some countries from flue dusts and residues collected in the smelting of copper, zinc, and lead ores. Although thallium was contained in ores mined or processed in the United States, it was not recovered domestically in 1999. Consumption of thallium metal and its compounds continued in most of the established end uses. These included a semiconductor material for selenium rectifiers, an activator in gamma radiation detection equipment, an electrical resistance component in infrared radiation detection and transmission equipment, and a crystalline filter for light diffraction in acousto-optical measuring devices. Other uses included an alloying component with mercury for low-temperature measurements, an additive in glass to increase its refractive index and density, a catalyst or intermediate in the synthesis of organic compounds, and a high-density liquid for sink-float separation of minerals. Also, the use of radioactive thallium compounds for medical purposes in cardiovascular imaging was continued in 1999.

<b>Salient Statistics—United States:</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999<sup>e</sup></b>
Imports for consumption <sup>1</sup>	1,180	166	168	104	380
Exports	NA	NA	NA	NA	NA
Consumption <sup>e</sup>	700	300	300	100	380
Price, metal, dollars per kilogram <sup>2</sup>	1,100	1,200	1,280	1,280	1,295
Net import reliance <sup>3</sup> as a percent of apparent consumption	100	100	100	100	100

**Recycling:** None.

**Import Sources (1995-98):** Belgium, 46%; Mexico, 43%; Germany, 10%; and United Kingdom, 1%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations<sup>4</sup> 12/31/99</b>
Unwrought; waste and scrap; powders	8112.91.6000	4.0% ad val.

**Depletion Allowance:** 15% (Domestic and foreign).

**Government Stockpile:** None.

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**Events, Trends, and Issues:** Research and development activities of both a basic and applied nature were conducted during 1999 to improve and expand the use of thallium. These activities focused principally on the development of high-temperature superconducting materials for such applications as magnetic resonance imaging, storage of magnetic energy, magnetic propulsion, and electric power generation and transmission, and on the further use of radioactive thallium in clinical diagnostic applications, including cardiovascular and oncological imaging.

Thallium metal and its compounds are highly toxic materials and are strictly controlled to prevent a threat to humans and the environment. Thallium and its compounds can be absorbed into the human body by skin contact, ingestion, or inhalation of dust or fumes. With regard to these toxicity concerns, the U.S. Environmental Protection Agency (EPA) issued a proposed rule and a notice during the year that addressed further the control of thallium levels in the environment. The proposed rule offered an efficient approach to the management of certain furnace dusts containing high levels of thallium. The notice requested information from interested and informed parties concerning transfrontier movement of wastes, including thallium wastes and residues, to recycling operations within the member countries of the Organization for Economic Cooperation and Development (OECD). The information will be used by the EPA and other Federal agencies in developing U.S. positions, with respect to potential harmonization of OECD Council decisions on the transfrontier movement issue with those of the Basel Convention.

### **World Mine Production, Reserves, and Reserve Base:**<sup>5</sup>

	Mine production		Reserves <sup>6</sup>	Reserve base <sup>6</sup>
	<u>1998</u>	<u>1999</u>		
United States	(7)	(7)	32,000	120,000
Other countries	<u>15,000</u>	<u>15,000</u>	<u>350,000</u>	<u>530,000</u>
World total (may be rounded)	15,000	15,000	380,000	650,000

**World Resources:** World resources of thallium contained in zinc resources total about 17 million kilograms; most are located in Canada, Europe, and the United States. An additional 630 million kilograms is in the world's coal resources. The average thallium content of the Earth's crust has been estimated at 0.7 part per million.

**Substitutes:** While other light-sensitive materials can substitute for thallium and its compounds in specific electronic applications, ample supplies of thallium discourage development of substitute materials.

<sup>6</sup>Estimated. NA Not available.

<sup>1</sup>Unwrought; waste and scrap; powders, including thallium contained in compounds.

<sup>2</sup>Estimated price of 99.999%-pure granules in 100-gram lots.

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

<sup>4</sup>By the North American Free Trade Agreement, there is no tariff for Canada or Mexico.

<sup>5</sup>Estimates, based on thallium content of zinc ores.

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

<sup>7</sup>Thallium contained in mined base-metal ores, estimated at 450 to 500 kilograms per year, is separated from the base metals but not extracted for commercial use.