

IODINE

(Data in metric tons elemental iodine unless otherwise noted)

Domestic Production and Use: Iodine was produced from brines in 2016 by three companies operating in Oklahoma. Production in 2016 was estimated to have decreased from that of 2015. U.S. iodine production in 2016 was withheld to avoid disclosing company proprietary data. The average cost, insurance, and freight value of iodine imports in 2016 was estimated to be \$23.00 per kilogram.

Because domestic and imported iodine were used by downstream manufacturers to produce many intermediate iodine compounds, it was difficult to establish an accurate end-use pattern. Organic iodine compounds, which included ethyl and methyl iodide, ethylenediamine dihydroiodide, and povidine iodine were estimated to account for 60% of domestic iodine consumption in 2016. Potassium iodide was the leading inorganic iodine compound consumed, accounting for approximately 20% of domestic iodine consumption, with other inorganic compounds, including hydriodic acid, potassium iodate, and sodium iodide, as well as resublimed iodine accounting for the remaining 20% of estimated domestic consumption. Iodine and its compounds are primarily used in x-ray contrast media, pharmaceuticals, liquid-crystal-display (LCD) screens, and iodophors, in descending order.

Salient Statistics—United States:	2012	2013	2014	2015	2016^e
Production	W	W	W	W	W
Imports for consumption, iodine, crude	5,960	5,960	5,360	5,630	5,000
Exports	1,040	1,150	1,240	1,190	1,130
Consumption:					
Apparent	W	W	W	W	W
Reported	4,920	4,050	3,740	3,610	3,500
Price, average c.i.f. value, dollars per kilogram, crude	42.28	42.77	37.04	27.74	23.00
Employment, number ^e	60	60	60	60	60
Net import reliance ¹ as a percentage of reported consumption	>50	>50	>50	>50	>50

Recycling: Small amounts of iodine were recycled, but no data were reported.

Import Sources (2012–15): Chile, 88%; Japan, 11%; and other, 1%.

Tariff:	Item	Number	Normal Trade Relations
			12–31–16
	Iodine, crude	2801.20.0000	Free.

Depletion Allowance: 14% (Domestic and foreign).

Government Stockpile: None.

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Events, Trends, and Issues: Global iodine prices declined over the course of the year. According to trade publications, spot prices of iodine crystal averaged about \$30 per kilogram at the beginning of 2016 and decreased to an average of about \$21 per kilogram in September 2016. The continuing decline in prices was attributed to a surplus of iodine in the market and competition among producers.

Although prices continued to decline from their historically high levels of 2012 and 2013, global demand for iodine and its derivative compounds remained steady in 2016, owing to growth in demand for x-ray contrast media, especially in developing countries, along with continued growth in demand for LCD screens.

As in recent years, Chile was the world's leading producer of iodine, followed by Japan and the United States. Excluding U.S. production, Chile accounted for about 66% of world production in 2016, with two of the leading iodine producers in the world. Most of the world's iodine supply comes from three areas: the Chilean desert nitrate mines and the oil and gas fields in Japan and northwestern Oklahoma.

World Mine Production and Reserves:

	Mine production		Reserves²
	<u>2015</u>	<u>2016^e</u>	
United States	W	W	250,000
Azerbaijan	247	247	170,000
Chile	20,000	21,000	1,800,000
China	NA	NA	4,000
Indonesia	45	45	100,000
Japan	9,800	9,800	5,000,000
Russia	—	—	120,000
Turkmenistan	<u>510</u>	<u>510</u>	<u>70,000</u>
World total (rounded)	³ 30,600	³ 31,600	<u>7,500,000</u>

World Resources: In addition to the reserves shown above, seawater contains 0.06 parts per million iodine, or approximately 90 billion tons. 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. NA Not available. W Withheld to avoid disclosing company proprietary data. — Zero.

¹Defined as imports – exports.

²See [Appendix C](#) for resource and reserve definitions and information concerning data sources.

³Excludes U.S. production.