

INDIUM

(Data in metric tons unless otherwise noted)

Domestic Production and Use: Indium was not recovered from ores in the United States in 2020. Several companies produced indium products—including alloys, compounds, high-purity metal, and solders—from imported indium metal. Production of indium tin oxide (ITO) continued to account for most of global indium consumption. ITO thin-film coatings were primarily used for electrically conductive purposes in a variety of flat-panel displays—most commonly liquid crystal displays (LCDs). Other indium end uses included alloys and solders, compounds, electrical components and semiconductors, and research. Based on an average of recent annual import levels, estimated domestic consumption of refined indium was 100 tons in 2020. The estimated value of refined indium consumed domestically in 2020, based on the average New York dealer price, was about \$40 million.

Salient Statistics—United States:	2016	2017	2018	2019	2020^e
Production, refinery	—	—	—	—	—
Imports for consumption	160	127	125	95	100
Exports	NA	NA	NA	NA	NA
Consumption, estimated ¹	160	127	125	95	100
Price, annual average, dollars per kilogram:					
New York dealer ²	345	363	375	390	400
Duties unpaid in warehouse, Rotterdam ³	240	225	291	185	150
Net import reliance ⁴ as a percentage of estimated consumption	100	100	100	100	100

Recycling: Indium is most commonly recovered from ITO scrap in Japan and the Republic of Korea. A significant quantity of scrap was recycled domestically; however, data on the quantity of secondary indium recovered from scrap were not available.

Import Sources (2016–19): China, 34%; Canada, 22%; the Republic of Korea, 15%; and other, 29%.

Tariff:	Item	Number	Normal Trade Relations 12–31–20
	Unwrought indium, including powders, waste, and scrap	8112.92.3000	Free.

Depletion Allowance: 14% (domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: The estimated average New York dealer price of indium was \$400 per kilogram in 2020, a slight increase from that of 2019. The average monthly price was \$390 per kilogram from January through April, and it increased to an average monthly price of \$400 per kilogram from May through September. The 2020 estimated average duties unpaid in the warehouse, Rotterdam price of indium was \$150 per kilogram, 19% less than in 2019. The average duties unpaid in the warehouse, Rotterdam price began the year at \$138 per kilogram and increased throughout the year to an average of \$162 per kilogram in September.

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On January 18, the Yunnan Provincial government sold 3,609 tons of indium that was held by the Fanya Metal Exchange that closed in 2015. The lot was offered by an auction process between January 17 and 18. The lot was purchased by the sole bidder for \$416 million (2.65 billion yuan). The 3,609 tons of indium that was sold was equivalent to 4 years of global primary indium production.

The leading producer of tin in China announced the launch of a production line for high-purity indium with a capacity of 5 tons per year. The line has the capacity to produce 6N- and 7N-grade metal. The company is also ramping up its indium tin oxide production after completing small-scale operations.

World Refinery Production and Reserves:

	Refinery production		Reserves ⁵
	<u>2019</u>	<u>2020^e</u>	
United States	—	—	Quantitative estimates of reserves are not available.
Belgium	20	20	
Canada	61	50	
China	535	500	
France	40	50	
Japan	70	65	
Korea, Republic of	225	200	
Peru	12	10	
Russia	<u>5</u>	<u>5</u>	
World total (rounded)	968	900	

World Resources:⁵ Indium is most commonly recovered from the zinc-sulfide ore mineral sphalerite. The indium content of zinc deposits from which it is recovered ranges from less than 1 part per million to 100 parts per million. Although the geochemical properties of indium are such that it occurs in trace amounts in other base-metal sulfides—particularly chalcopyrite and stannite—most deposits of these minerals are subeconomic for indium recovery.

Substitutes: Antimony tin oxide coatings have been developed as an alternative to ITO coatings in LCDs and have been successfully annealed to LCD glass; carbon nanotube coatings have been developed as an alternative to ITO coatings in flexible displays, solar cells, and touch screens; poly(3,4-ethylene dioxythiophene) (PEDOT) has also been developed as a substitute for ITO in flexible displays and organic light-emitting diodes; and copper or silver nanowires have been explored as a substitute for ITO in touch screens. Graphene has been developed to replace ITO electrodes in solar cells and also has been explored as a replacement for ITO in flexible touch screens. Researchers have developed a more adhesive zinc oxide nanopowder to replace ITO in LCDs. Hafnium can replace indium in nuclear reactor control rod alloys.

^eEstimated. NA Not available. — Zero.

¹Estimated to equal imports.

²Price is based on 99.99%-minimum-purity indium; delivered duty paid U.S. buyers; in minimum lots of 50 kilograms. Source: Platts Metals Week.

³Price is based on 99.99%-minimum-purity indium, duties unpaid in warehouse (Rotterdam). Sources: Metal Bulletin (2016–17) and Argus Media group—Argus Metals International (2018–20).

⁴Defined as imports – exports.

⁵See Appendix C for resource and reserve definitions and information concerning data sources.