BORON

(Data in thousand metric tons of boric oxide (B_2O_3), unless otherwise noted)

Domestic Production and Use: The estimated value of boric oxide contained in minerals and compounds produced in 1996 was $498 million. Domestic production of boron minerals primarily as sodium borates, by four companies was centered in southern California. The largest producer operated an open pit tincal and kernite mine and associated compound plants. A second firm, using Searles Lake brines as raw material at two plants, accounted for the remaining output. A third company continued to process small amounts of calcium and calcium sodium borates. A fourth company used an in-situ process. Principal consuming firms were in the North Central and Eastern States. The reported end-use distribution pattern for boron compounds consumed in the United States in 1996 was estimated as glass products, 56%; agriculture, 7%; fire retardants, 6%; soaps and detergents, 5%; and other, 26%.

Salient Statistics—United States:	1992	1993	1994	1995	1996[e]
Production[1]	554	574	550	495	622
Imports for consumption, gross weight:					
Borax	16	40	9	9	10
Boric acid	6	17	20	16	20
Colemanite	30	90	27	45	40
Ulexite	42	149	120	153	150
Exports, gross weight of boric acid and refined borates	489	481	498	588	590
Consumption: Apparent	356	481	389	312	234
Reported	345	321	296	NA	NA
Price, dollars per ton, granulated pentahydrate borax in bulk, carload, works[2]	250	304	324	324	375
Stocks, yearend[3]	NA	NA	NA	NA	NA
Employment, number	900	900	900	900	900
Net import reliance[4] as a percent of apparent consumption	E	E	E	E	E

Recycling: Insignificant.

Import Sources (1992-95): Borax: Turkey, 98%; Chile, 1%; and other, 1%.
Boric acid: Italy, 56%; Chile, 32%; Turkey, 6%; and other, 6%.
Colemanite: Turkey, 98%; Peru, 1%; and other, 1%.
Ulexite: Turkey, 97%; and, Chile, 3%.

Tariff: Item	Number	Most favored nation (MFN) 12/31/96	Non-MFN[5] 12/31/96
Borates:			
Refined borax:			
Anhydrous	2840.11.0000	0.3% ad val.	1.2% ad val.
Other	2840.19.0000	0.1% ad val.	0.4% ad val.
Other	2840.20.0000	3.7% ad val.	25% ad val.
Perborates:			
Sodium	2840.30.0010	3.7% ad val.	25% ad val.
Other	2840.30.0050	3.7% ad val.	25% ad val.
Boric acids	2810.00.0000	1.5% ad val.	8.5% ad val.
Natural borates:			
Sodium	2528.10.0000	Free	Free.
Other:			
Calcium	2528.90.0010	Free	Free.
Other	2528.90.0050	Free	Free.

Depletion Allowance: Borax 14% (Domestic), 14% (Foreign).

Government Stockpile: None.

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Events, Trends, and Issues: The United States was the world's second largest producer of boron compounds during 1996 and exported about one-half of domestic production. Exported materials competed with borax, boric acid, colemanite, and ulexite primarily from Turkey, the largest producer of boron ore in the world.

Imports of borates from northern Chile continued. Ulexite is mined in Chile for the production of boric acid, synthetic colemanite, and refined ulexite for use in ceramics, insulating and reinforcing fiberglass, and agriculture.

One company sold its electric and steam generating facility in California to a local utility company for $70 million. The net proceeds from the sale were used to reduce debt. The company leased the facilities for a term of 15 years. Electricity and steam produced were used to produce soda products and boron chemicals.

World Production, Reserves, and Reserve Base:[6]

	Production—all forms		Reserves[7]	Reserve base[7]
	1995	1996[e]		
United States	800	900	40,000	80,000
Argentina	140	140	2,000	9,000
Bolivia	10	10	4,000	19,000
Chile	90	90	8,000	41,000
China	140	140	27,000	36,000
Iran	1	1	1,000	1,000
Kazakstan	80	80	14,000	15,000
Peru	27	30	4,000	22,000
Turkey	1,100	1,200	30,000	150,000
World total (may be rounded)	2,400	2,500	170,000	420,000

World Resources: Large domestic resources 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. World resources are adequate to supply demand at current rates for the foreseeable future.

Substitutes: Substitution for boron materials is possible in applications such 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 the use of chlorine bleach or enzymes. Some enamels use other glass producing substances, such as phosphates. Insulation substitutes include foams and mineral wools.

[e]Estimated. E Net exporter. NA Not available.

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

[2]Chemical Marketing Reporter.

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

[4]Defined as imports - exports + adjustments for Government and industry stock changes.

[5]See Appendix B.

[6]Gross weight of ore in thousand metric tons.

[7]See Appendix C for definitions.