

## IODINE

(Data in metric tons elemental iodine unless otherwise noted)

**Domestic Production and Use:** Iodine was produced in 2010 by three companies operating in Oklahoma, with a fourth company initializing iodine production in Montana in March 2010. Domestic iodine production decreased slightly in 2009 compared with that of 2008, owing to the economic downturn. Production in 2010 was estimated to increase from that of 2009. To avoid disclosing company proprietary data, U.S. iodine production in 2010 was withheld. The operation at Woodward, OK, continued production of iodine from subterranean brines. Another company continued production at Vici, OK. Prices for iodine have increased in recent years owing to high demand, which has led to high capacity utilization. The average c.i.f. value of iodine imports in 2010 was estimated to be \$24.18 per kilogram.

Domestic and imported iodine were used by downstream manufacturers to produce many intermediate iodine compounds, making it difficult to establish an accurate end-use pattern. Of the consumers that participate in an annual U.S. Geological Survey canvass, 17 plants reported consumption of iodine in 2009. Iodine and iodine compounds reported were unspecified organic compounds, including ethyl and methyl iodide, 51%; potassium iodide, 11%; crude iodine, 11%; povidine-iodine (iodophors), 7%; ethylenediamine dihydroiodide, 5%; sodium iodide, 4%; and other, 11%.

<b>Salient Statistics—United States:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010<sup>e</sup></b>
Production	W	W	W	W	W
Imports for consumption, crude content	5,640	6,060	6,300	5,190	5,200
Exports	1,580	1,060	950	1,160	1,000
Shipments from Government stockpile excesses	467	93	—	—	—
Consumption:					
Apparent	W	W	W	W	W
Reported	4,570	4,470	4,590	4,550	4,800
Price, average c.i.f. value, dollars per kilogram, crude	19.34	21.01	21.52	25.55	24
Employment, number <sup>e</sup>	30	30	30	30	30
Net import reliance <sup>1</sup> as a percentage of reported consumption	89	100	100	89	88

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

**Import Sources (2006–09):** Chile, 82%; Japan, 17%; and other, 1%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
			<b>12-31-10</b>
	Iodine, crude	2801.20.0000	Free.
	Iodide, calcium or copper	2827.60.1000	Free.
	Iodide, potassium	2827.60.2000	2.8% ad val.
	Iodides and iodide oxides, other	2827.60.5100	4.2% ad val.

**Depletion Allowance:** 14% (Domestic and foreign).

**Government Stockpile:** None.

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**Events, Trends, and Issues:** Demand for iodine has been driven in recent years by consumption for liquid crystal displays (LCD) and x-ray contrast media. With increased demand in these two sectors and global iodine production remaining constant, an imbalance between supply and demand was created and resulted in iodine prices increasing by 19% from 2008 to 2009. As consumption of iodine in biocides, LCDs, and nylon declined owing to the global economic downturn, prices remained relatively firm. The prices in 2010 were estimated to decrease slightly from those of 2009, but were projected to be more than 10% greater than those of 2008. With an economic recovery expected, demand for iodine used in biocides, iodine salts, LCDs, synthetic fabric treatments, and x-ray contrast media was expected to increase at a rate of between 3.5% and 4% per year during the next decade.

As in previous years, Chile was the world's leading producer of iodine, followed by Japan and the United States. Chile accounted for more than 50% of world production, having two of the leading iodine producers in the world. The largest Chilean producer reported a 20% decrease in sales from 2008 to 2009, which was attributed to the global economic downturn. In response to the downturn, the company announced the suspension of operations at one of its mining facilities. The third largest Chilean producer initiated a new project at Algorta, Chile, which was expected to replace its current operation at Lagunas, Chile.

Several governmental programs were expected to affect future iodine demand. The European Union prohibited its 27 member countries from using or selling iodine for the purpose of disinfecting drinking water. China's Ministry of Health announced the reduction of iodine content in salt owing to fears that iodized salt is causing a rise in thyroid disease. The U.S. Environmental Protection Agency approved the restricted use of the soil fumigant iodomethane (methyl iodide) as an alternative to ozone-depleting methyl bromide. Australia and Belgium required bread manufacturers to use iodized salt with the intent of limiting iodine deficiency in their populations.

**World Mine Production and Reserves:** The iodine reserves for Japan have been revised based on new information from the country.

	Mine production		Reserves <sup>2</sup>
	2009	2010 <sup>e</sup>	
United States	W	W	250,000
Azerbaijan	300	300	170,000
Chile	17,400	18,000	9,000,000
China	580	590	4,000
Indonesia	75	75	100,000
Japan	9,600	9,800	5,000,000
Russia	300	300	120,000
Turkmenistan	270	270	170,000
Uzbekistan	<u>2</u>	<u>2</u>	NA
World total (rounded)	<sup>3</sup> 28,500	<sup>3</sup> 29,000	15,000,000

**World Resources:** In addition to the reserves shown above, seawater contains 0.05 parts per million iodine, or approximately 34 million 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, nitrate, and oil, the seaweed industry represented a major source of iodine prior to 1959 and remains a large resource.

**Substitutes:** There are no comparable substitutes 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. NA Not available. W Withheld to avoid disclosing company proprietary data. — Zero.

<sup>1</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>2</sup>See Appendix C for resource/reserve definitions and information concerning data sources.

<sup>3</sup>Excludes U.S. production.