

BORON

(Data in thousand metric tons of boric oxide (B₂O₃) unless otherwise noted)

Domestic Production and Use: The estimated value of boric oxide contained in minerals and compounds produced in 2007 was withheld to prevent disclosure of individual company proprietary data. Boron minerals, primarily as sodium borates, were produced domestically by two companies in southern California. The leading producer operated an open pit tincal and kernite mine and associated compound plants. A second company produced borax and boric acid using saline brines as the raw material. A third company that previously processed calcium and calcium sodium borates became a trader and sold from inventory and imported products. A fourth company has been idle since 2003. Boron minerals and chemicals were principally consumed in the North Central and the Eastern United States. The estimated distribution pattern for boron compounds consumed in the United States in 2006 was glass and ceramics, 72%; soaps, detergents, and bleaches, 4%; agriculture, 3%; enamels and glazes, 3%; and other, 18%.

Salient Statistics—United States:	2003	2004	2005	2006	2007^e
Production ¹	605	637	612	W	W
Imports for consumption, gross weight:					
Borax	(2)	(2)	1	2	1
Boric acid	47	49	52	85	90
Colemanite	24	21	31	25	30
Ulexite	80	110	103	131	140
Exports, gross weight:					
Boric acid	70	61	183	221	200
Colemanite	23	18	—	—	—
Refined sodium borates	131	135	308	393	390
Consumption:					
Apparent	532	509	439	W	W
Reported	366	385	W	W	W
Price, dollars per ton, granulated pentahydrate borax in bulk, carload, works ³	400-425	400-425	400-425	400-425	NA
Stocks, yearend ⁴	NA	NA	NA	NA	NA
Employment, number ^e	1,300	1,300	1,300	1,300	1,300
Net import reliance ⁵ as a percentage of apparent consumption	E	E	E	E	E

Recycling: Insignificant.

Import Sources (2003-06): Boric acid: Turkey, 45%; Chile, 30%; Bolivia, 7%; Peru, 7%; and other, 11%.

Tariff:	Item	Number	Normal Trade Relations
			12-31-07
Borates:			
Refined borax:			
Anhydrous		2840.11.0000	0.3% ad val.
Other		2840.19.0000	0.1% ad val.
Other		2840.20.0000	3.7% ad val.
Perborates:			
Sodium		2840.30.0010	3.7% ad val.
Other		2840.30.0050	3.7% ad val.
Boric acids		2810.00.0000	1.5% ad val.
Natural borates:			
Sodium		2528.10.0000	Free.
Calcium		2528.90.0010	Free.
Other		2528.90.0050	Free.

Depletion Allowance: Borax, 14% (Domestic and foreign).

Government Stockpile: None.

BORON

Events, Trends, and Issues: Although production data were withheld, the United States was a major world producer of refined boron compounds during 2007. U.S. processed products had fewer impurities and were produced with lower emissions than in other countries. The U.S. industry produced boron minerals with a higher productivity per worker hour than those produced in other countries. It was reported that a leading indicator for demand for refined borates was a strong housing market. The demand for housing decreased at yearend 2006 and remained depressed through 2007. Borate-based wood preservatives have been shown to have a lower environmental impact than other wood-treatment liquids.

Exported U.S. borate materials competed with borax, boric acid, colemanite, and ulexite, primarily from Turkey, the leading producer of boron ore in the world. China, Eastern Europe, and India are favorable areas for increased borates consumption because of their growing economies. Significant strides in industrialization, urbanization, foreign investment, and free trade should increase the demand for borates over the next several years.

World Production, Reserves, and Reserve Base:⁶

	Production—All forms		Reserves ⁷	Reserve base ⁷
	2006	2007 ^e		
United States	W	W	40,000	80,000
Argentina	650	650	2,000	9,000
Bolivia	60	60	NA	NA
Chile	460	460	NA	NA
China	145	150	25,000	47,000
Iran	3	3	1,000	1,000
Kazakhstan	30	30	NA	NA
Peru	10	10	4,000	22,000
Russia	400	400	40,000	100,000
Turkey	<u>2,500</u>	<u>2,500</u>	<u>60,000</u>	<u>150,000</u>
World total (rounded)	4,260	4,300	170,000	410,000

World Resources: Large domestic reserves of boron materials occur in California, chiefly in sediments and their contained brines. Extensive resources also occur in Turkey. Small deposits are being mined in South America. At current levels of consumption, world resources are adequate for the foreseeable future.

Substitutes: Substitution for boron materials is possible in such applications as soaps, detergents, enamel, and insulation. In soaps, sodium and potassium salts of fatty acids are the usual cleaning and emulsion agents. Borates in detergents can be replaced by chlorine bleach or enzymes. Some enamels can use other glass-producing substances, such as phosphates. Insulation substitutes include cellulose, foams, and mineral wools.

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

¹Minerals and compounds sold or used by producers; includes both actual mine production and marketable products.

²Less than ½ unit.

³Chemical Market Reporter 2003-05; ICIS Chemical Business (Americas) thereafter.

⁴Stocks data are not available and are assumed to be zero for net import reliance and apparent consumption calculations.

⁵Defined as imports – exports + adjustments for Government and industry stock changes.

⁶Gross weight of ore in thousand metric tons.

⁷See Appendix C for definitions.