

IODINE

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

Domestic Production and Use: Iodine was produced from brines in 2019 by three companies operating in Oklahoma. U.S. iodine production in 2019 was withheld to avoid disclosing company proprietary data. The average annual cost, insurance, and freight value of iodine imports in 2019 was estimated to be \$26 per kilogram, a 16% increase from that of 2018.

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 2019. 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.

Salient Statistics—United States:	2015	2016	2017	2018	2019^e
Production	W	W	W	W	W
Imports for consumption	5,630	4,320	4,170	4,930	4,600
Exports	1,210	1,050	1,230	1,190	1,200
Consumption:					
Apparent ¹	W	W	W	W	W
Reported	3,800	4,610	4,500	4,620	4,800
Price, crude, average value of imports, cost, insurance, and freight, dollars per kilogram	27.74	22.71	19.55	22.46	26
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 (2015–18): Chile, 88%; Japan, 11%; and other, 1%.

Tariff: Item	Number	Normal Trade Relations 12–31–19
Iodine, crude	2801.20.0000	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 \$28 per kilogram during the first half of 2019. Although this was an increase from the 2018 annual average of about \$25 per kilogram, prices were still considerably less than the historically high levels of \$65 to \$85 per kilogram in late 2012 and early 2013. The increase in the average spot price was attributed to an undersupply in the market. The estimated average annual value of crude iodine imported in the United States increased by about 16% in 2019 compared with that in 2018.

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 65% of world production in 2019. In Turkmenistan, a new iodine producer started operations and was thought to have contributed to an increase in the country's total iodine production in 2019. Most of the world's iodine supply comes from three areas: the Chilean desert nitrate mines, the oilfields and gasfields in Japan, and the iodine-rich brine wells in northwestern Oklahoma.

World Mine Production and Reserves: China and Iran also produce crude iodine, but output is not officially reported.

	Mine production		Reserves ³
	<u>2018</u>	<u>2019^e</u>	
United States	W	W	250,000
Azerbaijan	200	200	170,000
Chile	18,000	18,000	610,000
Indonesia	38	40	100,000
Japan	8,800	9,000	5,000,000
Russia	8	10	120,000
Turkmenistan	<u>540</u>	<u>600</u>	<u>70,000</u>
World total (rounded)	<u>427,600</u>	<u>428,000</u>	<u>6,300,000</u>

World Resources: 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.

^eEstimated. W Withheld to avoid disclosing company proprietary data.

¹Defined as production + imports – exports.

²Defined as imports – exports.

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

⁴Excludes U.S. production.