

# ANTIMONY

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Domestic consumption of primary antimony declined slightly in 1995, as did primary production. The antimony price continued its marked rise in early 1995 and then subsided somewhat towards midyear, ending the year at a high level by comparison with recent years.

Primary antimony metal and oxide were produced by six companies operating six plants using domestic and foreign feed material. Two plants were in Texas, and one each in Idaho, Montana, Nebraska, and New Jersey. Most domestic antimony smelter activity involved upgrading imported antimony oxide to higher purity. A small amount of antimony was recovered as a byproduct from the smelting of lead and silver-copper ores, but most primary antimony metal and oxide produced domestically originated from imports. The estimated value of primary antimony metal and oxide produced in 1995 was \$150 million. The estimated distribution of primary antimony uses was as follows: flame retardants, 57%; transportation, including batteries, 20%; chemicals, 10%; ceramics and glass, 8%; and other, 5%. (See tables 2, 3, and 4.)

Secondary antimony, produced from domestic scrap source materials, was derived mainly from recycled lead-acid batteries, although that market has been declining as a source of scrap antimony. U.S. Geological Survey (USGS) canvass scrap data are currently under review to better ascertain that amount. Recycling plus domestic mine output supplied less than one-half of the estimated domestic demand for antimony.

Antimony was mined as a principal product and produced as a byproduct of the smelting of base metal ores in 23 countries. It was estimated that China alone accounted for three-fourths of world mine production. Bolivia, China, Russia, and South Africa together accounted for more than 90% of mine production. Identified world antimony reserves at yearend 1995 were estimated to be 4.2 million metric tons.

## Legislation and Government Programs

Sales of antimony from the National Defense Stockpile (NDS) proceeded for the third consecutive year, following a prior 4-year hiatus. Sales were conducted on a sealed bid basis and were held by the Defense Logistics Agency on the third Thursday of January, June, October, November, and December. Each month a maximum of 454 tons of antimony, either Grade A or Grade B, was offered, usually in the form of ingots or cakes. In calendar 1995, a total of 1,131 tons was sold. Antimony is stockpiled in Government warehouses in 12 locations, with the Somerville, NJ, depot holding the largest amount.

## Production

**Mine Production.**—In the Coeur d' Alene District of Idaho, Sunshine Mining Co., the sole domestic producer, recovered antimony as a byproduct of the treatment of argentiferous tetrahedrite, a complex silver-copper-antimony sulfide ore. The company responded to the USGS voluntary canvass form.

**Smelter Production.**—The producers of primary antimony metal and oxide products were ASARCO Incorporated, Omaha, NE; Amspec Chemical Corp., Gloucester City, NJ; Anzon Inc., Laredo, TX; Laurel Industries Inc., La Porte, TX; Sunshine Mining Co., Kellogg, ID; and U.S. Antimony Corp., Thompson Falls, MT. All six primary smelters replied voluntarily to the USGS request for production data.

Old scrap, predominantly lead battery plates, was the source of almost all of the secondary antimony output. New scrap, mostly in the form of drosses and residues from various sources, supplied the remainder. Antimonial lead was the main market for scrap antimony.

## Consumption

Domestic consumption of primary antimony declined slightly in 1995. Most categories of consumption remained steady, but there was a moderate increase in the category of antimonial lead and a moderate decrease in the category of plastics. Lead-antimony alloys were used in starting-ignition batteries, ammunition, corrosion-resistant pumps and pipes, tank linings, roofing sheets, solder, cable sheaths, and antifriction bearings. Antimony compounds were used in plastics as stabilizers and as flame retardants. Antimony trioxide in an organic solvent was used to make textiles, plastics, and other combustibles flame resistant. Antimony was used as a decolorizing and refining agent in some forms of glass, such as optical glass.

Of the 196 companies to which a voluntary USGS canvass form was sent, 177 firms responded; consumption data for 19 firms were estimated.

## Prices

In 1995, antimony metal prices started to drift down from the peak established in late 1994, following the dramatic surge in prices that started in the spring of 1994. Reportedly, the major cause of the 1994-95 price surge was the extensive flooding in the regions of major antimony mining in China, which caused interruptions in production and delays in shipping. Although prices drifted downward somewhat through the year, the final price, \$2.00 to \$2.20 per pound, remained high compared with

the prices of recent years.

The New York dealers' antimony metal price, published by Platt's Metals Week, averaged \$2.28 per pound for the year, compared with \$1.78 per pound in 1994. The price range for high-tint antimony trioxide, published by American Metal Market, was \$3.50 to \$3.75 at the beginning of the year and finished the year at \$2.45 to \$2.55 per pound.

### **Foreign Trade**

Imports of antimony metal declined somewhat this year. China supplied about 72% of the antimony metal imports. Imports of antimony oxide also decreased somewhat this year, with China supplying about 37% of the imports. (*See tables 5, 6, 7, and 8.*)

### **Outlook**

Antimony demand declined slightly in 1995. The slight decline in demand occurred at a time of continuing high prices, indicating perhaps the strength of the underlying demand. The

major consumption category, flame retardants, experienced a modest decline, perhaps reflecting competitive inroads by tin oxide and other metal oxide substitutes. It is believed the overall flame retardant market should remain strong for some years.

It is anticipated that the reliance of the United States on imported antimony materials will continue, with China's dominance as a supplier of antimony being a continuing factor.

### **OTHER SOURCES OF INFORMATION**

#### **U.S. Geological Survey Publication**

Antimony. Ch. in Mineral Commodity Summaries, annual.

#### **U.S. Bureau of Mines Publications**

Antimony. Ch. in Mineral Facts and Problems, 1985 ed.

Antimony. Ch. in Minerals Yearbook, annual.

#### **Other Sources**

American Metal Market.

Engineering and Mining Journal.

Metal Bulletin (London).

Platt's Metals Week.

TABLE 1  
SALIENT ANTIMONY STATISTICS 1/

(Metric tons of antimony content unless otherwise specified)

	1991	1992	1993	1994	1995
United States:					
Production					
Primary:					
Mine (recoverable antimony)	W	W	W	W	W
Smelter	16,400	20,100	22,000 r/	25,500	23,500
Secondary 2/	NA	NA	NA	NA	NA
Exports of metal, alloys, waste and scrap	694	947	315	1,350	1,610
Exports of antimony oxide	3,750	4,820 3/	3,900 3/	6,500 3/	6,590 3/
Imports for consumption	28,800	31,200	30,900	41,500	36,600
Reported industrial consumption, primary antimony	11,900	12,200	12,400	14,800	14,300
Stocks: Primary antimony, all classes, Dec. 31	10,200	8,740	9,080	10,900	10,600
Price: Average, cents per pound 4/	82.0	79.0	76.9	177.7	227.8
World: Mine production	92,400 r/	76,100	87,800 r/	108,000	103,000 e/

e/ Estimated. r/ Revised. NA Not available. W Withheld to avoid disclosing company proprietary data.

1/ Data are rounded to three significant digits, except prices.

2/ Data under review.

3/ Antimony content as calculated by the U.S. Geological Survey.

4/ New York dealer price for 99.5% to 99.6% metal, c.i.f. U.S. ports.

TABLE 2  
REPORTED INDUSTRIAL CONSUMPTION OF PRIMARY ANTIMONY  
IN THE UNITED STATES 1/

(Metric tons of antimony content)

Year	Class of material consumed			Total
	Metal	Oxide	Other 2/	
1994	2,560 r/	12,100	124	14,800
1995	2,850	11,400	106	14,300

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes sulfide and residues.

TABLE 3  
REPORTED INDUSTRIAL CONSUMPTION OF PRIMARY  
ANTIMONY IN THE UNITED STATES, BY PRODUCT 1/

(Metric tons of antimony content)

Product	1994	1995
Metal products:		
Antimonial lead	1,990	2,230
Bearing metal and bearings	36	53
Solder	183 r/	192
Other 2/	1,520	1,290
Total	3,740 r/	3,760
Nonmetal products:		
Ammunition primers	32	19
Ceramics and glass	980	1,080
Pigments	369	492
Plastics	1,030	1,090
Other 3/	77	85
Total	2,490	2,770
Flame-retardants:		
Adhesives	356 r/	263
Plastics	6,690 r/	6,050
Rubber	433	443
Textiles	466	379
Other 4/	622	657
Total	8,570 r/	7,790
Grand total	14,800	14,300

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes ammunition, cable covering, castings, sheet and pipe, and type metal.

3/ Includes fireworks and rubber products.

4/ Includes paper and pigments.

TABLE 4  
INDUSTRY STOCKS OF PRIMARY ANTIMONY  
IN THE UNITED STATES, DECEMBER 31 1/

(Metric tons of antimony content)

Type of material	1994	1995
Metal	2,770	2,450
Oxide	5,000 r/	4,450
Other 2/	3,170	3,680
Total	10,900	10,600

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes ore and concentrate, sulfide and residues.

TABLE 5  
U.S. EXPORTS OF ANTIMONY METAL, ALLOYS, AND  
WASTE AND SCRAP, BY COUNTRY 1/

Country	1994		1995	
	Gross weight (metric tons)	Value (thousands)	Gross weight (metric tons)	Value (thousands)
Canada	79	\$205	178	\$482
Mexico	360	1,450	672	994
Netherlands	92	574	162	569
Spain	--	--	209	994
Taiwan	470	3,410	138	1,090
United Kingdom	78	153	112	164
Other	270 r/	1,680 r/	140	718
Total	1,350	7,470	1,610	5,010

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: Bureau of the Census.

TABLE 6  
U.S. EXPORTS OF ANTIMONY OXIDE, BY COUNTRY 1/

Country	1994			1995		
	Gross weight (metric tons)	Antimony content 2/ (metric tons)	Value (thousands)	Gross weight (metric tons)	Antimony content 2/ (metric tons)	Value (thousands)
Australia	254	211	\$349	54	45	\$216
Brazil	359	298	760	572	475	578
Canada	2,040	1,690	4,250	1,890	1,570	6,140
Colombia	288	239	393	436	362	730
Germany	129	107	129	12	10	63
Indonesia	5	4	39	192	159	303
Italy	245	203	327	254	211	633
Japan	721	598	1,760	1,050	873	2,600
Korea, Republic of	48	40	95	153	127	502
Mexico	1,390	1,150	1,620	875	726	1,860
Netherlands	477	396	659	18	15	60
Singapore	927	769	2,140	735	610	1,980
Taiwan	150	125	850	885	735	1,320
Turkey	333	276	484	95	79	265
United Kingdom	205	170	609	358	297	1,740
Other	268 r/	223 r/	575 r/	361	299	965
Total	7,840	6,500	15,000	7,940	6,590	19,900

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Antimony content as calculated by the U.S. Geological Survey.

Source: Bureau of the Census.

TABLE 7  
U.S. IMPORTS FOR CONSUMPTION OF ANTIMONY, BY CLASS AND COUNTRY 1/

Country	1994			1995		
	Gross weight (metric tons)	Antimony content 2/ (metric tons)	Value (thousands)	Gross weight (metric tons)	Antimony content 2/ (metric tons)	Value (thousands)
<b>Antimony ore and concentrate:</b>						
Australia	--	--	--	245	201	\$403
Bolivia	3,660	3,000	\$8,970	2,500	2,050	11,000
Canada	1,310	381	808	1,550	481	1,140
China	608	526	1,720	1,260	1,060	3,920
Ecuador	--	--	--	110	90	221
Kyrgyzstan	1,180	966	3,590	278	228	1,210
United Kingdom	807	661	1,610	--	--	--
Other	113	99	174	196	141	415
Total	7,680	5,640	16,900	6,140	4,260	18,300
<b>Antimony oxide:</b>						
Belgium	1,010	834	4,310	1,120	926	6,270
Bolivia	3,210	2,660	4,880	2,080	1,720	5,650
China	7,960	6,610	22,200	6,780	5,630	26,900
France	274	228	857	240	199	1,520
Germany	154	128	1,740	183	152	3,120
Hong Kong	170	141	357	170	141	834
Kyrgyzstan	1,050	870	2,370	753	625	2,630
Mexico	3,930	3,260	2,670	3,720	3,080	1,700
South Africa	3,200	2,650	925	3,180	2,640	886
United Kingdom	247	205	883	133	110	947
Other	111	93	629	225	188	1,390
Total	21,300	17,700	41,800	18,600	15,400	51,800

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Antimony content of ore and concentrate as reported; antimony content of oxide as calculated by the U.S. Geological Survey.

Source: Bureau of the Census.

TABLE 8  
U.S. IMPORTS FOR CONSUMPTION OF ANTIMONY METAL, BY COUNTRY 1/

Country	1994		1995	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Bolivia	375	\$1,410	255	\$1,010
Canada	45	281	120	371
Chile	72	101	20	78
China	15,500 2/	50,500 2/	12,100	50,600
Hong Kong	268	701	841	2,250
Kyrgyzstan	291	1,350	1,880	4,050
Japan	72 2/	4,340 2/	23	942
Mexico	1,070	582	1,630	1,180
Thailand	178	520	20	64
United Kingdom	192	1,060	20	251
Other	151 r/	796 r/	1	168
Total	18,200	61,700	16,900	60,900

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Bureau of the Census was unable to verify data..

Source: Bureau of the Census.

TABLE 9  
ANTIMONY: WORLD MINE PRODUCTION, BY COUNTRY 1/ 2/

(Metric tons)

Country	1991	1992	1993	1994	1995 e/
Australia e/ 3/	1,500	1,701 4/	1,700	1,700	1,700
Bolivia	7,287	6,022	5,556 r/	7,050 r/	6,500
Canada 5/	469	948	673	750	665 4/
China e/	58,300	45,000	60,000	80,000	75,000
Czech Republic	XX	XX	250 e/	--	--
Czechoslovakia e/ 6/	1,000	1,000	XX	XX	XX
Guatemala	609	582	600 e/	600 e/	610
Kyrgyzstan e/	XX	3,000	2,500	2,500	2,500
Mexico 7/	1,469	1,200 e/	1,469	1,500 e/	1,500
Morocco 5/	168	197	180	175 r/	175
Namibia (content of sodium antimonate)	10	6	8	29 r/	--
Pakistan e/	11	12	--	--	6 4/
Peru (recoverable)	278	339 r/	240 r/	460 r/	460
Russia (recoverable) e/	XX	10,000	8,000	7,000	7,000
Slovakia e/	XX	XX	450	400	400
South Africa 5/	4,485	3,779	4,111	4,534 r/	4,500
Tajikistan e/	XX	1,500	1,200	1,000	1,000
Thailand (content of ore and concentrate) e/	60	270 r/	620	500	500
Turkey	288 r/	309	111 r/	75 r/	100
U.S.S.R. e/ 8/	16,000	XX	XX	XX	XX
United States	W	W	W	W	W
Yugoslavia 9/	350 e/	XX	XX	XX	XX
Zimbabwe 5/	160	254	95	65 r/	50
Total	92,400 r/	76,100	87,800 r/	108,000	103,000

e/ Estimated. r/ Revised. W Withheld to avoid disclosing company proprietary data; not included in "Total." XX Not applicable.

1/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Antimony content of ore unless otherwise indicated. Table includes data available through July 12, 1996.

3/ Antimony content of antimony ore and concentrate, lead concentrates, and lead-zinc concentrates.

4/ Reported figure.

5/ Antimony content of concentrate.

6/ Dissolved Dec. 31, 1992.

7/ Antimony content of ores for export plus antimony content of antimonial lead and other smelter products produced.

8/ Dissolved in Dec. 1991.

9/ Dissolved in Apr. 1992.