

TELLURIUM

(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 1997, 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, 10%; and other uses, 5%.

Salient Statistics—United States:	1993	1994	1995	1996	1997^e
Production, refinery	W	W	W	W	W
Imports for consumption:					
Unwrought, waste and scrap ¹	45	27	46	74	68
Exports	NA	NA	NA	NA	NA
Consumption, apparent	NA	NA	NA	NA	NA
Price, dollars per pound, 99.7% minimum ²	32	26	23	21	19
Stocks, producer, refined, yearend	W	W	W	W	W
Employment, number	NA	NA	NA	NA	NA
Net import reliance ³ 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 (1993-96): The United Kingdom, 23%; the Philippines, 22%; Canada, 17%; Japan, 15%; and other, 23%.

Tariff: Item	Number	Most favored nation (MFN) <u>12/31/97</u>	Non-MFN⁴ <u>12/31/97</u>
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 1997, but world production remained steady, resulting in continued oversupply. Detailed information on the world tellurium market was not available.

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. The most promising application is in Remote Area Power Supplies, mainly in developing countries, where the largest increases in power consumption will occur in the next century.

Smaller, lighter imaging devices based on cadmium-zinc-telluride crystal chips for use in the medical and military areas, specifically cancer detection and nuclear weapons monitoring, are being developed in California. Sharper images result from direct readings of the signals produced without the need for the analog-to-digital conversion required by the conventional gamma cameras currently in use.

World Refinery Production, Reserves, and Reserve Base:

	Refinery production		Reserves ⁵	Reserve base ⁵
	1996	1997 ^e		
United States	W	W	3,000	6,000
Canada	62	60	700	1,500
Japan	39	40	—	—
Peru	28	30	500	1,600
Other countries ⁶	NA	NA	16,000	29,000
World total (may be rounded)	⁷ 129	⁷ 130	20,000	38,000

World Resources: The figures shown for reserves and reserve base include only tellurium contained in economic copper deposits. In addition, 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.

^eEstimated. NA Not available. W Withheld to avoid disclosing company proprietary data.

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

²Yearend prices quoted by the sole producer.

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

⁴See Appendix B.

⁵See Appendix D for definitions. Tellurium contained in copper resources only.

⁶In 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.

⁷Excludes refinery production from the United States and "other countries."