

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 1997 was \$503 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, accounted for the majority of 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 estimated distribution pattern for boron compounds consumed in the United States in 1997 was as follows: Glass products, 56%; agriculture, 7%; fire retardants, 6%; soaps and detergents, 5%; and other, 26%.

Salient Statistics—United States:	1993	1994	1995	1996	1997^e
Production ¹	574	550	728	581	622
Imports for consumption, gross weight:					
Borax	40	9	9	NA	NA
Boric acid	17	20	16	18	NA
Colemanite	90	27	45	NA	NA
Ulexite	149	120	153	NA	NA
Exports, gross weight of boric acid and refined borates	481	498	588	381	NA
Consumption: Apparent	481	389	312	234	NA
Reported	321	296	NA	NA	NA
Price, dollars per ton, granulated pentahydrate borax in bulk, carload, works ²	304	324	324	375	340
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 (1993-96): Boric acid: Chile, 36%; Italy, 25%; Turkey, 24%; and other, 15%.

Tariff: Item	Number	Most favored nation (MFN) 12/31/97	Non-MFN⁵ 12/31/97
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 largest producer of boron compounds during 1997 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.

A domestic company in California celebrated 125 years of sustained development. The Chairman and Chief Operating Officer of the company was installed by the Governor of California as manufacturer of the year for 1997. The company continues to improve methods by which overall production costs are contained, global distribution is effected, and reliability of supply is ensured. The company has developed a process to reclaim borates content of tailings, estimated to be about 10% boron oxide content. In addition to the benefit of reclaiming the boron content, about 350 hectares of land will be reclaimed and restored to natural desert habitat over the next 20 years.

The in-situ borate project produced synthetic calcium borate product that was being tested for usage in the glass industry.

The only domestic underground operation increased production during the year.

World Production, Reserves, and Reserve Base:⁶

	Production—all forms		Reserves ⁷	Reserve base ⁷
	1996	1997 ^e		
United States	1,150	1,200	40,000	80,000
Argentina	245	240	2,000	9,000
Bolivia	7	10	4,000	19,000
Chile	90	90	8,000	41,000
China	180	180	27,000	36,000
Iran	1	1	1,000	1,000
Kazakstan	80	80	14,000	15,000
Peru	30	30	4,000	22,000
Russia	220	220	40,000	100,000
Turkey	<u>1,200</u>	<u>1,200</u>	<u>30,000</u>	<u>150,000</u>
World total (may be rounded)	3,200	3,250	170,000	470,000

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.

^eEstimated. E Net exporter. NA Not available.

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

²Chemical Market Reporter.

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

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

⁵See Appendix B.

⁶Gross weight of ore in thousand metric tons.

⁷See Appendix D for definitions.