

COPPER

(Data in thousand metric tons of copper content, unless otherwise noted)

Domestic Production and Use: Domestic mine production in 1997 was essentially unchanged at 1.9 million metric tons valued at about \$4.6 billion. The five principal mining States, in descending order, Arizona, Utah, New Mexico, Nevada, and Montana, accounted for 98% of domestic production; copper was also recovered at mines in six other States. While copper was recovered at about 35 mines operating in the United States, 15 mines accounted for about 97% of production. Seven primary and 4 secondary smelters, 7 electrolytic and 6 fire refineries, and 15 solvent extraction-electrowinning facilities were operating at yearend. Refined copper and direct melt scrap were consumed at about 35 brass mills; 15 rod mills; and 600 foundries, chemical plants, and miscellaneous consumers. Copper and copper alloy products were consumed¹ in building construction, 43%; electric and electronic products, 24%; industrial machinery and equipment, 12%; transportation equipment, 12%; and consumer and general products, 9%.

Salient Statistics—United States:	1993	1994	1995	1996	1997^e
Production: Mine	1,800	1,850	1,850	1,920	1,920
Refinery: Primary ²	1,790	1,840	1,930	2,010	2,070
Secondary ³	460	392	352	333	350
Copper from all old scrap	543	500	442	428	420
Import for consumption:					
Ores and concentrates	37	82	127	72	50
Refined	343	470	429	543	570
All imports	637	763	808	924	920
Exports: Ores and concentrates	227	261	239	195	130
Refined	217	157	217	169	120
All exports	685	752	894	683	670
Consumption: Refined, reported	2,360	2,680	2,530	2,620	2,720
Apparent, primary and old scrap ⁴	2,510	2,690	2,540	2,830	2,830
Price, average, cents per pound:					
Domestic producer, cathode	91.6	111.0	138.3	109.0	108
London Metal Exchange, high-grade	86.8	104.6	133.1	104.0	104
Stocks, yearend, refined ⁵	153	119	163	146	250
Employment, mine and mill, thousands	13.3	13.1	13.8	13.2	13.3
Net import reliance ⁶ as a percent of apparent consumption	7	13	7	14	12

Recycling: Old scrap, converted to refined metal and alloys, provided 420,000 tons of copper, equivalent to 15% of apparent consumption. Purchased new scrap, derived from copper fabricating operations, yielded 930,000 tons of contained copper; 80% of the copper contained in new scrap was consumed at brass mills. Of the total copper recovered from scrap, copper smelters and refiners recovered 28%; ingot makers, 9%; brass mills, 58%; and miscellaneous manufacturers, foundries, and chemical plants, 5%. Copper in all old and new, refined or remelted scrap comprised 36% of U.S. copper supply.

Import Sources (1993-96): Unmanufactured: Canada, 48%; Chile, 22%; Mexico, 13%; and other, 17%. Refined copper comprised 57% of imports of unwrought copper.

Tariff: Item	Number	Most favored nation (MFN) 12/31/97	Canada 12/31/97	Mexico 12/31/97	Non-MFN⁷ 12/31/97
Unrefined copper; anodes	7402.00.0000	0.4% ad val. ⁸	Free	0.2% ad val. ⁸	6% ad val. ⁸
Refined and alloys; unwrought	7403.00.0000	1% ad val.	Free	Free	6% ad val.
Copper powder	7406.10.0000	2.2% ad val.	0.5% ad val.	Free	49% ad val.
Copper wire (bare)	7408.11.6000	3.4% ad val.	0.4% ad val.	Free	28% ad val.

Depletion Allowance: 15% (Domestic), 14% (Foreign).

Government Stockpile: None. The stockpile of about 20,000 tons of refined copper was liquidated in 1993. The stockpile of about 8,100 tons of brass was liquidated in 1994.

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Events, Trends, and Issues: World mine production of copper rose significantly for the third consecutive year, increasing by about 3% in 1997. Most of the increase in production came from Chile, where an estimated 300,000 tons of new capacity came on-stream. In the United States, mine production and capacity were essentially unchanged. Increased production from a major new mine in Nevada, which began production in 1996, and a new solvent-extraction electrowinning (SX-EW) operation in Arizona, was offset by closure of two smaller mines in Arizona during 1996, and depletion of ore at a third mine in Wisconsin in 1997. Production also declined at several SX-EW operations where mining of leach ore was curtailed and production limited to existing heaps. Though domestic production of refined copper was projected to rise about 3% for the year, it remained well below capacity owing to a shortage of anode copper during the first half of the year. The smelter in Utah, which had been plagued by problems since commissioning in 1995, was closed for 6 weeks for replacement of anode casting equipment.

Copper supply remained tight for the first 6 months of 1997 and prices trended upward, the U.S. producer price averaging almost \$1.16 per pound. However, in July, commodity exchange inventories began to rise and prices declined. By the end of September, exchange inventories had more than doubled from yearend 1996 levels and the U.S. producer price had fallen to below \$1.00 per pound. In response to the rising copper price, recovery of copper from both old and new scrap increased during the first half of the year, but then fell in the second half as the price fell and a secondary smelter in Pennsylvania closed.

Consumption of refined copper in the United States was projected to rise about 4% in 1997 owing to strong demand for wire mill products. At least one major wire rod producer reported operating above design capacity during 1997, despite having expanded capacity during 1996. Worldwide, the current surplus of refined copper is projected to increase in 1998, as world mine capacity is expected to increase about 900,000 tons in that year.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ⁹	Reserve base ⁹
	1996	1997 ^e		
United States	1,920	1,920	45,000	90,000
Australia	525	520	7,000	23,000
Canada	689	660	10,000	23,000
Chile	3,120	3,380	88,000	163,000
China	439	440	18,000	37,000
Congo (Kinshasa) ¹⁰	29	40	10,000	30,000
Indonesia	507	525	11,000	15,000
Kazakstan	250	230	14,000	20,000
Mexico	341	360	15,000	27,000
Peru	572	580	7,000	24,000
Poland	422	420	20,000	36,000
Russia	520	520	20,000	30,000
Zambia	334	350	12,000	34,000
Other countries	<u>1,330</u>	<u>1,360</u>	<u>40,000</u>	<u>75,000</u>
World total (rounded)	11,000	11,300	320,000	630,000

World Resources: Land-based resources are estimated at 1.6 billion tons of copper, and resources in deep-sea nodules are estimated at 0.7 billion tons.

Substitutes: Aluminum substitutes for copper in various products, such as electrical power cables, electrical equipment, automobile radiators, and cooling/refrigeration tubing. Titanium and steel are used in heat exchangers, and steel is used for artillery shell casings. Optical fiber substitutes for copper in some telecommunications applications. Plastics also substitute for copper in water pipe, plumbing fixtures, and many structural applications.

^eEstimated.

¹Some electrical components are included in each end use. Estimated after Copper Development Association, 1996.

²From both domestic and imported ores and concentrates.

³From both primary and secondary refineries.

⁴Defined as primary refined production + copper from old scrap converted to refined metal and alloys + refined imports - refined exports ± changes in refined stocks.

⁵Held by industry, the Commodity Exchange, Inc., and London Metal Exchange Ltd. warehouses in the United States.

⁶Defined as imports - exports + adjustments for Government and industry stock changes for refined copper.

⁷See Appendix B.

⁸Value of copper content.

⁹See Appendix D for definitions.

¹⁰Formerly Zaire.