

## IODINE

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

**Domestic Production and Use:** Iodine was produced from brines in 2020 by three companies operating in Oklahoma. U.S. iodine production in 2020 was withheld to avoid disclosing company proprietary data. The average annual cost, insurance, and freight value of iodine imports in 2020 was estimated to be \$31 per kilogram, about a 17% increase from that of 2019.

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 2020. 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.

<b><u>Salient Statistics—United States:</u></b>	<b><u>2016</u></b>	<b><u>2017</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020<sup>e</sup></u></b>
Production	W	W	W	W	W
Imports for consumption	4,320	4,170	4,930	4,300	4,300
Exports	1,050	1,230	1,190	1,230	1,300
Consumption:					
Apparent <sup>1</sup>	W	W	W	W	W
Reported	4,610	4,500	4,620	4,000	4,000
Price, crude iodine, average value of imports (cost, insurance, and freight), dollars per kilogram	22.71	19.55	22.46	26.38	31
Employment, number <sup>e</sup>	60	60	60	60	60
Net import reliance <sup>2</sup> as a percentage of reported consumption	>50	>50	>50	>50	>50

**Recycling:** Small amounts of iodine were recycled.

**Import Sources (2016–19):** Chile, 88%; Japan, 11%; and other, 1%.

<b><u>Tariff:</u></b>	<b><u>Item</u></b>	<b><u>Number</u></b>	<b><u>Normal Trade Relations</u></b>
	Iodine, crude	2801.20.0000	<b><u>12–31–20</u></b> 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 \$37 per kilogram during the first 9 months of 2020. Although this was an increase from the 2019 annual average of about \$30 per kilogram, prices were still considerably less than the historically high levels of \$65 to \$85 per kilogram in late 2012 and early 2013.

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 2020. 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.

Domestic and international iodine production was not considerably affected by the global COVID-19 pandemic during the first half of 2020. However, market demand was expected to decrease in the second half of 2020 and will likely affect iodine prices in the latter half of the year.

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

	Mine production		Reserves <sup>3</sup>
	<u>2019</u>	<u>2020<sup>e</sup></u>	
United States	W	W	250,000
Azerbaijan	190	200	170,000
Chile	20,200	20,000	610,000
Indonesia	40	40	100,000
Japan	9,100	9,000	4,900,000
Russia	2	2	120,000
Turkmenistan	<u>600</u>	<u>600</u>	<u>70,000</u>
World total (rounded)	<u>430,100</u>	<u>430,000</u>	<u>6,200,000</u>

**World Resources:**<sup>3</sup> 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.

<sup>e</sup>Estimated. W Withheld to avoid disclosing company proprietary data.

<sup>1</sup>Defined as production + imports – exports.

<sup>2</sup>Defined as imports – exports.

<sup>3</sup>See Appendix C for resource and reserve definitions and information concerning data sources.

<sup>4</sup>Excludes U.S. production.