COBALT

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

Domestic Production and Use: The United States did not mine or refine cobalt in 2002; however, negligible amounts of byproduct cobalt were produced as intermediate products from some mining operations. U.S. supply comprised imports, stock releases, and secondary materials, such as superalloy scrap, cemented carbide scrap, and spent catalysts. There were two domestic producers of extra-fine cobalt powder: One produced powder from imported primary metal, and another produced powder from cemented carbide scrap. In addition to the powder producers, six companies were known to be active in the production of cobalt compounds. Nearly 90 industrial consumers were surveyed on a monthly or annual basis. Data reported by these consumers indicate that approximately 51% of U.S. cobalt use was in superalloys, which are used primarily in aircraft gas turbine engines; 8% was in cemented carbides for cutting and wear-resistant applications; 19% was in various other metallic uses; and the remaining 22% was in a variety of chemical uses. The total estimated value of cobalt consumed in 2002 was $150 million.

Salient Statistics—United States:	1998	1999	2000	2001	2002[e]
Production:					
Mine	—	—	—	—	—
Secondary	3,080	2,720	2,550	2,740	2,700
Imports for consumption	7,670	8,150	8,770	9,410	9,400
Exports	1,680	1,550	2,630	3,210	2,100
Shipments from Government stockpile excesses	2,310	1,530	2,960	3,050	750
Consumption:					
Reported (includes secondary)	9,380	8,660	8,980	9,490	8,700
Apparent (includes secondary)	11,500	10,700	11,600	11,800	10,800
Price, average annual spot for cathodes, dollars per pound	21.43	17.02	15.16	10.55	6.90
Stocks, industry, yearend	1,000	1,160	1,180	1,370	1,300
Net import reliance[1] as a percentage of apparent consumption	73	75	78	77	75

Recycling: An estimated 2,700 tons of cobalt was recycled from purchased scrap in 2002. This represented 31% of estimated reported consumption for the year.

Import Sources (1998-2001): Cobalt content of metal, oxide, and salts: Finland, 23%; Norway, 19%; Russia, 12%; Canada, 10%; and other, 36%.

Tariff: Item	Number	Normal Trade Relations[2] 12/31/02
Unwrought cobalt, alloys	8105.20.3000	4.4% ad val.
Unwrought cobalt, other	8105.20.6000	Free.
Cobalt mattes and other intermediate products	8105.20.9000	Free.
Cobalt waste and scrap	8105.30.0000	Free.
Wrought cobalt and cobalt articles	8105.90.0000	3.7% ad val.
Chemical compounds:		
Cobalt oxides and hydroxides	2822.00.0000	0.1% ad val.
Cobalt sulfates	2833.29.1000	1.4% ad val.
Cobalt chlorides	2827.34.0000	4.2% ad val.
Cobalt carbonates	2836.99.1000	4.2% ad val.
Cobalt acetates	2915.23.0000	4.2% ad val.
Cobalt ores and concentrates	2605.00.0000	Free.

Depletion Allowance: 22% (Domestic), 14% (Foreign).

Government Stockpile: Sales of National Defense Stockpile cobalt began in March 1993. The Annual Materials Plan of the Defense Logistics Agency, U.S. Department of Defense, includes a cobalt disposal limit of 2,720 tons (6 million pounds) during fiscal year 2003.

	Stockpile Status—9-30-02[3]				
Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2002	Disposals FY 2002
Cobalt	6,640	214	6,640	2,720	1,210

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COBALT

Events, Trends, and Issues: World production of refined cobalt has steadily increased since 1993. Some of the increase has been from new operations and some has been from a net increase in production by established producers. During this period, sales of cobalt from the National Defense Stockpile and cobalt in recycled scrap have also contributed to supply.

World demand for cobalt is strongly influenced by general economic conditions and by demand from industries that consume large quantities of cobalt, such as superalloy melters and manufacturers of rechargeable batteries. In 2002, several factors reduced overall demand for cobalt, including continued weak economic conditions in major consuming countries such as the United States and Japan. Demand for superalloys was down from that in 2001, owing to a decrease in airplane deliveries to financially-stressed U.S. commercial airline companies and a decline in demand for land-based gas turbines for energy generation. By September, however, demand for cobalt from the rechargeable battery sector was reportedly improving from the low levels seen in 2001.

Since 1995, the general trend in cobalt prices has been downward. This trend is likely to continue unless supply is reduced or demand increases. By early October, the price of cobalt cathode had decreased to a range of $6.00 to $6.50 per pound, and as a result a cobalt refinery in Uganda was placed on care and maintenance. However, cobalt production from many other companies during the first half of 2002 was higher than that during the corresponding period in 2001. In most cases this was probably the result of increased production of copper or nickel, the primary metals produced at these operations.

World Mine Production, Reserves, and Reserve Base: Reserves and reserve base estimates for Congo (Kinshasa) have been increased significantly based on new information from that country. Reserves and reserve base estimates for Canada, Russia, and Zambia also have been revised based on new information.

	Mine production		Reserves[4]	Reserve base[4]
	2001	2002[e]		
United States	—	—	NA	860,000
Australia	6,200	6,600	1,300,000	1,600,000
Canada	5,300	5,300	90,000	300,000
Congo (Kinshasa)	4,700	4,000	3,400,000	4,700,000
Cuba	3,400	3,600	1,000,000	1,800,000
New Caledonia[5]	1,400	1,400	230,000	860,000
Russia[6]	3,800	4,600	250,000	350,000
Zambia	8,000	7,600	270,000	680,000
Other countries	3,800	3,800	150,000	1,600,000
World total (may be rounded)	36,700	36,900	6,700,000	13,000,000

World Resources: Identified cobalt resources of the United States are estimated to be about 1 million tons. Most of these resources are in Minnesota, but other important occurrences are in Alaska, California, Idaho, Missouri, Montana, and Oregon. With the exception of resources in Idaho and Missouri, any future cobalt production from these deposits would be as a byproduct of another metal. Identified world cobalt resources are about 15 million tons. The vast majority of these resources are in nickel-bearing laterite deposits, with most of the rest occurring in nickel-copper sulfide deposits hosted in mafic and ultramafic rocks in Australia, Canada, and Russia, and in the sedimentary copper deposits of Congo (Kinshasa) and Zambia. In addition, millions of tons of hypothetical and speculative cobalt resources exist in manganese nodules and crusts on the ocean floor.

Substitutes: Periods of high prices and concern about availability have resulted in various efforts to conserve, reduce, or substitute for cobalt. In many applications, further substitution of cobalt would result in a loss in product performance. Potential substitutes include barium or strontium ferrites, neodymium-iron-boron, or nickel-iron alloys in magnets; nickel, cermets, or ceramics in cutting and wear-resistant materials; nickel base alloys or ceramics in jet engines; nickel in petroleum catalysts; rhodium in hydroformylation catalysts; iron, manganese, or nickel in batteries; and manganese, iron, cerium, or zirconium in paints.

[e]Estimated. NA Not available. — Zero.

[1]Defined as imports - exports + adjustments for Government and industry stock changes.

[2]No tariff for Canada or Mexico.

[3]See Appendix B for definitions.

[4]See Appendix C for definitions.

[5]Overseas territory of France.

[6]Previously unavailable Russian data were used to estimate 2002 production, indicating that the estimate shown for 2001 understates actual production for that year.