

## 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 1997. The estimated value of thallium consumed in 1997 was \$380,000. Research and development in the use of thallium-base superconductor materials accounted for a significant portion of domestic consumption in 1997. Thallium also was used in electronics, alloys, glass manufacturing, and pharmaceuticals.

| <b>Salient Statistics—United States:</b>                              | <b>1993</b> | <b>1994</b> | <b>1995</b> | <b>1996</b> | <b>1997<sup>e</sup></b> |
|---|-------------|-------------|-------------|-------------|-------------------------|
| Imports for consumption <sup>1</sup>                                  | 273         | 630         | 1,180       | 166         | 200                     |
| Exports   | NA          | NA          | NA          | NA          | NA                      |
| Consumption <sup>e</sup>  | 300         | 630         | 700         | 300         | 300                     |
| Price, metal, dollars per kilogram <sup>2</sup>                       | 800         | 950         | 1,100       | 1,200       | 1,280                   |
| Net import reliance <sup>3</sup> as a percent of apparent consumption | 100         | 100         | 100         | 100         | 100                     |

**Recycling:** None.

**Import Sources (1993-96):** Belgium, 42%; Mexico, 31%; and Canada, 27%.

| <b>Tariff: Item</b>                 | <b>Number</b> | <b>Most favored nation (MFN)<sup>4</sup></b> | <b>Non-MFN<sup>5</sup></b> |
|-------------------------------------|---------------|--|----------------------------|
|                                     |               | <b>12/31/97</b>                              | <b>12/31/97</b>            |
| Unwrought; waste and scrap; powders | 8112.91.6000  | 4.6% ad val.                                 | 25% ad val.                |

**Depletion Allowance:** 14% (Domestic), 14% (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 1997 to improve and expand the use of thallium. These experimental activities concerned essentially all existing uses of thallium as well as its potential use in superconductor alloys.

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. The Occupational Safety and Health Administration and the American Conference of Governmental Industrial Hygienists each has set an exposure limit of 0.1 milligram per cubic meter for thallium in workplace air. Thallium, thallium compounds, and metal waste consisting of alloys of thallium are included on the list of materials to which export restrictions are expected to be applied, according to the United Nations Environment Program's Basel Convention currently under discussion.

### **World Mine Production, Reserves, and Reserve Base:<sup>6</sup>**

|                              | Mine production |        | Reserves <sup>7</sup> | Reserve base <sup>7</sup> |
|------------------------------|-----------------|--------|-----------------------|---------------------------|
|                              | 1996            | 1997   |                       |                           |
| United States                | (8)             | (8)    | 32,000                | 120,000                   |
| Other countries              | 15,000          | 15,000 | 350,000               | 530,000                   |
| 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 Europe, Canada, 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>See Appendix B.

<sup>6</sup>Estimates, based on thallium content of zinc ores.

<sup>7</sup>See Appendix D for definitions.

<sup>8</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.