

IODINE

(Data in metric tons of elemental iodine unless otherwise noted)

Domestic Production and Use: Iodine was produced from brines in 2022 by three companies operating in Oklahoma. U.S. iodine production in 2022 was withheld to avoid disclosing company proprietary data but was estimated to have increased from that in 2021. The annual average cost, insurance, and freight unit value of iodine imports in 2022 was estimated to be \$41 per kilogram, about 26% more than that in 2021.

Because domestic and imported iodine was used by downstream manufacturers to produce many intermediate iodine compounds, it was difficult to establish an accurate end-use pattern. Crude iodine and inorganic iodine compounds were thought to account for more than 50% of domestic iodine consumption in 2022. Worldwide, the leading uses of iodine and its compounds were X-ray contrast media, pharmaceuticals, liquid crystal displays (LCDs), and iodophors, in descending order of quantity consumed. Other applications of iodine included animal feed, biocides, fluoride derivatives, food supplements, and nylon.

<u>Salient Statistics—United States:</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022^e</u>
Production	W	W	W	W	W
Imports for consumption	4,930	4,300	4,570	4,120	4,600
Exports	1,190	1,230	1,130	1,280	1,000
Consumption:					
Apparent ¹	W	W	W	W	W
Reported	4,620	4,000	3,750	3,720	4,000
Price, crude iodine, average unit value of imports (cost, insurance, and freight), dollars per kilogram	22.46	26.38	31.57	32.72	41
Employment, number ^e	60	60	60	60	60
Net import reliance ² as a percentage of reported consumption	>50	>50	>50	>50	>50

Recycling: Small amounts of iodine were recycled.

Import Sources (2018–21): Chile, 89%; Japan, 10%; and other, 1%.

<u>Tariff:</u>	<u>Item</u>	<u>Number</u>	<u>Normal Trade Relations</u>
	Iodine, crude	2801.20.0000	<u>12-31-22</u> Free.

Depletion Allowance: 14% (domestic and foreign).

Government Stockpile: None.

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Events, Trends, and Issues: According to trade publications, spot prices for iodine crystal averaged about \$67 per kilogram during the first 9 months of 2022. This was about 77% more than the 2021 annual average of \$37.83 per kilogram. Iodine price increases were attributed to strong global demand, particularly in Asia.

In the latter part of 2022, some countries in Europe began distributing and stockpiling potassium iodide tablets amid concerns over the possible use of nuclear weapons by Russia in Ukraine as well as concerns regarding the security of the Zaporizhzhia nuclear powerplant in Ukraine. Potassium iodide tablets can be taken to prevent radioactive iodine from accumulating in the thyroid gland following exposure to nuclear radiation.

As in recent years, Chile was the world's leading producer of iodine, followed by Japan and the United States. Excluding production in the United States, Chile accounted for about two-thirds of world production in 2022. Most of the world's iodine supply comes from three areas: the Chilean desert nitrate mines, the gasfields and oilfields in Japan, and the iodine-rich brine wells in northwestern Oklahoma.

World Mine Production and Reserves: China also produces crude iodine, but output is not officially reported, and available information was inadequate to make reliable estimates of output. Available information was inadequate to make an estimate of iodine reserves in Indonesia for 2022.

	Mine production⁶		Reserves³
	<u>2021</u>	<u>2022</u>	
United States	W	W	250,000
Azerbaijan	190	200	170,000
Chile	22,000	22,000	610,000
Indonesia	⁴ 36	40	NA
Iran	700	700	NA
Japan	8,900	9,000	4,900,000
Russia	3	3	120,000
Turkmenistan	<u>700</u>	<u>700</u>	<u>70,000</u>
World total (rounded)	⁵ 32,500	⁵ 33,000	6,100,000

World Resources:³ Seawater contains 0.06 part per million iodine, and the oceans are estimated to contain approximately 90 billion tons of iodine. Seaweeds of the Laminaria family are able to extract and accumulate up to 0.45% iodine on a dry basis. Although not as economical as the production of iodine as a byproduct of gas, nitrates, and oil, the seaweed industry represented a major source of iodine prior to 1959 and remains a large resource.

Substitutes: No comparable substitutes exist for iodine in many of its principal applications, such as in animal feed, catalytic, nutritional, pharmaceutical, and photographic uses. Bromine and chlorine could be substituted for iodine in biocide, colorant, and ink, although they are usually considered less desirable than iodine. Antibiotics can be used as a substitute for iodine biocides.

⁶Estimated. W Withheld to avoid disclosing company proprietary data. NA Not available.

¹Defined as production + imports – exports.

²Defined as imports – exports.

³See Appendix C for resource and reserve definitions and information concerning data sources.

⁴Reported.

⁵Excludes U.S. production.