

NICKEL

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

Domestic Production and Use: The only nickel smelter in the United States—a ferronickel operation near Riddle, OR—closed in April 1998 because of low nickel prices. The adjoining mine on Nickel Mountain has been idle since 1996. Limited amounts of byproduct nickel are recovered from copper and palladium-platinum ores mined in the western United States. On a monthly or annual basis, 154 facilities reported nickel consumption. The principal consuming State was Pennsylvania, followed by West Virginia, Illinois, and Ohio. Approximately 43% of the primary nickel consumed went into stainless and alloy steel production, 34% into nonferrous alloys and superalloys, 13% into electroplating, and 10% into other uses. Ultimate end uses were as follows: transportation, 29%; chemical industry, 13%; electrical equipment, 11%; construction, 8%; fabricated metal products, 7%; petroleum, 7%; household appliances, 6%; machinery, 6%; and other, 13%. Estimated value of apparent primary consumption was \$1.0 billion.

Salient Statistics—United States:	1996	1997	1998	1999	2000^o
Production: Mine	1,330	—	—	—	—
Plant	15,100	16,000	4,290	—	—
Shipments of purchased scrap: ¹	84,900	97,600	89,700	93,000	124,000
Imports: Ore	15,000	17,600	1,420	—	—
Primary	142,000	147,000	148,000	139,000	166,000
Secondary	8,060	11,000	8,500	9,480	12,600
Exports: Primary	13,100	16,400	8,440	7,430	7,920
Secondary	33,600	40,200	35,100	31,400	48,200
Consumption: Reported, primary	118,000	120,000	114,000	115,000	119,000
Reported, secondary	59,300	68,400	63,100	71,000	88,100
Apparent, primary	146,000	154,000	149,000	140,000	158,000
Price, average annual, London Metal Exchange:					
Cash, dollars per metric ton	7,501	6,927	4,630	6,011	8,613
Cash, dollars per pound	3.402	3.142	2.100	2.727	3.907
Stocks: Government, yearend	15,900	8,530	2,600	—	—
Consumer, yearend	13,500	16,100	15,800	9,790	10,600
Producer, yearend ²	13,300	12,600	13,100	12,700	12,900
Employment, yearend, number:					
Mine	8	7	7	1	1
Smelter	253	264	6	6	6
Port facility	23	22	1	1	1
Net import reliance ³ as a percent of apparent consumption	59	56	64	63	58

Recycling: About 88,000 tons of nickel was recovered from purchased scrap in 2000. This represented about 43% of reported consumption for the year.

Import Sources (1996-99): Canada, 39%; Norway, 15%; Russia, 13%; Australia, 10%; and other, 23%.

Tariff: Item	Number	Normal Trade Relations 12/31/00
Nickel oxide, chemical grade	2825.40.0000	Free.
Ferronickel	7202.60.0000	Free.
Nickel oxide, metallurgical grade	7501.20.0000	Free.
Unwrought nickel, not alloyed	7502.10.0000	Free.

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

Government Stockpile: On June 10, 1999, the U.S. Government sold the last of the nickel in the National Defense Stockpile. The Government held 33,800 tons of nickel in the stockpile when the sales program began on March 24, 1993. The U.S. Department of Energy is holding 6,000 tons of nickel scrap contaminated by low-level radioactivity.

Events, Trends, and Issues: Stainless steel accounts for two-thirds of primary nickel consumed in the world. U.S. demand for austenitic (i.e., nickel bearing) stainless steel was at an all-time high in 2000, with much of the increase being met by imports. Domestic steel producers continued to compete with importers by modernizing plants, adding new capacity, and consolidating less efficient operations. U.S. production of austenitic stainless steel exceeded 1.37 million tons in 2000, edging out the previous record of 1.36 million tons set in 1988. Imported steels accounted for 29% of total U.S. stainless steel consumption in 2000. The U.S. International Trade Commission issued several countervailing duty and antidumping rulings in 1999-2000 that temporarily slowed the surge in stainless steel imports.

NICKEL

World nickel demand continued to grow faster than supply in 2000, causing a gradual drawdown of stocks in warehouses approved by the London Metal Exchange (LME). Producer stock levels were relatively unchanged because mine production was at an all-time high. Resumption of economic growth in parts of East Asia and strong demand for stainless steel in the European Union and the Americas kept nickel prices from returning to the depressed levels of 1998. For the week ending December 1, 2000, the LME cash price for 99.8%-pure nickel averaged \$7,488 per metric ton (\$3.40 per pound). Since 1975, demand for stainless steel has grown at an average rate of 4.5% per year. This growth rate is projected to continue or accelerate over the next 20 years. Three laterite mines were commissioned in Western Australia in 1999. The nickel was being recovered onsite using advanced pressure acid leach (PAL) technology. At least three other Australian PAL projects were in varying stages of development. Competitors were considering employing PAL technology in Cuba, Indonesia, New Caledonia, and the Philippines. In Canada, development of the huge Voisey's Bay nickel-copper sulfide deposit near Nain was on hold. The project sponsor and the Provincial Government of Newfoundland and Labrador were unable to agree on critical concepts, and suspended negotiations in January 2000. Exploration crews will continue to carry out surface drilling and geophysical surveys around the deposit and in the rest of the Voisey's Bay district. Drilling crews are exploring several other promising districts in northern Canada—the Lac Rocher region southeast of James Bay, the Ungava Nickel Belt in northern Quebec, and an area in Manitoba northeast of the Thompson Nickel Belt.

Several automobile manufacturers were using nickel-metal hydride (Ni-MH) batteries to power their gasoline-electric hybrid and pure electric vehicles for the 2001 and 2002 model years. The hybrid automobile uses an electric motor to propel the vehicle in low-speed, stop-and-go city driving, and switches to an internal combustion engine for higher speeds. Some models have a regenerative braking system that recovers part of the vehicle's kinetic energy and converts it to electrical energy for later reuse by the motor. Japanese manufacturers of Ni-MH batteries consumed an estimated 22,000 tons of nickel in 1999.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ⁴	Reserve base ⁴
	1999	2000 ^e		
United States	—	—	43,000	2,500,000
Australia	126,000	168,000	11,000,000	18,000,000
Botswana	25,800	24,200	880,000	1,400,000
Brazil	43,784	43,900	670,000	6,000,000
Canada	188,218	194,000	6,600,000	15,000,000
China	50,100	51,900	3,700,000	7,900,000
Colombia	39,300	55,500	920,000	1,200,000
Cuba	64,407	68,700	5,700,000	23,000,000
Dominican Republic	39,500	44,700	670,000	1,300,000
Greece	16,050	20,900	450,000	900,000
Indonesia	89,100	93,500	3,200,000	13,000,000
New Caledonia	110,062	120,000	4,500,000	15,000,000
Philippines	8,450	20,700	410,000	11,000,000
Russia	260,000	265,000	6,600,000	7,300,000
South Africa	35,802	32,800	2,500,000	12,000,000
Venezuela	—	3,200	610,000	610,000
Zimbabwe	11,164	9,900	240,000	260,000
Other countries	12,400	9,300	450,000	12,000,000
World total (rounded)	1,120,000	1,230,000	49,000,000	150,000,000

World Resources: Identified land-based resources averaging 1% nickel or greater contain at least 130 million tons of nickel; about 60% is in laterites, and 40% is in sulfide deposits. In addition, extensive deep-sea resources of nickel are in manganese crusts and nodules covering large areas of the ocean floor, particularly in the Pacific Ocean.

Substitutes: With few exceptions, substitutes for nickel would result in increased cost or some tradeoff in the economy or performance of the product. Aluminum, coated steels, and plastics can replace stainless steel to a limited extent in many construction and transportation applications. Nickel-free specialty steels are sometimes used in place of stainless steel within the power generating, petrochemical, and petroleum industries. Titanium alloys or specialty plastics can substitute for nickel metal or nickel-based superalloys in some highly corrosive chemical environments.

^eEstimated.

¹Scrap receipts - shipments by consumers + exports - imports + adjustments for consumer stock changes.

²Stocks of producers, agents, and dealers held only in the United States.

³Defined as imports - exports + adjustments for Government and industry stock changes.

⁴See Appendix C for definitions.