INDIUM

(Data in metric tons unless otherwise specified)

Domestic Production and Use: Indium was not recovered from ores in the United States in 2024. 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 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. Estimated domestic consumption of refined indium was 250 tons in 2024 and was based on the annual estimated import quantity. There were no readily available recycling or end-use data available for indium. The estimated value of refined indium consumed domestically in 2024, based on the average U.S. warehouse price, was about $85 million.

Salient Statistics—United States:	2020	2021	2022	2023	2024[e]
Production, refinery	—	—	—	—	—
Imports for consumption	115	158	202	219	250
Exports	NA	NA	NA	NA	NA
Consumption, estimated[1]	115	158	202	219	250
Price, annual average, dollars per kilogram:					
New York dealer[2]	395	NA	NA	NA	NA
U.S. warehouse, free on board[3]	161	223	250	244	340
Rotterdam, duties unpaid[4]	158	217	257	238	300
Net import reliance[5] 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. Indium-containing scrap was recycled domestically; however, data on the quantity of indium recovered from scrap were not available.

Import Sources (2020–23): Republic of Korea, 29%; Japan 18%; Canada, 14%; Belgium, 9%; and other, 30%.

Tariff: Item	Number	Normal Trade Relations 12–31–24
Unwrought indium, including powders	8112.92.3000	Free.

Depletion Allowance: 14% (domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: In 2024, the estimated annual average U.S. warehouse price (free on board) was $340 per kilogram, 42% more than the reported average price in 2023. The U.S. price, as reported by Argus Media Group, Argus Non-Ferrous Markets, began the year at $265 per kilogram until April when the price started to increase drastically as United States prices followed price increases on the Chinese Changzhou ZonglianJin platform. By June, the price had peaked at $420 per kilogram.

In September, the Office of the United States Trade Representative announced final tariff modifications after completing its review of the actions imposed under section 301(b) of the Trade Act of 1974 (19 U.S.C. 2411, as amended): China's acts, policies, and practices related to technology transfer, intellectual property, and innovation. Additional categories of goods from China were subject to tariffs including a 25% ad valorem tariff on critical minerals, which included indium. Over the past 4 years, the United States has, on average, imported 8% of its indium from China. As of September 2024, 25% of United States indium imports came from China.

China is the leading global producer of Indium, accounting for 70% of the world total. China is also the leading exporter of indium globally and exported 347 tons of indium in the first 9 months of 2024, about the same as that in the same period in 2023. Exports were primarily sent to the Republic of Korea, 74%; Malaysia, 10%; and the United States, 10%. China imported 180 tons of indium over the same time period.

As of July, a zinc-copper-silver-indium project in Utah was fully permitted for the construction of an exploration shaft and open pit mine. In August, an indium-phosphide-wafer fabrication facility, located in Alhambra, CA, resumed production after it was acquired by a U.S.-based photonic devices manufacturer.

Kazakhstan plans to open access to previously classified deposits of indium and other rare metals in order to attract foreign investment as it did in 2021 with lithium.

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INDIUM

Fifth-generation (5G) technologies continued to increase demand for indium. Indium phosphide (InP)-based substrates are used in 5G fiber-optic telecommunications networks where InP lasers and receivers send data through fiber-optic lines, which allow for lower latency, reduced signal loss, and faster speeds.

Artificial intelligence was expected to increase demand for specialized chip materials, including those made of InP, that allow for more advanced computation. A domestic semiconductor substrate company indicated that its second quarter revenue from InP increased 67% year on year. Indium, as ITO, is used as a coating on data center fibers and cables to increase signal transmission and reduce loss. InP is also used in high-speed photodetectors and laser diodes for optical communications. Additionally, some electrical components in data centers use indium-based solder alloys.

Since the CHIPS and Science Act was signed into law in 2022, the U.S. Department of Commerce announced as of October 2024 preliminary agreements with 20 companies for 32 semiconductor manufacturing projects in 20 States. In total, these projects have received almost $34 billion of the available $39 billion in direct funding and almost $29 billion in loans. The Department of Commerce planned to allocate the remaining funds to CHIPS and Science Act grantees by the end of 2024.

World Refinery Production and Capacity:

	Refinery production		Refinery capacity
	2023	2024[e]	2024[e]
United States	—	—	—
Belgium	19	10	50
Canada	40	35	70
China	690	760	1,100
France	21	21	70
Japan	65	60	70
Korea, Republic of	180	180	310
Peru	—	—	50
Russia	5	10	15
Uzbekistan	1	1	1
World total (rounded)	1,020	1,080	1,800

World Resources:[7] 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—indium recovery from most deposits of these minerals was not economic.

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 potentially replace ITO in LCDs. Hafnium can replace indium in nuclear reactor control rod alloys.

[e]Estimated. NA Not available. — Zero.

[1]Estimated to equal imports.

[2]Price is based on 99.99%-minimum-purity indium, delivered duty paid by U.S. buyers, in minimum lots of 50 kilograms. Source: S&P Global Platts Metals Week; price was discontinued as of September 11, 2020.

[3]Price is based on 99.99%-minimum-purity indium, free on board U.S. warehouse. Source: Argus Media Group, Argus Non-Ferrous Markets.

[4]Price is based on 99.99%-minimum-purity indium, duties unpaid in warehouse (Rotterdam). Source: Argus Media Group, Argus Non-Ferrous Markets.

[5]Defined as imports – exports.

[6]Refinery production data for indium were limited or unavailable for most countries. Estimates were derived from trade data, production capacity, and (or) changes in related lead and zinc smelter production.

[7]See Appendix C for resource and reserve definitions and information concerning data sources.