

NICKEL

(Data in metric tons of nickel content unless otherwise noted)

Domestic Production and Use: In 2019, the underground Eagle Mine in Michigan produced approximately 14,000 tons of nickel in concentrate, which was exported to smelters in Canada and overseas. In October, the mine processed the first ore from the newly developed Eagle East extension. As part of the Superfund Redevelopment Initiative, a company in Missouri constructed a facility to recover metals, including nickel, from mine tailings. Nickel in crystalline sulfate was produced as a byproduct of smelting and refining platinum-group-metal ores mined in Montana.

In the United States, the leading uses for primary nickel are stainless and alloy steels, nonferrous alloys and superalloys, electroplating, and other uses including catalysts and chemicals. Domestic production of stainless steel was estimated to have decreased by approximately 10% in 2019. Consumption of nickel used in alloys for jet turbine engines continued to increase.

Salient Statistics—United States:	2015	2016	2017	2018	2019^e
Production:					
Mine	27,200	24,100	22,100	17,600	14,000
Refinery, byproduct	W	W	W	W	W
Imports:					
Ores and concentrates	24	(1)	64	3	—
Primary	130,000	111,000	150,000	144,000	120,000
Secondary	27,100	32,300	38,100	45,100	38,000
Exports:					
Ores and concentrates	25,400	22,400	20,000	² 19,000	19,000
Primary	9,610	10,300	11,000	9,780	13,000
Secondary	51,900	63,700	51,500	67,200	49,000
Consumption:					
Estimated, primary metal	110,000	98,000	100,000	110,000	110,000
Estimated, secondary	120,000	130,000	130,000	120,000	120,000
Apparent, primary metal ³	118,000	104,000	140,000	136,000	110,000
Apparent, total ⁴	234,000	235,000	273,000	259,000	230,000
Price, average annual, London Metal Exchange (LME):					
Cash, dollars per metric ton	11,831	9,594	10,403	13,114	14,000
Cash, dollars per pound	5.367	4.352	4.719	5.977	6.30
Stocks, yearend:					
Consumer	19,200	15,100	14,600	16,300	16,000
LME U.S. warehouses	4,212	5,232	3,780	2,268	2,000
Net import reliance ⁵ as a percentage of total apparent consumption					
	50	44	51	52	47

Recycling: Nickel in alloyed form was recovered from the processing of nickel-containing waste, including flue dust, grinding swarf, mill scale, and shot blast generated during the manufacturing of stainless steel; filter cakes, plating solutions, spent catalysts, spent pickle liquor, sludges, and all types of spent nickel-containing batteries. Nickel-containing alloys and stainless steel scrap were also melted and used to produce new alloys and stainless steel. In 2019, recycled nickel in all forms accounted for approximately 47% of apparent consumption.

Import Sources (2015–18): Nickel contained in ferronickel, metal, oxides, and salt: Canada, 41%; Norway, 11%; Australia, 8%; Finland, 8%; and other, 32%. Nickel-containing scrap, including nickel content of stainless-steel scrap: Canada, 38%; Mexico, 28%; United Kingdom, 9%; and other, 25%.

Tariff: Item	Number	Normal Trade Relations 12–31–19
Nickel ores and concentrates, nickel content	2604.00.0040	Free.
Ferronickel	7202.60.0000	Free.
Unwrought nickel, not alloyed	7502.10.0000	Free.
Nickel waste and scrap	7503.00.0000	Free.
Nickel powders	7504.00.0010	Free.
Nickel flakes	7504.00.0050	Free.

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

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Government Stockpile:⁶ The U.S. Department of Energy is holding nickel ingot contaminated by low-level radioactivity at Paducah, KY, and shredded nickel scrap at Oak Ridge, TN. Ongoing decommissioning activities at former nuclear defense sites were expected to generate additional nickel in scrap. See the Lithium chapter for statistics on lithium-nickel-cobalt-aluminum oxide.

Material	Inventory As of 9–30–19	FY 2019		FY 2020	
		Potential Acquisitions	Potential Disposals	Potential Acquisitions	Potential Disposals
Nickel alloys, gross weight	592	—	68	—	272

Events, Trends, and Issues: The Government of Indonesia decided to reinstate its ban on direct-shipping nickel ore beginning in January 2020, 2 years earlier than previously announced. The Government had relaxed enforcement of the ban in 2017 following rapid development of the country's nickel-processing capacity, primarily smelters producing nickel pig iron. The return to the regulation was reportedly in order to conserve ore for the domestic processing industry.

In January 2019, a company in Indonesia's Central Sulawesi Province broke ground on a project to produce nickel and cobalt for use in batteries. Globally, numerous idled facilities and delayed development projects resumed activity in anticipation of growing demand for nickel in electric vehicle batteries.

World Mine Production and Reserves: Reserves for Australia, Canada, and Russia were revised based on new information from company or Government reports.

	Mine production		Reserves ⁷
	2018	2019 ^e	
United States	17,600	14,000	110,000
Australia	170,000	180,000	⁸ 20,000,000
Brazil	74,400	67,000	11,000,000
Canada	176,000	180,000	2,600,000
China	110,000	110,000	2,800,000
Cuba	51,000	51,000	5,500,000
Indonesia	606,000	800,000	21,000,000
New Caledonia ⁹	216,000	220,000	NA
Philippines	345,000	420,000	4,800,000
Russia	272,000	270,000	6,900,000
Other countries	366,000	370,000	14,000,000
World total (rounded)	2,400,000	2,700,000	89,000,000

World Resources: Identified land-based resources averaging 1% nickel or greater contain at least 130 million tons of nickel, with about 60% in laterites and 40% in sulfide deposits. Extensive nickel resources also are found in manganese crusts and nodules on the ocean floor. The decline in discovery of new sulfide deposits in traditional mining districts has led to exploration in more challenging locations such as east-central Africa and the subarctic.

Substitutes: Low-nickel, duplex, or ultrahigh-chromium stainless steels are being substituted for austenitic grades in construction. Nickel-free specialty steels are sometimes used in place of stainless steel in the power-generating and petrochemical industries. Titanium alloys can substitute for nickel metal or nickel-base alloys in corrosive chemical environments. Lithium-ion batteries may be used instead of nickel metal hydride batteries in certain applications.

⁶Estimated. NA Not available. W Withheld to avoid disclosing company proprietary data. — Zero.

¹Less than ½ unit.

²Estimated. The U.S. Census Bureau reported that exports of nickel in ores and concentrates were 54,600 tons in 2018; all or part of these data have been referred to the U.S. Census Bureau for verification.

³Defined as primary imports – primary exports + adjustments for industry stock changes, excluding secondary consumer stocks.

⁴Defined as apparent primary metal consumption + estimated secondary consumption.

⁵Defined as imports – exports + adjustments for consumer stock changes.

⁶See Appendix B for definitions.

⁷See Appendix C for resource and reserve definitions and information concerning data sources.

⁸For Australia, Joint Ore Reserves Committee-compliant reserves were 5.4 million tons.

⁹Overseas territory of France.