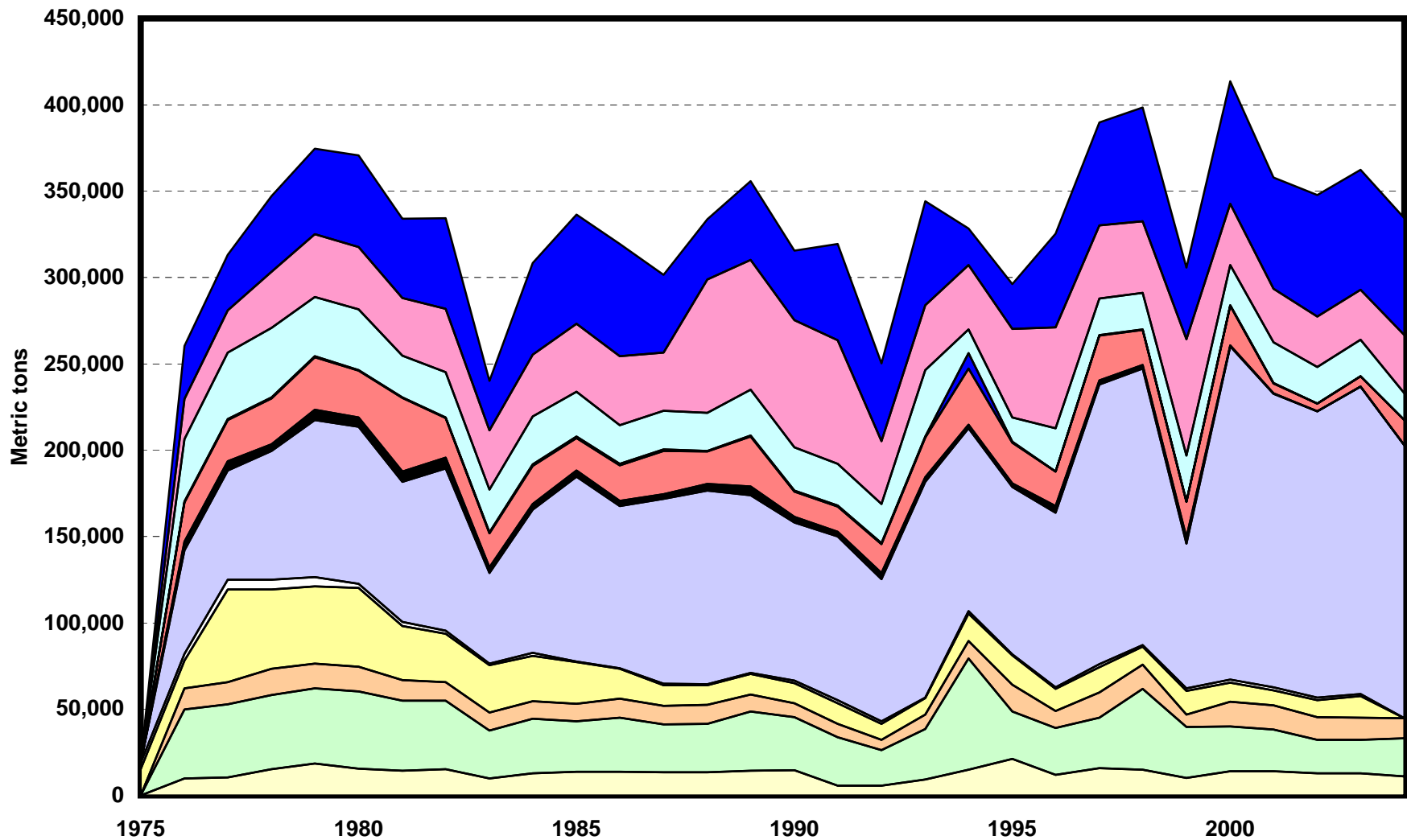


BORON END-USE STATISTICS¹
U.S. GEOLOGICAL SURVEY
 [Metric tons of boron oxide content]
 Last modification: September 15, 2005

Year	Agriculture	Borosilicate glass	Enamels, frits, glazes	Fire retardants		Insulation-grade glass	Metallurgy	Miscellaneous uses	Nuclear applications	Soaps and detergents	Sold to distributors (end use unknown)	Textile-grade glass fibers	Reported consumption	Undistributed	Apparent consumption
				Cellulosic insulation	Other retardants										
1975	9,710	40,200	12,200	15,300	3,610	59,900	4,990	22,700	555	36,300	23,300	30,500	259,000	183,000	442,000
1976	10,300	42,500	12,900	16,100	3,810	63,300	5,270	24,000	586	38,400	24,600	32,200	275,000	192,000	467,000
1977	15,200	43,100	15,200	53,600	5,570	74,400	3,810	26,700	586	40,100	32,500	43,900	354,000	198,000	552,000
1978	18,500	43,400	14,400	45,700	5,860	91,100	5,860	30,500	586	34,300	36,300	49,500	375,000	213,000	588,000
1979	15,500	44,800	14,400	44,800	5,270	91,100	5,270	27,200	293	35,200	36,000	53,000	372,000	214,000	586,000
1980	14,200	40,600	12,100	45,500	2,360	81,100	5,990	42,500	454	24,100	33,500	45,700	348,000	128,000	476,000
1981	15,100	39,900	10,600	31,100	2,540	93,900	6,170	23,000	363	26,400	36,700	52,200	338,000	196,000	534,000
1982	9,800	27,800	10,300	28,100	1,720	52,400	3,080	19,900	635	24,500	34,500	28,700	241,000	195,000	436,000
1983	12,900	31,400	10,200	27,400	1,180	82,900	3,450	21,900	998	27,600	35,800	53,300	309,000	159,000	468,000
1984	13,600	29,400	10,100	26,400	1,590	107,000	3,750	18,700	1,000	26,000	39,200	63,400	340,000	4,000	344,000
1985	13,600	31,400	11,200	24,100	270	93,900	3,000	20,400	987	22,300	40,000	65,100	326,000	-34,000	292,000
1986	13,400	27,900	10,700	17,200	378	107,000	2,800	25,000	979	22,200	33,800	45,000	307,000	-22,000	285,000
1987	13,400	28,000	11,200	11,800	966	112,000	3,830	18,800	535	22,000	77,200	34,900	334,000	-1,000	333,000
1988	14,400	34,100	9,920	11,200	641	103,000	5,180	28,800	679	26,400	75,400	45,400	355,000	215,000	570,000
1989	14,600	30,600	8,150	11,900	509	91,700	3,040	14,700	611	25,100	73,500	40,500	315,000	-85,000	230,000
1990	5,790	27,900	7,880	11,700	1,400	95,100	2,550	14,600	546	24,200	71,700	55,700	319,000	-10,000	309,000
1991	5,710	20,500	5,880	11,700	1,770	82,400	3,520	16,700	546	22,800	36,300	45,100	253,000	84,000	337,000
1992	9,190	29,300	8,230	9,450	1,390	125,000	2,620	23,100	455	38,500	37,600	60,200	345,000	-47,000	298,000
1993	14,800	64,500	10,300	9,670	286	106,000	1,870	32,600	8,870	13,800	37,200	21,300	321,000	86,000	407,000
1994	21,200	27,400	15,400	15,800	1,360	97,000	1,950	23,800	395	14,000	51,300	26,000	296,000	24,000	320,000
1995	12,000	27,200	9,650	17,200	472	101,000	3,790	20,000	123	24,900	58,600	54,200	329,000	149,000	478,000
1996	15,800	29,300	14,600	12,800	1,060	162,000	2,210	25,900	291	21,200	42,300	59,700	387,000	66,000	453,000
1997	14,900	46,900	14,000	14,700	1,720	160,000	2,020	20,300	291	21,200	41,500	66,000	403,000	23,000	426,000
1998	10,200	29,500	7,090	10,500	882	83,600	3,790	20,400	297	26,600	67,300	41,500	303,000	98,000	401,000
1999	14,000	25,900	14,400	13,700	1,610	193,000	552	22,800	454	23,200	35,400	71,100	416,000	61,000	477,000
2000	13,900	24,400	13,800	10,900	1,980	170,000	488	5,430	454	23,600	30,900	64,500	360,000	-8,000	352,000
2001	12,700	19,600	13,000	8,760	1,650	166,000	0	4,460	0	21,000	29,200	70,400	347,000	118,000	465,000
2002	12,900	19,300	12,700	9,790	1,480	178,000	39	6,010	0	20,900	29,100	69,300	359,000	125,000	484,000
2003	11,000	22,000	11,800	12,700	1,230	158,000	14	14,600	0	15,400	33,700	67,800	348,000	184,000	532,000

¹Compiled by G.R. Matos and P.A. Lyda;

End Uses of Boron



- | | | |
|-------------------------|--|------------------------------|
| □ Agriculture | □ Borosilicate glass | □ Enamels, frits, glazes |
| □ Cellulosic insulation | □ Other retardants | □ Insulation-grade glass |
| ■ Metallurgy | ■ Miscellaneous uses | ■ Nuclear applications |
| □ Soaps and detergents | ■ Sold to distributors (end use unknown) | ■ Textile-grade glass fibers |

Boron End-Use Worksheet Notes

Data Sources

The sources of data for the boron end-use worksheet are the Minerals Yearbook, an annual collection, compilation, and analysis of mineral industry data, published by the U.S. Bureau of Mines and the U.S. Geological Survey, and the Minerals Facts and Problems, a publication of the U.S. Bureau of Mines.

End Use

End use is defined as the use of the mineral commodity in a particular industrial sector or product. For boron, end-use categories are agriculture, borosilicate glasses, enamels, frits, glazes, fire retardants (cellulosic insulation and other), insulation-grade glass fibers, metallurgy, miscellaneous uses, nuclear applications, soaps and detergents, sold to distributors (end-use unknown), and textile-grade glass fibers. The undistributed category is the difference between apparent consumption and reported consumption, which is the sum of sold or used by boron producers. It reflects trade, stocks changes, and data not reported by end use.

The U.S. consumption of boron minerals and compounds by end use includes imports of borax, boric acid, colemanite, and ulexite.

End use for the year 1975 was estimated by applying the percent increase in gross domestic product for 1975, which is 5.6 percent, to the 1976 data. For the years 1995 and 1998, a linear trend was applied using the previous 10 years.

Boron is also an essential component of some steel and aluminum alloys. From 1999 to late 2003 there was a significant downturn in the use of boron in metallurgy probably as a consequence of the low-priced imports in the domestic iron and steel industry. Boron used in the nuclear category received a boost in 1993 with the construction of the nation's first facility to produce a borosilicate glass from solid nuclear waste.

Data are rounded to no more than three significant digits; data may not add to totals shown.

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Recommended Citation Format:

(1) If taken from CD version:

U.S. Geological Survey, [year of last update, e.g., 2005], [Mineral commodity, e.g., Gold] statistics, *in* Kelly, T.D., and Matos, G.R., comps., Historical statistics for mineral and material commodities in the United States: U.S. Geological Survey Data Series 140, one CD-ROM. (Also available online at <http://pubs.usgs.gov/ds/2005/140/>.)

(2) If taken from online version:

U.S. Geological Survey, [year of last update, e.g., 2005], [Mineral commodity, e.g., Gold] statistics, *in* Kelly, T.D., and Matos, G.R., comps., Historical statistics for mineral and material commodities in the United States: U.S. Geological Survey Data Series 140, available online at <http://pubs.usgs.gov/ds/2005/140/>. (Accessed [date].)

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