

NICKEL

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

Domestic Production and Use: The United States did not have any active nickel mines in 2002. Limited amounts of byproduct nickel, though, were recovered from copper and palladium-platinum ores mined in the Western United States. On a monthly or annual basis, 145 facilities reported nickel consumption. The principal consuming State was Pennsylvania, followed by West Virginia, Indiana, and Illinois. Approximately 42% of the primary nickel consumed went into stainless and alloy steel production, 38% into nonferrous alloys and superalloys, 14% into electroplating, and 6% into other uses. Ultimate end uses were as follows: transportation, 32%; chemical industry, 13%; electrical equipment, 10%; construction, 9%; fabricated metal products, 8%; household appliances, 7%; petroleum industry, 6%; machinery, 6%; and other, 9%. Estimated value of apparent primary consumption was \$775 million.

Salient Statistics—United States:	1998	1999	2000	2001	2002^e
Production: Mine	—	—	—	—	—
Plant	4,290	—	—	—	—
Shipments of purchased scrap: ¹	89,700	93,000	123,000	141,000	145,000
Imports: Ore	1,420	—	—	—	—
Primary	148,000	139,000	156,000	136,000	122,000
Secondary	8,500	9,480	10,700	8,760	8,920
Exports: Primary	8,440	7,440	8,150	8,450	7,000
Secondary	35,100	31,400	49,900	48,600	43,200
Consumption: Reported, primary	116,000	116,000	115,000	98,800	84,600
Reported, secondary	63,100	71,000	84,000	101,000	111,000
Apparent, primary	149,000	140,000	147,000	129,000	114,000
Total ²	212,000	211,000	231,000	230,000	225,000
Price, average annual, London Metal Exchange:					
Cash, dollars per metric ton	4,630	6,011	8,638	5,945	6,776
Cash, dollars per pound	2.100	2.727	3.918	2.696	3.074
Stocks: Government, yearend	2,600	—	—	—	—
Consumer, yearend	15,900	10,000	14,300	13,900	12,500
Producer, yearend ³	13,100	12,700	12,300	12,600	12,400
Employment, yearend, number: Mine	7	5	1	—	—
Smelter and port	7	7	—	—	—
Net import reliance ⁴ as a percentage of apparent consumption	64	63	56	46	43

Recycling: About 111,000 tons of nickel was recovered from purchased scrap in 2002. This represented about 57% of total reported consumption for the year.

Import Sources (1998-2001): Canada, 40%; Norway, 13%; Russia, 12%; Australia, 10%; and other, 25%.

Tariff: Item	Number	Normal Trade Relations 12/31/02
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. production of austenitic (i.e., nickel bearing) stainless steel was up 30% from the 1.01 million tons of 2001. The increase occurred after recessionary forces began weakening in mid-2002 and the economic disruption created by the terrorist attacks of September 11, 2001, had partially subsided. Imported steels accounted for 22% of total U.S. stainless steel consumption in 2002, down slightly from 24% for the previous year. On March 5, 2002, the U.S. Government temporarily raised tariffs on some forms of stainless steel. The new tariffs were part of a much larger trade action taken to slow dumping of excess foreign steel products at below market prices. The new tariffs were to decrease annually over 3 years and then drop back down to 2001 levels.

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World nickel supply grew faster than demand in the second half of 2001, causing a gradual buildup of stocks in London Metal Exchange (LME) approved warehouses. By June 2002, LME stocks had climbed back above the 20,000-ton level from a 10-year low of 9,000 tons in March 2001. Producer stock levels were significantly higher than those controlled by the LME but more stable—fluctuating between 87,000 and 104,000 tons. World mine production was at an alltime high in 2001. In early 2002, prices began to rise despite the increase in mine production but peaked in mid-year. For the week ending November 29, 2002, the LME cash price for 99.8%-pure nickel averaged \$7,390 per metric ton (\$3.35 per pound). Twelve months earlier, the cash price was \$5,314 per ton (\$2.41 per pound). In April 2002, the Government of Newfoundland and a major Canadian nickel producer came to terms on developing the Voisey's Bay sulfide deposit in northeastern Labrador. The agreement ended a 3-year impasse over key economic and environmental issues. Mine construction began in mid-2002. The same company also was developing a laterite deposit at the southeastern tip of New Caledonia. The New Caledonian nickel was to be recovered onsite using advanced pressure acid leach (PAL) technology. In Australia, three laterite mining and processing complexes incorporating similar technology were commissioned between 1998 and 1999, and a second generation of PAL projects was in varying stages of development. Competitors were considering employing some form of acid leach technology to recover nickel at greenfield sites in Cuba, Indonesia, and the Philippines. Several automobile manufacturers were using nickel-metal hydride (NiMH) batteries to power their gasoline-electric hybrid and pure electric vehicles for the 2004 and 2005 model years. In the first quarter of 2002, more than 41,300 hybrid automobiles were operating on U.S. highways. An additional 5,200 battery electric automobiles, vans, and light trucks have been leased or sold in the United States since 1996. One Japanese-based automobile manufacturer was ramping up operations to produce 300,000 hybrid vehicles per year by 2007. A multimillion-dollar NiMH battery production facility was under construction at Springboro, OH, and was expected to be operational by May 2003.

World Mine Production, Reserves, and Reserve Base: Reserves estimates for Botswana, Philippines, South Africa, and Zimbabwe have been revised based on new information from the mining industry.

	Mine production		Reserves ⁵	Reserve base ⁵
	2001	2002 ^e		
United States	—	—	—	—
Australia	197,000	186,000	22,000,000	27,000,000
Botswana	26,200	23,200	490,000	920,000
Brazil	45,400	44,900	670,000	6,000,000
Canada	193,361	188,000	5,200,000	15,000,000
China	51,500	55,700	3,600,000	7,600,000
Colombia	52,962	55,400	900,000	1,100,000
Cuba	70,662	73,100	5,600,000	23,000,000
Dominican Republic	31,000	24,300	690,000	1,000,000
Greece	20,830	22,400	490,000	900,000
Indonesia	102,000	105,000	3,200,000	13,000,000
New Caledonia	117,554	98,200	4,400,000	12,000,000
Philippines	27,359	31,800	940,000	5,200,000
Russia	325,000	328,000	6,600,000	9,200,000
South Africa	36,443	38,000	3,700,000	12,000,000
Venezuela	13,600	20,600	610,000	610,000
Zimbabwe	8,145	9,690	15,000	260,000
Other countries	9,240	13,700	1,300,000	5,100,000
World total (rounded)	1,330,000	1,320,000	61,000,000	140,000,000

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.