

**TELLURIUM<sup>1</sup>**

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

**Domestic Production and Use:** Tellurium and tellurium dioxide of commercial grades were recovered in the United States at one copper refinery, principally from anode slimes, but also from lead refinery skimmings. High-purity tellurium, tellurium master alloys, and tellurium compounds were produced by primary and intermediate processors from commercial-grade metal and tellurium dioxide. Tellurium was used mainly in the production of free-machining steels. It was used as a minor additive in copper and lead alloys and malleable cast iron, as an accelerator in rubber compounding, in thermoelectric applications, and as a semiconductor in thermal-imaging and photoelectric applications. Tellurium was added to selenium-base photoreceptor alloys to increase the photo speed. In 2002, the estimated distribution of uses, worldwide, was as follows: iron and steel products, 50%; catalysts and chemicals, 25%; additives to nonferrous alloys, 10%; photoreceptors and thermoelectric devices, 8%; and other, 7%.

<b><u>Salient Statistics—United States:</u></b>	<b><u>1998</u></b>	<b><u>1999</u></b>	<b><u>2000</u></b>	<b><u>2001</u></b>	<b><u>2002<sup>e</sup></u></b>
Production, refinery	W	W	W	W	W
Imports for consumption, unwrought, waste and scrap <sup>2</sup>	89	38	52	30	23
Exports	NA	NA	NA	NA	NA
Consumption, apparent	NA	NA	NA	NA	NA
Price, dollars per pound, 99.7% minimum <sup>3</sup>	18	15	14	15	17
Stocks, producer, refined, yearend	W	W	W	W	W
Employment, number	NA	NA	NA	NA	NA
Net import reliance <sup>4</sup> as a percentage of apparent consumption	NA	NA	NA	NA	NA

**Recycling:** There was no domestic secondary production of tellurium. However, some tellurium may have been recovered abroad from selenium-base photoreceptor scrap exported by the United States for recycling.

**Import Sources (1998-2001):** United Kingdom, 28%; Philippines, 28%; Belgium, 18%; Canada, 11%; and other, 15%.

<b><u>Tariff:</u></b>	<b><u>Item</u></b>	<b><u>Number</u></b>	<b><u>Normal Trade Relations</u></b>
			<b><u>12/31/02</u></b>
	Metal	2804.50.0020	Free.

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

**Government Stockpile:** None.

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**Events, Trends, and Issues:** Domestic and world tellurium demand decreased slightly in 2002. World production of tellurium, a byproduct of copper refining, was down slightly owing to a drop in the level of copper production. Detailed information on the world tellurium market was not available.

Cadmium telluride is one of the most promising thin-film photovoltaic module compounds for power generation, achieving some of the highest power conversion ratios yet obtained. A possible application of this technology that would significantly affect tellurium demand is for power supplies in remote areas, mainly in developing countries, where the largest percentage increases in power consumption are expected to occur early in this century.

Tellurium is used in a germanium-antimony-tellurium alloy for optical storage in digital video discs. This is a rapidly growing market, but the amount of tellurium used for each disc is very small.

**World Refinery Production, Reserves, and Reserve Base:** Reserves and reserve base estimates for Peru have been increased based on new information from that country.

	Refinery production		Reserves <sup>5</sup>	Reserve base <sup>5</sup>
	2001	2002 <sup>e</sup>		
United States	W	W	3,000	6,000
Canada	80	75	650	1,500
Japan	39	39	—	—
Peru	22	20	1,600	2,800
Other countries <sup>6</sup>	NA	NA	16,000	37,000
World total (may be rounded)	<sup>7</sup> 141	<sup>7</sup> 130	21,000	47,000

**World Resources:** The figures shown for reserves and reserve base include only tellurium contained in economic copper deposits. In addition to copper deposits, significant quantities of tellurium are contained in gold and lead deposits, but currently none is recovered. Deposits of coal, copper, and other metals that are of subeconomic grade contain several times the amount of tellurium contained in identified economic copper deposits. However, it is unlikely that tellurium contained in these deposits can be recovered economically.

**Substitutes:** The chief substitutes for tellurium are selenium, bismuth, and lead in metallurgical applications; selenium and sulfur in rubber compound applications; and selenium, germanium, and organic compounds in electronic applications.

<sup>e</sup>Estimated. NA Not available. W Withheld to avoid disclosing company proprietary data. — Zero.

<sup>1</sup>Prepared by Henry E. Hilliard.

<sup>2</sup>Imports of boron and tellurium are grouped together under the Harmonized Tariff Schedule; however, imports of boron are thought to be small relative to tellurium.

<sup>3</sup>Yearend prices quoted by the sole producer.

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

<sup>5</sup>See Appendix C for definitions. Estimates include tellurium contained in copper resources only.

<sup>6</sup>In addition to the countries listed, Australia, Belgium, China, France, Germany, Kazakhstan, the Philippines, Russia, and the United Kingdom produce refined tellurium, but output is not reported and available information is inadequate for formulation of reliable production estimates.

<sup>7</sup>Excludes refinery production from the United States.