

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 2009; 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 cemented carbide scrap, spent catalysts, and superalloy scrap. The sole U.S. producer of extra-fine cobalt powder, in Pennsylvania, used cemented carbide scrap as feed. Seven companies were known to produce cobalt compounds. In 2009, a cobalt plant in North Carolina ceased operations, and one plant in Ohio was placed on care-and-maintenance status. More than 60 industrial consumers were surveyed on a monthly or annual basis. Data reported by these consumers indicate that 49% of the cobalt consumed in the United States was used in superalloys, mainly in aircraft gas turbine engines; 9% in cemented carbides for cutting and wear-resistant applications; 15% in various other metallic applications; and 27% in a variety of chemical applications. The total estimated value of cobalt consumed in 2009 was \$270 million.

Salient Statistics—United States:	2005	2006	2007	2008	2009^e
Production:					
Mine	—	—	—	—	—
Secondary	2,030	2,010	1,930	1,930	1,700
Imports for consumption	11,100	11,600	10,300	10,700	7,300
Exports	2,440	2,850	3,100	2,850	2,500
Shipments from Government stockpile excesses	1,110	260	617	203	200
Consumption:					
Reported (includes secondary)	9,150	9,280	9,320	8,810	7,000
Apparent ¹ (includes secondary)	11,800	11,000	9,630	10,100	6,700
Price, average annual spot for cathodes, dollars per pound	15.96	17.22	30.55	39.01	18.00
Stocks, industry, yearend	1,190	1,180	1,310	1,160	1,160
Net import reliance ² as a percentage of apparent consumption	83	82	80	81	75

Recycling: In 2009, cobalt contained in purchased scrap represented an estimated 24% of cobalt reported consumption.

Import Sources (2005-08): Cobalt contained in metal, oxide, and salts: Norway, 19%; Russia, 17%; China, 12%; Canada, 10%; and other, 42%.

Tariff: Item	Number	Normal Trade Relations³ 12-31-09
Cobalt ores and concentrates	2605.00.0000	Free.
Chemical compounds:		
Cobalt oxides and hydroxides	2822.00.0000	0.1% ad val.
Cobalt chlorides	2827.39.6000	4.2% ad val.
Cobalt sulfates	2833.29.1000	1.4% ad val.
Cobalt carbonates	2836.99.1000	4.2% ad val.
Cobalt acetates	2915.29.3000	4.2% ad val.
Unwrought cobalt, alloys	8105.20.3000	4.4% ad val.
Unwrought cobalt, other	8105.20.6000	Free.
Cobalt mattes and other intermediate products; cobalt powders	8105.20.9000	Free.
Cobalt waste and scrap	8105.30.0000	Free.
Wrought cobalt and cobalt articles	8105.90.0000	3.7% ad val.

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

Government Stockpile: The disposal limit for cobalt for fiscal year 2010 was reduced to 454 tons.

Stockpile Status—9-30-09⁴

Material	Uncommitted inventory	Authorized for disposal	Disposal plan FY 2009	Disposals FY 2009
Cobalt	304	304	1,360	187

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Events, Trends, and Issues: The global economic downturn that began in late 2008 resulted in reduced demand for and supply of cobalt. During the first half of 2009, the world availability of refined cobalt (as measured by production and U.S. Government shipments) was 13% lower than that of the first half of 2008. The decrease was primarily because of a decline in 2009 production from China and the closure of a Zambian refinery in late 2008. During the second half of 2009, a labor strike at a company in Canada resulted in reduced production of refined cobalt from that country. Beginning in late 2008, production of cobalt-bearing concentrates and intermediates was impacted by cutbacks at numerous nickel operations and at some copper-cobalt operations in Congo (Kinshasa). Financing, construction, and startup of some proposed brownfield and greenfield projects that would add to future world cobalt supply were delayed by various factors, including global economic conditions and low cobalt, copper, and nickel prices.

The London Metal Exchange planned to launch a cobalt contract in February 2010. The global contract would trade in 1-metric-ton lots of minimum 99.3% cobalt with delivery to warehouses in Baltimore, Rotterdam, and Singapore.

China was the world's leading producer of refined cobalt, and much of its production was from cobalt-rich ore and partially refined cobalt imported from Congo (Kinshasa). In 2008, China became the leading supplier of cobalt imports to the United States.

World Mine Production and Reserves: Reserves for Cuba were revised downward based on resource information for various nickel operations published by industry sources.

	Mine production		Reserves ⁵
	2008	2009 ^e	
United States	—	—	33,000
Australia	6,100	6,300	1,500,000
Brazil	1,200	1,000	29,000
Canada	8,600	5,000	120,000
China	6,000	6,200	72,000
Congo (Kinshasa)	31,000	25,000	3,400,000
Cuba	3,200	3,500	500,000
Morocco	1,700	1,600	20,000
New Caledonia ⁶	1,600	1,300	230,000
Russia	6,200	6,200	250,000
Zambia	6,900	2,500	270,000
Other countries	3,400	3,200	180,000
World total (rounded)	75,900	62,000	6,600,000

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, as much as 1 billion tons of hypothetical and speculative cobalt resources may exist in manganese nodules and crusts on the ocean floor.

Substitutes: In some applications, 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; cerium, iron, lead, manganese, or vanadium in paints; cobalt-iron-copper or iron-copper in diamond tools; iron-cobalt-nickel, nickel, cermets, or ceramics in cutting and wear-resistant materials; iron-phosphorous, manganese, nickel-cobalt-aluminum, or nickel-cobalt-manganese in lithium-ion batteries; nickel-based alloys or ceramics in jet engines; nickel in petroleum catalysts; and rhodium in hydroformylation catalysts.

^eEstimated. — Zero.

¹The sum of U.S. net import reliance and secondary production, as estimated from consumption of purchased scrap.

²Defined as imports – exports + adjustments for Government and industry stock changes.

³No tariff for Canada or Mexico. Tariffs for other countries for some items may be eliminated under special trade agreements.

⁴See Appendix B for definitions.

⁵See Appendix C for definitions. Reserve base estimates were discontinued in 2009; see Introduction.

⁶Overseas territory of France.