

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 2010; however, negligible amounts of byproduct cobalt were produced as intermediate products from some mining operations. U.S. supply comprised imports, stock releases, and secondary (scrap) materials. The sole U.S. producer of extra-fine cobalt powder, in Pennsylvania, used cemented carbide scrap as feed. Six companies were known to produce cobalt compounds. 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; 7% in cemented carbides for cutting and wear-resistant applications; 15% in various other metallic applications; and 29% in a variety of chemical applications. The total estimated value of cobalt consumed in 2010 was \$440 million.

Salient Statistics—United States:	2006	2007	2008	2009	2010^e
Production:					
Mine	—	—	—	—	—
Secondary	2,010	1,930	1,930	1,790	2,000
Imports for consumption	11,600	10,300	10,700	7,680	11,000
Exports	2,850	3,100	2,850	2,440	2,800
Shipments from Government stockpile excesses	260	617	203	180	—
Consumption:					
Reported (includes secondary)	9,280	9,320	8,810	7,460	8,500
Apparent ¹ (includes secondary)	11,000	9,630	10,100	7,520	10,000
Price, average annual spot for cathode, dollars per pound	17.22	30.55	39.01	17.86	21.00
Stocks, yearend:					
Industry	1,180	1,310	1,160	840	880
LME, U.S. warehouse	XX	XX	XX	XX	30
Net import reliance ² as a percentage of apparent consumption	82	80	81	76	81

Recycling: In 2010, cobalt contained in purchased scrap represented an estimated 24% of cobalt reported consumption.

Import Sources (2006–09): Cobalt contained in metal, oxide, and salts: Norway, 18%; Russia, 16%; China, 15%; Canada, 11%; and other, 40%.

Tariff: Item	Number	Normal Trade Relations³ 12-31-10
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:

Material	Stockpile Status—9-30-10⁴			
	Uncommitted inventory	Authorized for disposal	Disposal plan FY 2010	Disposals FY 2010
Cobalt	301	301	454	6

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Events, Trends, and Issues: During 2009 and into 2010, global economic conditions began to improve, which resulted in increased demand for and supply of cobalt. During the first half of 2010, the world availability of refined cobalt (as measured by production and U.S. Government shipments) was 49% higher than that of the first half of 2009. China showed the largest increase in production; production from Congo (Kinshasa), Japan, and Zambia also increased significantly. In the next few years, global increases in supply from existing producers and new projects are forecast to outpace increases in consumption. If an oversupply of cobalt takes place, it could lead to a downward trend in prices.

The London Metal Exchange (LME) launched a cobalt contract in February 2010. The global contract traded in 1-metric-ton lots of minimum 99.3% cobalt metal with delivery to warehouses in Asia, Europe, and the United States. In early November, LME warehouses held approximately 200 tons of cobalt inventory worldwide.

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). China was a leading supplier of cobalt imports to the United States.

World Mine Production and Reserves: Reserves for Australia, Brazil, and China were revised based on information from those countries. Reserves for Canada, New Caledonia, and "Other countries" were revised based on company reports.

	Mine production		Reserves ⁵
	2009	2010 ^e	
United States	—	—	33,000
Australia	4,600	4,600	⁶ 1,400,000
Brazil	1,200	1,500	89,000
Canada	4,100	2,500	150,000
China	6,000	6,200	80,000
Congo (Kinshasa)	35,500	45,000	3,400,000
Cuba	3,500	3,500	500,000
Morocco	1,600	1,500	20,000
New Caledonia ⁷	1,000	1,700	370,000
Russia	6,100	6,100	250,000
Zambia	5,000	11,000	270,000
Other countries	3,700	4,700	740,000
World total (rounded)	72,300	88,000	7,300,000

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 for 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. XX Not applicable. — 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.

⁴[See Appendix B for definitions.](#)

⁵[See Appendix C for resource/reserve definitions and information concerning data sources.](#)

⁶Joint Ore Reserves Committee (JORC) compliant reserves for Australia were only about 290,000 tons.

⁷Overseas territory of France.