

CADMIUM

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

Domestic Production and Use: Primary cadmium metal in the United States is produced by two companies, one in Illinois and one in Tennessee, as a byproduct of smelting and refining zinc metal from sulfide ore concentrates. Secondary cadmium is recovered from spent nickel-cadmium (Ni-Cd) batteries by one Pennsylvania company. Based on the average New York dealer price, the combined output of primary and secondary metal was valued at about \$249,000 in 2001. Consumption of cadmium during the past 3 years declined by about 50% in response to environmental concerns. About 75% of total apparent consumption was for batteries. The remaining 25% was distributed as follows: pigments, 12%; coatings and plating, 8%; stabilizers for plastics, 4%; and nonferrous alloys and other, 1%.

| Salient Statistics—United States: | 1997 | 1998 | 1999 | 2000 | 2001^e |
|--|-------------|-------------|-------------|-------------|-------------------------|
| Production, refinery ¹ | 2,060 | 1,240 | 1,190 | 1,890 | 1,400 |
| Imports for consumption, metal | 790 | 514 | 294 | 425 | 170 |
| Exports of metal, alloys, and scrap | 554 | 180 | 20 | 312 | 280 |
| Shipments from Government stockpile excesses | 161 | 190 | 550 | 319 | 250 |
| Consumption, apparent | 2,510 | 2,100 | 1,850 | 2,010 | 1,440 |
| Price, metal, dollars per pound ² | 0.51 | 0.28 | 0.14 | 0.16 | 0.15 |
| Stocks, yearend, producer and distributor | 1,060 | 729 | 893 | 1,200 | 1,300 |
| Employment, smelter and refinery | NA | NA | NA | NA | NA |
| Net import reliance ³ as a percentage of apparent consumption | 19 | 38 | 9 | 6 | 3 |

Recycling: To date, cadmium recycling has been practical only for Ni-Cd batteries, some alloys, and dust from electric arc furnaces (EAF). The exact amount of recycled cadmium is unknown. In 2001, the U.S. steel industry generated more than 0.6 million tons of EAF dust, typically containing 0.003% to 0.07% cadmium. In 2001, 13 States had laws regulating battery labeling and removability, and 8 States had take-back requirements for Ni-Cd batteries.

Import Sources (1997-2000): Metal: Canada, 49%; Australia, 20%; Belgium, 16%; Germany, 6%; and other, 9%.

| Tariff: Item | Number | Normal Trade Relations⁴ 12/31/01 |
|--|---------------|--|
| Cadmium sulfide | 2830.30.0000 | 3.1% ad val. |
| Pigments and preparations based on cadmium compounds | 3206.30.0000 | 3.1% ad val. |
| Unwrought cadmium; waste and scrap; powders | 8107.10.0000 | Free. |

Depletion Allowance: 22% (Domestic), 14% (Foreign).

Government Stockpile:

Stockpile Status—9-30-01⁵

| Material | Uncommitted inventory | Committed inventory | Authorized for disposal | Disposal plan FY 2001 | Disposals FY 2001 |
|-----------------|------------------------------|----------------------------|--------------------------------|------------------------------|--------------------------|
| Cadmium | 800 | — | 800 | 544 | 115 |

CADMIUM

Events, Trends, and Issues: During the past decade, regulatory pressure to reduce or even eliminate the use of cadmium has gained momentum in many developed countries. In the United States, Federal and State agencies regulate cadmium content in the environment. To help unify different standards, the U.S. Environmental Protection Agency created a list of persistent and bioaccumulative toxic pollutants. Cadmium is one of eleven metals on the list, and it is targeted for a 50% reduction by 2005. The International Cadmium Association objected to the rating used for creating the list because no distinction was made between various cadmium compounds and cadmium metal. The European Commission issued a new proposal to ban all Ni-Cd batteries containing more than 0.002% cadmium beginning on January 1, 2008, and to increase the collection rate for all spent industrial and automotive batteries to 95% by weight by December 31, 2003.

World Refinery Production, Reserves, and Reserve Base:

| | Refinery production | | Reserves ⁶ | Reserve base ⁶ |
|------------------------------|---------------------|-------------------|-----------------------|---------------------------|
| | 2000 | 2001 ^e | | |
| United States | 1,890 | 1,400 | 90,000 | 270,000 |
| Australia | 552 | 650 | 110,000 | 300,000 |
| Belgium | 1,400 | 1,400 | — | — |
| Canada | 1,390 | 1,150 | 55,000 | 150,000 |
| China | 2,200 | 2,200 | 13,000 | 35,000 |
| Germany | 1,000 | 800 | 6,000 | 8,000 |
| Japan | 2,472 | 2,500 | 10,000 | 15,000 |
| Kazakhstan | 1,060 | 1,100 | 25,000 | 40,000 |
| Mexico | 1,350 | 1,400 | 35,000 | 40,000 |
| Russia | 925 | 900 | 16,000 | 30,000 |
| Other countries | 5,460 | 5,200 | 240,000 | 310,000 |
| World total (may be rounded) | 19,700 | 18,700 | 600,000 | 1,200,000 |

World Resources: Estimated world resources of cadmium were about 6 million tons based on zinc resources containing about 0.3% cadmium. The zinc-bearing coals of the central United States, and Carboniferous-age coals of other countries, also contain large subeconomic resources of cadmium.

Substitutes: Ni-Cd batteries are being replaced in some applications with lithium-ion and nickel-metal hydride batteries. However, the higher cost of these substitutes restricts their use. Except where the surface characteristics of the coating are critical (e.g., fasteners for aircraft), coatings of zinc or vapor-deposited aluminum can substitute for cadmium in plating applications. Cerium sulfide is used as a replacement for cadmium pigments, mostly for plastics.

^eEstimated. NA Not available. — Zero.

¹Primary and secondary metal.

²Average New York dealer price for 99.95% purity in 5-short-ton lots. Source: Platts Metals Week.

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

⁴No tariff for Canada and Mexico for items shown.

⁵See Appendix B for definitions.

⁶See Appendix C for definitions.