

CADMIUM

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

Domestic Production and Use: Primary cadmium in the United States is produced by two companies as a byproduct of beneficiating and refining zinc metal from sulfide ore concentrates. Secondary cadmium is recovered from spent nickel-cadmium (Ni-Cd) batteries by one company. Based on the average New York dealer price, the combined output of primary and secondary metal in 1998 was valued at about \$3.5 million. About 69% of total apparent cadmium consumption was for batteries. The remaining 31% was distributed as follows: pigments, 13%; coatings and plating, 8%; stabilizers for plastics, 7%; nonferrous alloys, 2%; and other uses, 1%.

Salient Statistics—United States:	1994	1995	1996	1997	1998^e
Production, refinery ¹	1,010	1,270	1,530	2,060	2,100
Imports for consumption, metal	1,110	848	843	790	650
Exports of metal, alloys, and scrap	1,450	1,050	201	554	300
Shipments from Government stockpile excesses	210	220	230	161	130
Consumption, apparent	1,040	1,160	2,250	2,510	2,650
Price, metal, dollars per pound ²	1.13	1.84	1.24	.51	.30
Stocks, yearend, producer and distributor	423	990	1,140	1,090	1,020
Employment, smelter and refinery, number	125	125	145	150	150
Net import reliance ³ as a percent of apparent consumption	3	E	32	16	21

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 not known. In 1998, the U.S. steel industry generated more than 0.6 million ton of EAF dust, typically containing 0.003% to 0.07% cadmium. At least nine States required collection of rechargeable Ni-Cd batteries.

Import Sources (1994-97): Metal: Canada, 63%; Australia, 17%; Belgium, 15%; Mexico, 3%; and other, 2%.

Tariff: Item	Number	Canada and Mexico	Normal Trade Relations (NTR)	Non-NTR⁴
		12/31/98	12/31/98	12/31/98
Cadmium sulfide	2830.30.0000	Free	3.1% ad val.	25% ad val.
Pigments and preparations based on cadmium compounds	3206.30.0000	Free	3.1% ad val.	25% ad val.
Unwrought cadmium; waste and scrap; powders	8107.10.0000	Free	Free	33¢/kg.

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

Government Stockpile:

Material	Stockpile Status—9-30-98⁵				
	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 1998	Disposals FY 1998
Cadmium	1,753	2	1,753	544	119

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Events, Trends, and Issues: Japan is the largest producer and the largest net importer of refined cadmium metal. More than 60% of the cadmium consumed by Western countries goes into batteries, of which about 75% are for cellular telephones and other cordless electronic equipment. The remaining 25% is used for industrial purposes, such as emergency power supplies for telephone exchanges and hospital operating rooms. Because of environmental concerns about cadmium, some of the Ni-Cd batteries in electronic equipment are being replaced by lithium-ion batteries; the latter have already captured about a 30% share of Japan's rechargeable battery market. The current consumption pattern is expected to change as the manufacture of electric vehicles accelerates in the United States, the European Union, and Japan. If this market develops as expected, recycling of Ni-Cd batteries on a large scale will be required, both for environmental reasons and to assure an adequate supply of cadmium metal.

Additional inducements for recycling will come from a new U.S. law entitled "*The Mercury-Containing and Rechargeable Battery Management Act of 1996*" (Public Law 104-142) that became effective in May 1998. Title I of the act establishes uniform national labeling requirements and provides for the streamlining of regulations governing battery collection and recycling.

World Refinery Production, Reserves, and Reserve Base:

	Refinery production		Reserves ⁶	Reserve base ⁶
	1997	1998 ^e		
United States	2,060	2,100	90,000	270,000
Australia	632	640	120,000	350,000
Belgium	1,600	1,600	—	—
Canada	2,380	2,300	55,000	155,000
China	1,600	1,600	13,000	35,000
Germany	1,140	1,140	6,000	8,000
Japan	2,460	2,400	10,000	15,000
Kazakhstan	1,200	1,100	25,000	40,000
Mexico	800	800	35,000	40,000
Russia	790	750	16,000	30,000
Other countries	<u>5,300</u>	<u>5,450</u>	<u>230,000</u>	<u>275,000</u>
World total (may be rounded)	20,000	19,900	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. E Net exporter.

¹Primary and secondary metal.

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

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

⁴See Appendix B.

⁵See Appendix C for definitions.

⁶See Appendix D for definitions.