INDIUM

(Data in metric tons, unless otherwise noted)

Domestic Production and Use: No indium was recovered from ores in the United States in 1996. 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 1996. Several firms produced high-purity indium shapes, alloys, and compounds. Thin-film coatings, which are used in applications such as liquid crystal displays 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. Estimated uses in 1996 were about the same as in 1995: coatings, 45%; solders and alloys, 35%; electrical components and semiconductors, 15%; and research and other, 5%. The estimated value of primary metal consumed in 1996, based on the average price, was $13.5 million.

Salient Statistics—United States:	1992	1993	1994	1995	1996[e]
Production, refinery	—	—	—	—	—
Imports for consumption	36.3	73.4	70.2	85.2	45.0
Exports	NA	NA	NA	NA	NA
Consumption[e]	30.0	35.0	40.0	43.0	45.0
Price, average annual, dollars per kilogram (99.97% indium)	218	200	138	375	300
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, has become significant.

Import Sources (1992-95): Canada, 45%; France, 11%; Russia, 10%; Italy, 9%; and others, 25%. Imports from Russia increased significantly in 1994. Those from China increased even more dramatically in 1995 (but not enough to rank China among the top four sources).

Tariff: Item	Number	Most favored nation (MFN) 12/31/96	Non-MFN[2] 12/31/96
Unwrought, waste and scrap	8112.91.3000	Free	25% ad. val.

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

Government Stockpile:

	Stockpile Status—9-30-96			
Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposals Jan.-Sept.96
Indium	1.56	—	—	—

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INDIUM

Events, Trends, and Issues: Estimated domestic indium consumption remained fairly steady at about 45 tons in 1996. Although world consumption was steady, increased production from China and Russia over the past 2 years, resumed production from France, and much greater use of recycling lowered the demand for indium from other traditional sources, causing the price to drop from $16.25 per troy ounce in January to $6.53 per troy ounce in December 1996. After the price of indium reached its high in 1995, recycling became economical and stockpiles of scrap were tapped throughout 1996, easing the demand for primary metal.

World Refinery Production, Reserves, and Reserve Base:

	Refinery production[e]		Reserves[3]	Reserve base[3]
	1995	1996		
United States	—	—	300	600
Belgium	18	15	([4])	([4])
Canada	40	15	700	2,000
China	40	45	400	1,000
France	40	45	([4])	([4])
Italy	12	12	([4])	([4])
Japan	61	40	100	150
Peru	4	4	100	150
Russia	20	20	200	300
Other countries	4	4	800	1,500
World total (may be rounded)	239	200	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 anyway. 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]Estimate based on the indium content of zinc ores. See Appendix C for definitions.

[4]Reserves for European countries are included in “Other countries.”