

BROMINE

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

Domestic Production and Use: Bromine was recovered from underground brines by two companies in Arkansas. The total estimated value of bromine sold or used in the United States in 2007 was \$470 million. Bromine was the leading mineral commodity, in terms of value, produced in Arkansas. The United States accounted for 42% of world bromine production.

Bromine is used in the manufacture of dyes, fire retardants, insect repellents, oilfield completion fluids, perfumes, pharmaceuticals, photographic chemicals, water-treatment chemicals, and other chemicals. Other products included intermediate chemicals for the manufacture of products and bromide solutions used alone or in combination with other chemicals.

Salient Statistics—United States:	2003	2004	2005	2006	2007^e
Production ¹	216	222	226	243	235
Imports for consumption, elemental bromine and compounds ²	48	62	60	44	45
Exports, elemental bromine and compounds	8	9	10	12	10
Consumption, apparent ³	256	274	277	275	270
Price, cents per kilogram, bulk, purified bromine	71.7	86.0	74.0	139.2	200.0
Employment, number	1,700	1,500	1,200	1,100	1,000
Net import reliance ⁴ as a percentage of apparent consumption	15	19	18	12	13

Recycling: Some bromide solutions were recycled to obtain elemental bromine and prevent the solutions from being disposed of as hazardous waste. This recycled bromine is not included in the virgin bromine production reported by the companies, but is included in data collected by the U.S. Census Bureau.

Import Sources (2003-06): Israel, 94%; United Kingdom, 2%; and other, 4%.

Tariff: Item	Number	Normal Trade Relations 12-31-07
Ammonium, calcium, or zinc bromide	2827.59.2500	Free.
Bromides and bromide oxides	2827.59.5100	3.6% ad val.
Bromine	2801.30.2000	5.5% ad val.
Bromochloromethane	2903.49.1000	Free.
Decabromodiphenyl and octabromodiphenyl oxide	2909.30.0700	5.5% ad val.
Ethylene dibromide	2903.31.0000	5.4% ad val.
Hydrobromic acid	2811.19.3000	Free.
Methyl bromide	2903.90.1520	Free.
Potassium bromate	2829.90.0500	Free.
Potassium or sodium bromide	2827.51.0000	Free.
Sodium bromate	2829.90.2500	Free.
Tetrabromobisphenol A	2908.19.2500	5.5% ad val.

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

Government Stockpile: None.

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Events, Trends, and Issues: Israel and the United States were the leading producers of bromine in the world. Approximately 90% of Israel's production was for export, accounting for about 80% of international trade in bromine and bromine compounds to more than 100 countries.

Bromine and bromine compound prices increased in 2007, reflecting the rising market value of bromine and major increases in the costs of energy, raw materials, regulatory compliance, and transportation.

A bromine recovery facility in Michigan was closed at the end of 2006. The recovered bromine was used by a company in Arkansas to produce bromine chemicals. The company signed an agreement to buy elemental bromine from one of the two producers in Arkansas to ensure its supply of bromine.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ⁵	Reserve base ⁵
	2006	2007 ^e		
United States ¹	243	235	11,000	11,000
Azerbaijan	2	2	300	300
China	43	43	130	3,500
France	2	—	1,600	1,600
Germany	(6)	(6)	(7)	(7)
India	1.5	1.5	(8)	(8)
Israel	179	200	(9)	(9)
Italy	(6)	(6)	(8)	(8)
Japan	20	20	(10)	(10)
Jordan	50	50	(9)	(9)
Spain	(6)	(6)	1,400	1,400
Turkmenistan	(6)	(6)	700	700
Ukraine	3	3	400	400
World total (rounded)	545	556	Large	Large

World Resources: Resources of bromine are virtually unlimited. Bromine is found principally in seawater, salt lakes, and underground brines associated with oil. 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 and gas well completion and packer applications that do not harm the permeability of the production zone and that control well "blowouts." Because plastics have a low ignition temperature, alumina, magnesium hydroxide, organic chlorine compounds, and phosphorus compounds can be substituted for bromine as fire retardants in some uses. Bromine compounds and bromine acting as a synergist with other materials are used as fire retardants in plastics, such as those found in electronics.

^eEstimated. — Zero.

¹Sold or used by U.S. producers.

²Imports calculated from items shown in Tariff section.

³Includes recycled product.

⁴Defined as imports – exports + adjustments for Government and industry stock changes.

⁵[See Appendix C for definitions.](#)

⁶Less than ½ unit.

⁷From waste biterms associated with potash production.

⁸From waste biterms associated with solar salt.

⁹From the Dead Sea.

¹⁰From seawater.