INDIUM

(Data in metric tons, unless otherwise noted)

Domestic Production and Use: No indium was recovered from ores in the United States in 1998. Domestically produced indium was derived from the upgrading of lower grade imported indium metal. Two companies, one each in New York and Rhode Island, were the major producers of indium metal and indium products in 1998. Several firms produced high-purity indium shapes, alloys, and compounds. Thin-film coatings, which are used in applications such as liquid crystal displays (LCD's) and electroluminescent lamps, continued to be the largest end use. Indium semiconductor compounds were used in infrared detectors, high-speed transistors, and high-efficiency photovoltaic devices. The estimated distribution of uses in 1998 was about the same as in 1997: coatings, 50%; solders and alloys, 33%; electrical components and semiconductors, 12%; and research and other, 5%. The estimated value of primary metal consumed in 1998, based on the annual average price, was $14.8 million.

Salient Statistics—United States:	1994	1995	1996	1997	1998[e]
Production, refinery	—	—	—	—	—
Imports for consumption	70.2	85.2	33.2	80	77
Exports	NA	NA	NA	NA	NA
Consumption[e]	40.0	43.0	45.0	50	50
Price, annual average, dollars per kilogram (99.97% indium)	138	375	370	309	296
Stocks, producer, yearend	NA	NA	NA	NA	NA
Employment, number	NA	NA	NA	NA	NA
Net import reliance[1] as a percent of apparent consumption	NA	NA	NA	NA	NA

Recycling: Small quantities of old scrap were recycled. Recycling of new scrap, the scrap from fabrication of indium products, becomes significant when the price is relatively high and/or increasing rapidly. This was not the case for 1998.

Import Sources (1994-97): Canada, 47%; Russia, 15%; China, 11%; France, 8%; and other, 19%.

Tariff: Item	Number	Normal Trade Relations (NTR) 12/31/98	Non-NTR[2] 12/31/98
Unwrought, waste and scrap	8112.91.3000	Free	25% ad. val.

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

Government Stockpile:

Stockpile Status—9-30-98[3]

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 1998	Disposals FY 1998
Indium	0.44	—	1.09	0.44	—

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INDIUM

Events, Trends, and Issues: Estimated domestic indium consumption remained steady at about 50 tons in 1998. The indium market appeared to be approaching long term stability. The last indium held by the Government Stockpile was offered for sale on December 10, 1998. In 1995, prices rose steadily over supply concerns and strong demand. In 1996, significant quantities of indium were recycled for the first time. This brought about a steady decrease in prices and significantly lower U.S. imports. In 1997, domestic prices fluctuated moderately, and in 1998 they were very steady. Although the production of LCD's was slightly lower in 1998 than it was in 1997, the long range outlook for the indium market remains promising.

World Refinery Production, Reserves, and Reserve Base:

	Refinery production[e]		Reserves[4]	Reserve base[4]
	1997	1998		
United States	—	—	300	600
Belgium	12	15	([5])	([5])
Canada	50	40	700	2,000
China	45	50	400	1,000
France	45	50	([5])	([5])
Italy	12	12	([5])	([5])
Japan	40	40	100	150
Peru	4	4	100	150
Russia	20	25	200	300
Other countries	4	4	800	1,500
World total (may be rounded)	230	240	2,600	5,700

World Resources: Indium occurs predominantly in solid solution in sphalerite, a sulfide ore of zinc. Significant quantities of indium also are contained in ores of copper, lead, and tin, but there is not enough information to formulate reliable estimates of indium resources, and most of these deposits are subeconomic for indium. Indium is recovered almost exclusively as a byproduct of zinc. Estimates of the average indium content of the Earth's crust range from 50 to 200 parts per billion. The average indium content of zinc deposits ranges from less than 1 part per million to 100 parts per million. The highest known concentrations of indium occur in vein or replacement sulfide deposits, usually associated with tin-bearing minerals. However, this type of deposit is usually difficult to process economically.

Substitutes: Gallium arsenide can substitute for indium phosphide in solar cells and semiconductor applications. Silver-zinc oxide or tin oxide are lower cost substitutes for indium-tin oxide in transparent conductive coatings for glass. Hafnium can replace indium alloys for use in nuclear reactor control rods.

[e]Estimated. NA Not available.

[1]Defined as imports - exports + adjustments for Government and industry stock changes.

[2]See Appendix B.

[3]See Appendix C for definitions.

[4]Estimate based on the indium content of zinc ores. See Appendix D for definitions.

[5]Reserves for European countries are included in "Other countries."