

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—was decommissioned in 2000 after 45 years of operation. 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, 152 facilities reported nickel consumption. The principal consuming State was Pennsylvania, followed by West Virginia, Illinois, and Ohio. Approximately 39% of the primary nickel consumed went into stainless and alloy steel production, 38% into nonferrous alloys and superalloys, 13% into electroplating, and 10% into other uses. Ultimate end uses were as follows: transportation, 32%; chemical industry, 12%; electrical equipment, 11%; construction, 8%; fabricated metal products, 7%; petroleum, 6%; household appliances, 6%; machinery, 6%; and other, 12%. Estimated value of apparent primary consumption was \$758 million.

Salient Statistics—United States:	1997	1998	1999	2000	2001^e
Production: Mine	—	—	—	—	—
Plant	16,000	4,290	—	—	—
Shipments of purchased scrap: ¹	97,600	89,700	93,000	123,000	111,000
Imports: Ore	17,600	1,420	—	—	—
Primary	147,000	148,000	139,000	156,000	138,000
Secondary	11,000	8,500	9,480	10,700	15,800
Exports: Primary	16,400	8,440	7,440	8,150	9,040
Secondary	40,200	35,100	31,400	49,900	52,700
Consumption: Reported, primary	120,000	116,000	116,000	115,000	90,100
Reported, secondary	68,400	63,100	71,000	84,000	74,600
Apparent, primary	154,000	149,000	140,000	147,000	128,000
Total ²	222,000	212,000	211,000	231,000	202,000
Price, average annual, London Metal Exchange:					
Cash, dollars per metric ton	6,927	4,630	6,011	8,638	5,929
Cash, dollars per pound	3.142	2.100	2.727	3.918	2.689
Stocks: Government, yearend	8,530	2,600	—	—	—
Consumer, yearend	16,100	16,000	9,920	14,300	11,100
Producer, yearend ³	12,600	13,100	12,700	12,300	13,500
Employment, yearend, number: Mine	7	7	1	1	1
Smelter and port	286	7	7	—	—
Net import reliance ⁴ as a percentage of apparent consumption	56	64	63	56	56

Recycling: About 75,000 tons of nickel was recovered from purchased scrap in 2001. This represented about 45% of reported consumption for the year.

Import Sources (1997-2000): Canada, 40%; Norway, 14%; Russia, 13%; Australia, 9%; and other, 24%.

Tariff: Item	Number	Normal Trade Relations 12/31/01
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: The U.S. Government sold the last of the nickel in the National Defense Stockpile in 1999. 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 the primary nickel consumed in the world. U.S. demand for austenitic (i.e., nickel bearing) stainless steel was down 23% from the record 1.57 million tons of 2000. The sharp decrease was due to the buildup of recessionary forces in late 2000 and the economic upheaval that followed the tragic events of September 11, 2001. Imported steels accounted for 24% of total U.S. stainless steel consumption in 2001, down slightly from a record 27% the previous year. U.S. production of austenitic stainless steel exceeded 1.24 million tons in 2000, 3% less than the near record 1.28 million tons achieved in 1999. On June 5, 2001, the U.S. Government launched a steel trade initiative aimed at reducing excess production capacity worldwide and curtailing the dumping of excess foreign production in the United States at below market prices.

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World nickel demand grew faster than supply in the second half of 2000, causing a gradual drawdown of stocks in London Metal Exchange (LME) approved warehouses. By January 2001, LME stocks had fallen to levels unseen since 1991. Producer stock levels, though, were nearly unchanged because mine production was at an alltime high. In mid-2001, significant production from several newly commissioned mines began reaching the market, causing prices to weaken. For the week ending November 23, 2001, the LME cash price for 99.8%-pure nickel averaged \$5,256 per metric ton (\$2.38 per pound). Twelve months earlier, the cash price was \$7,198 per ton (\$3.26 per pound).

Production was being ramped up at three new laterite mines in Western Australia. Nickel was being recovered onsite using advanced pressure acid leach (PAL) technology. All three operators had to overcome startup problems associated with the new technology. At least four other Australian PAL projects were in varying stages of development. Competitors were considering employing PAL technology in Cuba, Indonesia, and the Philippines. In April 2001, a Canadian company launched an innovative PAL project in New Caledonia. If the New Caledonian laterite project is successful, the company will use the technology in Newfoundland to recover nickel and cobalt from sulfide concentrates. The concentrates would come from the Voisey's Bay nickel-copper sulfide deposit in northeastern Labrador. In late 2001, development of the Voisey's Bay deposit was still in limbo. The Canadian company and the Government of Newfoundland resumed negotiations in June 2001, but have been unable to agree on critical concepts.

Several automobile manufacturers were using nickel-metal hydride (NiMH) batteries to power their gasoline-electric hybrid and pure electric vehicles for the 2001 and 2002 model years. In the first quarter of 2001, more than 12,400 hybrid automobiles were operating on U.S. highways. An additional 4,000 battery electric automobiles, vans, and light trucks have been leased or sold in the United States since 1996. Most of the NiMH batteries were being made in France, Germany, Japan, or the United States.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ⁵	Reserve base ⁵
	2000	2001 ^e		
United States	—	—	—	2,500,000
Australia	168,300	184,000	20,000,000	25,000,000
Botswana	34,465	32,700	880,000	1,400,000
Brazil	45,317	44,900	670,000	6,000,000
Canada	190,728	183,000	6,600,000	15,000,000
China	51,100	50,700	3,700,000	7,900,000
Colombia	58,927	62,800	920,000	1,200,000
Cuba	68,305	71,000	5,600,000	23,000,000
Dominican Republic	39,943	29,000	750,000	1,300,000
Greece	19,535	19,900	450,000	900,000
Indonesia	98,200	105,000	3,200,000	13,000,000
New Caledonia	127,493	126,000	4,500,000	15,000,000
Philippines	23,500	23,700	410,000	11,000,000
Russia	270,000	265,000	6,600,000	7,300,000
South Africa	36,616	36,300	2,500,000	12,000,000
Venezuela	2,472	10,600	610,000	610,000
Zimbabwe	8,160	7,480	240,000	260,000
Other countries	8,200	7,800	450,000	12,000,000
World total (rounded)	1,250,000	1,260,000	58,000,000	160,000,000

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% 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. — Zero.

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

²Apparent primary consumption + reported secondary consumption.

³Stocks of producers, agents, and dealers held only in the United States.

⁴Defined as imports - exports + adjustments for Government and industry stock changes.

⁵See Appendix C for definitions.