

Bismuth

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Exports of bismuth increased during the year; domestic consumption, domestic production, and imports of bismuth all declined in 1977. Consumption was 2.4 million pounds, the same as that of 1976. Exports increased to 95,334 pounds, a gain of 39% over the 1976 level. Imports declined 14% to 2.0 million pounds. The decline was attributed to reduced demand. The domestic producer price for bismuth continued its

downward trend of recent years: The price held firm at \$7.50 for the first half of the year, but by September had fallen to \$4.50 per pound where it remained through December. World bismuth mine production was 8.8 million pounds, an increase of 4% over that of 1976. The general pattern of production was unchanged from that of 1976.

Table 1.—Salient bismuth statistics
(Pounds)

	1973	1974	1975	1976	1977
United States:					
Consumption -----	2,906,219	2,283,978	1,406,021	2,410,584	2,379,635
Exports ¹ -----	151,053	329,926	128,893	68,488	95,334
Imports, general -----	2,683,671	1,893,744	1,331,173	2,328,051	2,013,333
Price: New York, average per pound (ton lots) -----	\$4.92	\$8.41	\$7.72	\$7.50	\$6.01
Stocks Dec. 31: Consumer -----	540,756	596,757	451,250	483,810	436,092
World: Production ² -----	8,205,000	10,631,000	[†] 8,776,000	[†] 8,532,000	8,844,000

¹Revised.

²Includes bismuth, bismuth alloys, and waste and scrap.

[†]Excludes the United States.

Legislation and Government Programs.—Government stocks of bismuth remained at 2,081,298 pounds, including 567,186 pounds in the national stockpile and 1,514,112 pounds in the supplemental stockpile. On October 7, 1977, the stockpile goals were reaffirmed by the President, including the goal of 771,000 pounds for bismuth. No action was taken to dispose of the 1,310,298 pounds of excess. Bismuth remained on the list of commodities eligible

for exploration assistance under the program administered by the U.S. Geological Survey's Office of Minerals Exploration. However, no funds were available in 1977 for exploration projects, and none has been available since fiscal year 1974.

Federal income tax laws under the Tax Reform Act of 1969 provided a percentage depletion allowance of 22% for domestic production and 14% for U.S. companies producing from foreign sources.

DOMESTIC PRODUCTION

Bismuth was produced almost entirely from the treatment of lead ores and bullion of both foreign and domestic origin. A single primary refinery operated by ASARCO Inc. at Omaha, Nebr., accounted for all primary U.S. production. A small quantity of

bismuth was also recovered by recycling secondary material at the United Refining and Smelting Co., Franklin Park, Ill. U.S. refinery production statistics are withheld to avoid disclosing company confidential data.

CONSUMPTION AND USES

Consumption of bismuth in the United States during 1977 was 2.4 million pounds, the same as the quantity consumed in 1976. Consumption in most categories was about

the same as that of 1976. Fusible alloys registered an increase of 18%, to 611,219 pounds. Experimental uses declined to 601 pounds from 8,756 pounds in 1976.

Table 2.—Bismuth metal consumed in the United States, by use
(Pounds)

Use	1976	1977
Fusible alloys	518,648	611,219
Metallurgical additives	455,940	461,573
Other alloys	20,263	18,617
Pharmaceuticals ¹	1,391,663	1,274,510
Experimental uses	8,756	601
Other uses	15,314	13,115
Total	2,410,584	2,379,635

¹Includes industrial and laboratory chemicals and cosmetics.

STOCKS

Consumer stocks at yearend totaled 436,092 pounds, a decline of 47,718 pounds

during the year. No data are available on producer or dealer stocks.

PRICES

The domestic producer price for refined bismuth was \$7.50 per pound at the beginning of 1977 and declined in several stages, ending the year at \$4.50 per pound. Dealer

quotations started the year at \$4.65 to \$4.80 per pound and ended the year at \$2.70 to \$2.80 per pound. Price weakness was evident throughout the year.

FOREIGN TRADE

Exports of bismuth in all forms rose to 95,334 pounds, an increase of 26,846 pounds over the 1976 figure. During 1977, bismuth was exported to 13 countries, with 5 countries receiving 95% of the total shipments.

The principal recipients were the Netherlands (47,479 pounds), Canada (17,648 pounds), the United Kingdom (11,657 pounds), India (9,686 pounds), and Belgium-Luxembourg (4,247 pounds).

Table 3.—U.S. exports of bismuth¹

Year	Gross weight (pounds)	Value
1974 -----	329,926	\$1,520,105
1975 ² -----	128,893	635,717
1976 ² -----	68,488	513,660
1977 -----	95,334	636,506

¹Includes bismuth, bismuth alloys, and waste and scrap.

²Adjusted by the Bureau of Mines.

General imports of metallic bismuth in 1977 totaled 2.0 million pounds, down 314,718 pounds compared with those of 1976. The imports were from Peru (31%), the United Kingdom and the Federal Republic of Germany (12% each), Chile (Bolivia) (10%), Japan and Mexico (9% each), the

Republic of Korea (8%), Belgium-Luxembourg (7%), and Canada (2%). Chile does not produce bismuth in any form; however, official U.S. statistics report Bolivian bismuth shipped, via a Chilean port, as originating in the intermediate nation.

Table 4.—U.S. general imports¹ of metallic bismuth, by country

Country	1976		1977	
	Quantity (pounds)	Value (thousands)	Quantity (pounds)	Value (thousands)
Belgium-Luxembourg -----	151,690	\$790	137,606	\$687
Canada -----	100,983	612	20,020	124
Chile -----	107,364	694	208,792	1,296
Germany, Federal Republic of -----	288,028	2,152	243,465	1,635
India -----	55,000	299	---	---
Italy -----	2,203	12	---	---
Japan -----	278,995	1,634	187,948	946
Korea, Republic of -----	177,666	970	156,784	499
Mexico -----	248,120	1,509	182,175	843
Peru -----	569,078	3,261	682,368	2,766
United Kingdom -----	307,818	2,037	244,175	1,442
Yugoslavia -----	41,106	184	---	---
Total -----	2,328,051	14,154	2,013,333	10,238

¹General imports and imports for consumption were the same in 1976 and 1977.

WORLD REVIEW

World production of bismuth in 1977 was essentially the same as in 1976. This was attributable primarily to the lack of full economic recovery throughout the world, especially in Europe and Japan. All of the major bismuth-producing countries produced at levels comparable with those in 1976.

Australia.—Mine production of bismuth in Australia rose nominally, from 1.4 million pounds in 1976 to 1.5 million pounds in 1977. Production continued to be less than maximum since copper mining by Peko-Wallsend Ltd. at Tennant Creek in the Northern Territory remained dormant. The main source of bismuth in Australia was a gold-bismuth bullion from the Mount Isa mine in Queensland, which was shipped through northern Europe for gold recovery;

the residue was then shipped forward to the United Kingdom for bismuth recovery and refining. Small amounts of bismuth were also shipped from Australia as byproducts in lead ores and concentrates; however, the bismuth assays were too low to be accountable for production purposes.

Bolivia.—Bolivian production of bismuth in 1977 was 1.4 million pounds, virtually the same output as in 1976. Most of the bismuth was either mined directly from high-grade deposits or produced from complex copper-tin ores. The new Corporación Minera de Bolivia (COMIBOL) refinery at Quechisla, Potosi, continued its production of high-purity refined bismuth. Bolivia's output ranks it among the top five countries in world bismuth production.

Canada.—Bismuth metal was produced

by two companies in Canada. The bismuth section of the Belledune plant of Brunswick Mining & Smelting Corp. Ltd. was largely inactive during 1977 due to the declining price of bismuth. Bismuth was also produced by Cominco Ltd. at its lead-zinc plant in Trail, British Columbia. Most bismuth produced in Canada came from Canadian ores, with small amounts derived from imported ores. Under a new agreement with Sullivan Mining Group, Billiton Exploration Canada will conduct an extensive feasibility study of the Sullivan-owned tungsten-bismuth-molybdenum project in the Mount Pleasant area of southern New Brunswick.

Mexico.—Production of bismuth in Mexi-

co was 1.3 million pounds, up slightly from the 1976 output. The two companies that produced bismuth were Industrial Minera Mexico, S.A., at its Chihuahua, Chihuahua plant, and Met Mex Peñoles, S.A., which in 1977 moved its bismuth production from Monterrey to its new lead refinery in Torreon, Coahuila.

Peru.—Bismuth production in Peru continued at a steady level, totaling 1.3 million pounds in 1977. Bismuth was produced at the Oroya works, managed by Centromin-Peru, and marketed worldwide by Minero Peru Comercial.

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Table 5.—Bismuth: World mine production, by country
(Thousand pounds)

Country ¹	1975	1976	1977 ^P
Argentina (in ore) -----	^R 1	--	--
Australia (in concentrates) -----	^R 1,861	1,398	1,455
Bolivia -----	² 1,348	1,349	^E 1,350
Canada -----	345	286	310
China, People's Republic of (in ore) ³ -----	550	550	550
France (metal) -----	123	139	^E 145
Germany, Federal Republic of (in ore) ³ -----	23	23	23
Japan (metal) -----	^R 1,436	1,501	^E 1,523
Korea, Republic of (metal) -----	249	384	^E 400
Mexico ³ -----	^R 1,003	1,228	^E 1,260
Mozambique ^E -----	9	--	--
Peru ³ -----	1,354	1,149	1,300
Romania (in ore) ^E -----	180	180	180
Sweden (in ore) ^E -----	33	33	33
Uganda (in ore) ^E -----	9	10	7
U.S.S.R. (metal) ^E -----	130	130	145
United States -----	W	W	W
Yugoslavia -----	122	172	163
Total -----	^R 8,776	8,532	8,844

^EEstimate. ^PPreliminary. ^RRevised. W Withheld to avoid disclosing individual company confidential data; not included in total.

¹In addition to the countries listed, Brazil, Bulgaria, German Democratic Republic, and the Territory of South-West Africa (Namibia) are believed to produce bismuth, but available information is inadequate for formulation of reliable estimates of output levels.

²Production by COMIBOL plus exports by medium and small mines.

³Bismuth content of refined metal, bullion, and alloys produced indigenously, plus recoverable bismuth content of domestic ores and concentrates exported for processing.