

COBALT

(Data in metric tons, cobalt content, unless otherwise specified)

Domestic Production and Use: In 2024, the Eagle Mine, a nickel-copper mine in Michigan, produced cobalt-bearing nickel concentrate, which was exported to Canada or overseas for processing. Mining activity at a cobalt-copper-gold mine in Idaho remained suspended in 2024 owing to low cobalt prices. Most U.S. cobalt supply consisted of imports and secondary (scrap) materials. About five companies in the United States produced cobalt chemicals. An estimated 51% of cobalt consumed in the United States was used in superalloys, mainly aircraft gas turbine engines; 25% in a variety of chemical applications; 15% in various other metallic applications; and 9% in cemented carbides for cutting and wear-resistant applications. The total estimated value of cobalt consumed in 2024 was \$260 million.

| Salient Statistics—United States: | 2020 | 2021 | 2022 | 2023 | 2024^e |
|--|-------------|-------------|-------------|-------------|-------------------------|
| Production: ^e | | | | | |
| Mine | 600 | 650 | 500 | 500 | 300 |
| Secondary ¹ | 2,010 | 1,800 | 1,920 | 2,030 | 2,000 |
| Imports for consumption | 9,740 | 9,790 | 10,500 | 9,500 | 11,000 |
| Exports | 3,430 | 4,930 | 5,360 | 5,110 | 4,500 |
| Consumption (includes secondary): | | | | | |
| Estimated ² | 7,260 | 7,270 | 7,570 | 7,840 | 8,000 |
| Apparent ^{e, 3} | 8,480 | 6,650 | 7,150 | 6,440 | 8,500 |
| Price, average, dollars per pound: | | | | | |
| U.S. spot, cathode ⁴ | 15.70 | 24.21 | 30.78 | 17.20 | 17 |
| London Metal Exchange (LME), cash | 14.21 | 23.17 | 28.83 | 15.48 | 12 |
| Stocks, yearend: | | | | | |
| Industry ^{e, 2, 5} | 952 | 1,010 | 946 | 925 | 900 |
| LME, U.S. warehouse | 82 | 50 | 34 | 34 | 34 |
| Net import reliance ⁶ as a percentage of apparent consumption | 76 | 73 | 73 | 69 | 76 |

Recycling: In 2024, cobalt content of purchased scrap represented 25% of estimated cobalt consumption.

Import Sources (2020–23): Metal, oxide, and salts: Norway, 27%; Finland, 17%; Japan, 14%; Canada, 13%; and other, 29%.

| Tariff: | Item | Number | Normal Trade Relations 12–31–24 |
|----------------|--|---------------|--|
| | Cobalt ores and concentrates | 2605.00.0000 | Free. |
| | Chemical compounds: | | |
| | Cobalt oxides and hydroxides | 2822.00.0000 | 0.1% ad valorem. |
| | Cobalt chlorides | 2827.39.6000 | 4.2% ad valorem. |
| | Cobalt sulfates | 2833.29.1000 | 1.4% ad valorem. |
| | Cobalt carbonates | 2836.99.1000 | 4.2% ad valorem. |
| | Cobalt acetates | 2915.29.3000 | 4.2% ad valorem. |
| | Unwrought cobalt, alloys | 8105.20.3000 | 4.4% ad valorem. |
| | 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 valorem. |

Depletion Allowance: 22% (domestic), 14% (foreign).

Government Stockpile:⁷

| Material | FY 2024 | | FY 2025 | |
|--|-----------------------------------|--------------------------------|-----------------------------------|--------------------------------|
| | Potential acquisitions | Potential disposals | Potential acquisitions | Potential disposals |
| Cobalt alloys, gross weight ⁸ | 200 | — | 60 | — |

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Events, Trends, and Issues: Global cobalt mine and refinery production were estimated to have increased to another record high in 2024. The increase in mine production was mainly in Congo (Kinshasa), the world's leading source of mined cobalt, which accounted for an estimated 76% of world cobalt mine production, followed by Indonesia, which accounted for 10%. China was the world's leading producer of refined cobalt and increased metal refining capacity throughout the year. The majority of China's refinery production was from partially refined cobalt imported from Congo (Kinshasa) and Indonesia. China was the world's leading consumer of cobalt, with the majority used by the lithium-ion battery industry. New production of mined and refined cobalt has led to excess global supply and lower cobalt prices. In 2024, the United States enacted tariff rate increases on cobalt ores and concentrates originating from China, as well as cobalt-containing products including electric vehicles and lithium-ion batteries.

World Mine Production and Reserves: Reserves for the United States, Canada, Indonesia, Papua New Guinea, and "Other countries" were revised based on company and Government reports.

| | Mine production ^e | | Reserves ⁹ |
|-----------------------------|------------------------------|---------|-------------------------|
| | 2023 | 2024 | |
| United States | 500 | 300 | 70,000 |
| Australia | 5,220 | 3,600 | ¹⁰ 1,700,000 |
| Canada | 4,220 | 4,500 | 220,000 |
| Congo (Kinshasa) | 175,000 | 220,000 | 6,000,000 |
| Cuba | 3,300 | 3,500 | 500,000 |
| Indonesia | 19,000 | 28,000 | 640,000 |
| Madagascar | 4,000 | 2,600 | 100,000 |
| New Caledonia ¹¹ | 2,570 | 1,500 | NA |
| Papua New Guinea | 3,070 | 2,800 | 62,000 |
| Philippines | 3,800 | 3,800 | 260,000 |
| Russia | 8,700 | 8,700 | 250,000 |
| Turkey | 2,500 | 2,700 | 91,000 |
| Other countries | 6,080 | 6,200 | 800,000 |
| World total (rounded) | 238,000 | 290,000 | 11,000,000 |

World Resources:⁹ Identified cobalt resources of the United States are estimated to be about 1 million tons. Most of these resources are in Minnesota. Other notable occurrences are in Alaska, California, Idaho, Michigan, Missouri, Montana, Oregon, and Pennsylvania. Identified world terrestrial cobalt resources are about 25 million tons. The vast majority of global resources are in sediment-hosted stratiform copper deposits in Congo (Kinshasa) and Zambia; nickel-bearing laterite deposits in Australia and nearby island countries and Cuba; and magmatic nickel-copper sulfide deposits of mafic and ultramafic rocks in Australia, Canada, Russia, and the United States.

Substitutes: Depending on the application, substitution for cobalt could result in a loss in product performance or increase cost. The cobalt contents of lithium-ion batteries, the leading global use for cobalt, are being reduced; cobalt-free substitutes that use iron and phosphorus held significant market share in China. Potential substitutes in other applications include barium or strontium ferrites, neodymium-iron-boron alloys, or nickel-iron alloys in magnets; cerium, iron, lead, manganese, or vanadium in paints; cobalt-iron-copper or iron-copper in diamond tools; copper-iron-manganese for curing unsaturated polyester resins; iron, iron-cobalt-nickel, nickel, ceramic-metallic composites (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; and titanium-base alloys in prosthetics.

^eEstimated, — Zero. NA Not available.

¹Estimated from consumption of purchased scrap.

²Includes reported data and U.S. Geological Survey estimates.

³Defined for 2020–22 as secondary production + imports – exports ± adjustments for Government and industry stock changes for refined cobalt. Beginning in 2023, Government stock changes no longer included.

⁴Source: S&P Global Platts Metals Week. Cobalt cathode is refined cobalt metal produced by an electrolytic process.

⁵Stocks held by consumers and processors; excludes stocks held by trading companies and held for investment purposes.

⁶Defined for 2020–22 as imports – exports ± adjustments for Government and industry stock changes for refined cobalt. Beginning in 2023, Government stock changes no longer included.

⁷See Appendix B for definitions.

⁸Samarium-cobalt alloy; excludes potential disposals of aerospace alloys.

⁹See Appendix C for resource and reserve definitions and information concerning data sources.

¹⁰For Australia, Joint Ore Reserves Committee-compliant or equivalent reserves were 610,000 tons.

¹¹Overseas territory of France.