

BROMINE

(Data in metric tons of bromine content unless otherwise noted)

Domestic Production and Use: Bromine was recovered from underground brines by two companies in Arkansas. Bromine is one of the leading mineral commodities, in terms of value, produced in Arkansas. The two bromine companies in the United States account for a large percentage of world production capacity.

The leading global applications of bromine are for the production of brominated flame retardants, and intermediates and industrial uses. Bromine compounds are also used in a variety of other applications, including drilling fluids and industrial water treatment. U.S. apparent consumption of bromine in 2019 was estimated to be greater than that in 2018.

Salient Statistics—United States:	2015	2016	2017	2018	2019^e
Production	W	W	W	W	W
Imports for consumption, elemental bromine and compounds ¹	61,200	58,400	52,700	56,200	66,000
Exports, elemental bromine and compounds ²	29,600	28,300	43,400	40,500	44,000
Consumption, apparent ³	W	W	W	W	W
Price, average value of imports, Cost, insurance, and freight, dollars per kilogram	2.27	2.19	2.30	2.21	2.19
Employment, number ^e	1,100	1,100	1,100	1,100	1,100
Net import reliance ⁴ as a percentage of apparent consumption	<25	<25	<25	<25	<25

Recycling: Some bromide solutions were recycled to obtain elemental bromine and to prevent the solutions from being disposed of as hazardous waste. For example, hydrogen bromide is emitted as a byproduct in many organic reactions. This byproduct waste can be recycled with virgin bromine brines and used as a source of bromine production. Bromine contained in plastics can be incinerated as solid organic waste, and the bromine can be recovered.

Import Sources (2015–18):⁵ Israel, 79%; Jordan, 11%; China, 7%; and other, 3%.

Tariff: Item	Number	Normal Trade Relations 12–31–19
Bromine	2801.30.2000	5.5% ad val.
Hydrobromic acid	2811.19.3000	Free.
Potassium or sodium bromide	2827.51.0000	Free.
Ammonium, calcium, or zinc bromide	2827.59.2500	Free.
Potassium bromate	2829.90.0500	Free.
Sodium bromate	2829.90.2500	Free.
Ethylene dibromide	2903.31.0000	5.4% ad val.
Methyl bromide	2903.39.1520	Free.
Dibromoneopentyl glycol	2905.59.3000	Free.
Tetrabromobisphenol A	2908.19.2500	5.5% ad val.
Decabromodiphenyl and octabromodiphenyl oxide	2909.30.0700	5.5% ad val.

Depletion Allowance: Brine wells, 5% (Domestic and foreign).

Government Stockpile: None.

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Events, Trends, and Issues: The United States maintained its position as one of the leading bromine producers in the world. China, Israel, and Jordan also are major producers of elemental bromine. In 2019, U.S. net imports of bromine and bromine compounds increased compared with those in 2018. The average import value of elemental bromine increased by about 20% in 2019 compared with that in 2018. The leading source of imports of bromine and bromide compound (gross weight) was Israel. The leading imported bromine products in terms of both gross weight and bromine content were bromides and bromide oxides of ammonium, calcium, or zinc (79%) and bromides of potassium or sodium (17%). The leading exported bromine product was methyl bromide (45%).

Global consumption of elemental bromine and brominated flame retardants was strong in 2019. The price of bromine compounds also increased in 2019. The amount of clear brine fluids consumed in the oil-well and gas-well drilling industries continued to mirror global changes in oil prices and the number of active drilling rigs. In 2019, the monthly average number of active drilling rigs was about the same as in 2018.

Many bromine facilities in Shandong Province, China, remained closed in the first half of 2019 while rectifications and improvements were completed to meet new environmental regulations initiated by the Government of China in late 2017. Some plants restarted operations in the spring of 2019 following approval by the local government while others, especially small-scale unofficial plants, remained closed until they could meet the new guidelines.

In order to meet growing demand, a company in Jordan began an expansion project in 2018 to increase production capacity. The increased capacity was expected to have increased the country's 2019 bromine production.

World Production and Reserves:

	Production		Reserves ⁶
	2018	2019 ^e	
United States	W	W	11,000,000
Azerbaijan	—	—	300,000
China	60,000	60,000	NA
India	2,300	2,300	NA
Israel	175,000	180,000	Large
Japan	20,000	20,000	NA
Jordan	100,000	150,000	Large
Ukraine	4,500	4,500	NA
World total (rounded)	⁷ 362,000	⁷ 420,000	Large

World Resources: Bromine is found principally in seawater, evaporitic (salt) lakes, and underground brines associated with petroleum deposits. The Dead Sea, in the Middle East, is estimated to contain 1 billion tons of bromine. Seawater contains about 65 parts per million of bromine, or an estimated 100 trillion tons. Bromine is also recovered from seawater as a coproduct during evaporation to produce salt.

Substitutes: Chlorine and iodine may be substituted for bromine in a few chemical reactions and for sanitation purposes. There are no comparable substitutes for bromine in various oil-well and gas-well completion and packer applications. Because plastics have a low ignition temperature, aluminum hydroxide, magnesium hydroxide, organic chlorine compounds, and phosphorus compounds can be substituted for bromine as fire retardants in some uses.

^eEstimated. NA Not available. W Withheld to avoid disclosing company proprietary data. — Zero.

¹Imports calculated from items shown in Tariff section.

²Exports calculated from Schedule B numbers 2801.30.2000, 2827.51.0000, 2827.59.0000, 2903.31.0000, and 2903.39.1520.

³Defined as production (sold or used) + imports – exports.

⁴Defined as imports – exports.

⁵Calculated using the gross weight of imports.

⁶See Appendix C for resource and reserve definitions and information concerning data sources.

⁷Excludes U.S. production.