

## TELLURIUM

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

**Domestic Production and Use:** Tellurium and tellurium dioxide of commercial grades were recovered from anode slimes at one electrolytic copper refinery in the United States. 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 1996, the estimated consumption was for iron and steel products, 50%; catalysts and chemicals, 25%; additives to nonferrous alloys, 10%; photoreceptors and thermoelectric devices, 10%; and other uses, 5%.

<b>Salient Statistics—United States:</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996<sup>e</sup></b>
Production, refinery	W	W	W	W	W
Imports for consumption:					
Unwrought, waste and scrap <sup>1</sup>	48	45	27	46	70
Exports	NA	NA	NA	NA	NA
Consumption, apparent	NA	NA	NA	NA	NA
Price, dollars per pound, 99.7% minimum <sup>2</sup>	35	32	26	23	21
Stocks, producer, refined, yearend	W	W	W	W	W
Employment, number	NA	NA	NA	NA	NA
Net import reliance <sup>3</sup> as a percent 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 for recycling.

**Import Sources (1992-95):** Philippines, 18%; Japan, 18%; United Kingdom, 18%; Belgium, 17%; and other, 29%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Most favored nation (MFN) 12/31/96</b>	<b>Non-MFN<sup>4</sup> 12/31/96</b>
Metal	2804.50.0000	Free	25.0% ad val.

**Depletion Allowance:** 14% (Domestic), 14% (Foreign).

**Government Stockpile:** None.

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**Events, Trends, and Issues:** Domestic and world tellurium demand decreased in 1996, but production remained steady, resulting in continued oversupply. Detailed information on the world tellurium market was not available.

The U.S. Environmental Protection Agency removed tellurium metal from its list of extremely hazardous substances. It had been put on the list using data for a tellurium compound that was already on the list. When the data were reviewed, it was found that the much less toxic metallic tellurium did not meet the criteria for inclusion.

Cadmium telluride remains one of the most promising thin-film photovoltaic (PV) module compounds for power generation, achieving some of the highest power conversion ratios yet obtained. Research is being planned at Sandia National Laboratory, part of the U.S. Department of Energy, that will include cadmium telluride in solar cell development tests.

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

	Refinery production		Reserves <sup>5</sup>	Reserve base <sup>5</sup>
	1995	1996 <sup>e</sup>		
United States	W	W	3,000	6,000
Canada	45	45	700	1,500
Japan	45	45	—	—
Peru	19	19	500	1,600
Other countries	NA	NA	16,000	29,000
World total (rounded)	<sup>6</sup> NA	<sup>6</sup> NA	20,000	38,000

**World Resources:** The reserve base includes only tellurium contained in economic copper deposits. Significant quantities of tellurium are contained in economic gold and lead deposits, but currently none is recovered. Deposits of coal, copper, and other metals that are undeveloped or 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.

<sup>1</sup>Imports of boron and tellurium are grouped together under the Harmonized Code System; however, imports of boron are thought to be small relative to tellurium.

<sup>2</sup>Yearend prices quoted by the sole producer.

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

<sup>4</sup>See Appendix B.

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

<sup>6</sup>In addition to the countries listed, Australia, Belgium, China, France, Germany, Kazakstan, 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.