

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 2005 was \$483 million. Domestic production of boron minerals, primarily as sodium borates, was by three companies in southern California. The leading producer operated an open pit tincal and kernite mine and associated compound plants. The company planned to expand boric acid production capacity. The project was valued at \$44 million. The majority of the remaining output was produced using saline brines as the raw material. A third company that previously processed calcium and calcium sodium borates was idle after a flood washed out the main road. A fourth company was idle during most of 2003 and all of 2004 and 2005. Principal consumption of boron minerals and chemicals was in the production of glass by firms in the North Central and the Eastern United States. The estimated distribution pattern for boron compounds consumed in the United States in 2004 was glass and ceramics, 70%; soaps and detergents, 5%; fire retardants, 4%; agriculture, 2%; and other, 19%.

Salient Statistics—United States:	2001	2002	2003	2004	2005^e
Production ¹	536	543	605	637	657
Imports for consumption, gross weight:					
Borax	1	(²)	(²)	(²)	65
Boric acid	56	49	47	49	49
Colemanite	35	32	24	21	98
Ulexite	109	125	80	110	70
Exports, gross weight:					
Boric acid	85	84	70	61	168
Colemanite	NA	5	23	18	—
Refined sodium borates	221	150	131	135	33
Consumption:					
Apparent	482	492	532	509	649
Reported	347	359	366	385	NA
Price, dollars per ton, granulated pentahydrate borax in bulk, carload, works ³	376	376	400-425	400-425	400-425
Stocks, yearend ⁴	NA	NA	NA	NA	NA
Employment, number	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 (2001-04): Boric acid: Turkey, 57%; Chile, 31%; Peru, 5%; Russia, 3%; and other, 4%.

Tariff:	Item	Number	Normal Trade Relations 12-31-05
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.
Other:			
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: The United States was the world's leading producer of refined boron compounds during 2005, and about one-half of domestic production was exported. 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 2005.

A new ulexite mine opened in Olacapato, Salta Province, Argentina. The ulexite is transported 180 kilometers (km) to the City of Saltato where a boric acid plant was constructed to produce 400 tons per month. A second stage was under construction to increase the production to 1,000 tons per month.

A Chilean company extracted ulexite from Salar de Uyumi in southwest Potosi, Bolivia. Bolivia's Mining and Hydrocarbons Ministry rescinded the mining concessions in June 2005. The Chilean company had to wait 6 months before taking action to assess the value of the claim through the World Bank's International Center for the Settlement of Investment Disputes. The company filed charges against the Bolivian Government in 2005.

A new colemanite mine opened in 2004 in northern Chile 85 km from Calaman City at Salar de Tara. It produced granulated fertilizer ulexite; 32% B₂O₃ (10% B) for bulk blending or direct agricultural application and ground ulexite 30% to 40% B₂O₃ under 1 millimeter (mm) and concentrate 50% to 60% B₂O₃ under 0.5 mm. A major producer in Chile was looking for buyers for its borate-producing subsidiary. Ulexite from the Salar of Ascotan was produced to manufacture boric acid.

A subsidiary of an Italian company produced ulexite and inyoite 80 km from Arequipa, Peru. The open pit mine operates 6 months per year because of the rainy season. Estimated reserves were 10 million tons. Ulexite from the mine is transported to a boric acid plant in Rio Seco.

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.

World Production, Reserves, and Reserve Base:⁶

	Production—all forms		Reserves ⁷	Reserve base ⁷
	2004	2005 ^e		
United States	1,210	1,230	40,000	80,000
Argentina	560	550	2,000	9,000
Bolivia	110	100	NA	NA
Chile	401	600	NA	NA
China	135	140	25,000	47,000
Iran	3	3	1,000	1,000
Kazakhstan	30	30	NA	NA
Peru	9	10	4,000	22,000
Russia	500	500	40,000	100,000
Turkey	1,450	1,700	60,000	150,000
World total (rounded)	4,410	4,860	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. — Zero.

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

²Less than ½ unit.

³Chemical Market Reporter.

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.