

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 2000, 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%.

| Salient Statistics—United States: | <u>1996</u> | <u>1997</u> | <u>1998</u> | <u>1999</u> | <u>2000^o</u> |
|--------------------------------------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------------------|
| Production, refinery | W | W | W | W | W |
| Imports for consumption: | | | | | |
| Unwrought, waste and scrap ¹ | 74 | 64 | 89 | 38 | 40 |
| Exports | NA | NA | NA | NA | NA |
| Consumption, apparent | NA | NA | NA | NA | NA |
| Price, dollars per pound, 99.7% minimum ² | 21 | 19 | 18 | 15 | 14 |
| 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 by the United States for recycling.

Import Sources (1996-99): United Kingdom, 26%; Philippines, 19%; Belgium, 17%; Canada, 14%; and other, 24%.

| Tariff: Item | Number | Normal Trade Relations <u>12/31/00</u> |
|---------------------|---------------|---------------------------------------------------|
| Metal | 2804.50.0020 | Free. |

Depletion Allowance: 14% (Domestic and foreign).

Government Stockpile: None.

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Events, Trends, and Issues: Domestic and world tellurium demand in 2000 was about the same as it was in 1999. World production was steady; oversupply remained a problem. 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.

World Refinery Production, Reserves, and Reserve Base:

| | Refinery production | | Reserves⁴ | Reserve base⁴ |
|------------------------------|----------------------------|--------------------------------|-----------------------------|---------------------------------|
| | <u>1999</u> | <u>2000^e</u> | | |
| United States | W | W | 3,000 | 6,000 |
| Canada | 67 | 65 | 700 | 1,500 |
| Japan | 35 | 35 | — | — |
| Peru | 22 | 25 | 500 | 1,600 |
| Other countries ⁵ | <u>NA</u> | <u>NA</u> | <u>16,000</u> | <u>29,000</u> |
| World total (rounded) | ⁶ 124 | ⁶ 125 | 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 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 Tariff Schedule; 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 C for definitions. Estimates include tellurium contained in copper resources only.

⁵In 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.

⁶Excludes refinery production from the United States and "Other countries."