

## IODINE

(Data in metric tons elemental iodine unless otherwise noted)

**Domestic Production and Use:** Iodine was produced in 2013 by two companies operating in Oklahoma, and one company in Montana. Production in 2013 was estimated to have slightly increased from that of 2012. To avoid disclosing company proprietary data, U.S. iodine production in 2013 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 cost, insurance, and freight value of iodine imports in 2013 was estimated to be \$43.00 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, 13 plants reported consumption of iodine in 2012. Iodine and iodine compounds reported were ethyl and methyl iodide, 50%; potassium iodide, 13%; povidine-iodine, 8%; crude iodine, ethylenediamine dihydroiodide, and hydriodic acid, 4% each; resublimed iodine, 2%; sodium iodide, 1%; and other inorganic compounds, 14%.

| <b>Salient Statistics—United States:</b>                                 | <b>2009</b> | <b>2010</b> | <b>2011</b> | <b>2012</b> | <b>2013<sup>e</sup></b> |
|--|-------------|-------------|-------------|-------------|-------------------------|
| Production   | W           | W           | W           | W           | W                       |
| Imports for consumption, crude content                                   | 5,190       | 5,710       | 6,590       | 5,960       | 5,650                   |
| Exports  | 1,160       | 1,070       | 900         | 1,040       | 1,180                   |
| Consumption:   |             |             |             |             |                         |
| Apparent   | W           | W           | W           | W           | W                       |
| Reported   | 4,550       | 4,640       | 4,740       | 4,880       | 4,900                   |
| Price, average c.i.f. value, dollars per kilogram, crude                 | 25.55       | 24.39       | 38.13       | 41.97       | 43.00                   |
| 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         | 100         | 91                      |

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

**Import Sources (2009–12):** Chile, 86%; Japan, 13%; and other, 1%.

| <b>Tariff:</b> | <b>Item</b>                      | <b>Number</b> | <b>Normal Trade Relations</b> |
|----------------|----------------------------------|---------------|-------------------------------|
|                |                                  |               | <b>12–31–13</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.

## IODINE

**Events, Trends, and Issues:** Historically high iodine prices continued into 2013; however, by the end of the first quarter of 2013, prices began to slightly decrease. Strong demand for iodine continued, driven by the liquid crystal display (LCD) and x-ray contrast media industries. Some companies that minimized their use of iodine and iodine compounds in 2011 and 2012 owing to the uncertainty of supply, have come back into the market. With a continued global economic recovery, 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 recent years, Chile was the world's leading producer of iodine, followed by Japan and the United States. Chile accounted for more than 63% of world production in 2012, having two of the leading iodine producers in the world. The Chilean producers were operating near capacity and were expected to continue to expand production in response to changes in demand and to capitalize on price increases.

### **World Mine Production and Reserves:**

|                       | Mine production     |                         | Reserves <sup>2</sup> |
|-----------------------|---------------------|-------------------------|-----------------------|
|                       | <u>2012</u>         | <u>2013<sup>e</sup></u> |                       |
| United States         | W                   | W                       | 250,000               |
| Azerbaijan            | 350                 | 350                     | 170,000               |
| Chile                 | 17,500              | 18,000                  | 1,800,000             |
| China                 | NA                  | NA                      | 4,000                 |
| Indonesia             | 75                  | 75                      | 100,000               |
| Japan                 | 9,300               | 9,400                   | 5,000,000             |
| Russia                | 300                 | 170                     | 120,000               |
| Turkmenistan          | 480                 | 480                     | 170,000               |
| Uzbekistan            | <u>2</u>            | <u>2</u>                | <u>NA</u>             |
| World total (rounded) | <sup>3</sup> 28,000 | <sup>3</sup> 28,500     | 7,600,000             |

**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, nitrate, 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. NA Not available. W Withheld to avoid disclosing company proprietary data.

<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.