

CADMIUM

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

Domestic Production and Uses: 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 1997 was valued at about \$3.8 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:	1993	1994	1995	1996	1997^e
Production, refinery ¹	1,090	1,010	1,270	1,530	1,750
Imports for consumption, metal	1,420	1,110	848	843	800
Exports of metal, alloys, and scrap	38	1,450	1,050	201	100
Shipments from Government stockpile excesses	185	210	220	230	200
Consumption, apparent	3,010	1,040	1,160	2,250	2,600
Price, metal, dollars per pound ²	0.45	1.13	1.84	1.24	1.00
Stocks, yearend, producer and distributor	579	423	543	693	750
Employment, smelter and refinery, number	195	125	125	145	150
Net import reliance ³ as a percent of apparent consumption	64	3	E	32	33

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 1996, the U.S. steel industry generated more than 0.5 million tons of EAF dust, typically containing 0.003% to 0.07% cadmium. At least nine States required collection of rechargeable Ni-Cd batteries.

Import Sources (1993-96): Metal: Canada, 45%; Mexico, 13%; Belgium, 12%; Germany, 7%; and other, 23%.

Tariff: Item	Number	Canada and Mexico 12/31/97	Most favored nation (MFN) 12/31/97	Non-MFN⁴ 12/31/97
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—9-30-97⁵				
	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 1997	Disposals FY 1997
Cadmium	1,870	36	1,870	544	148

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Events, Trends, and Issues: More than 60% of the cadmium consumed by Western countries goes into batteries, making batteries the principal end use. Canada has replaced Japan as the largest refiner of cadmium. However, Japan continued to be the largest net importer of cadmium metal.

About 75% of the batteries being produced by Western manufacturers are for cellular telephones and other cordless electronic equipment. The remaining 25% are 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 captured about a 30% share of Japan's rechargeable battery market. The current consumption pattern is expected to change as the manufacture of electrical vehicles accelerates in the United States, the European Union, and Japan. If this market develops, then recycling of Ni-Cd batteries on a large scale will be required, both for environmental reasons and to assure adequate supply of cadmium metal.

Additional inducement 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 will become effective by 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
	1996	1997 ^e		
United States	1,530	1,750	70,000	210,000
Australia	682	700	63,000	190,000
Belgium	1,580	1,500	—	—
Canada	2,540	2,600	60,000	170,000
Germany	1,150	1,100	6,000	8,000
Japan	2,340	2,300	10,000	15,000
Mexico	675	700	35,000	40,000
Other countries	<u>8,400</u>	<u>8,850</u>	<u>280,000</u>	<u>380,000</u>
World total (rounded)	18,900	19,500	530,000	1,000,000

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 resources of cadmium in addition to those in the reserve base category.

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 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.