

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 2008. Limited amounts of byproduct nickel were recovered from copper and palladium-platinum ores mined in the Western United States. On a monthly or annual basis, 110 facilities reported nickel consumption. The principal consuming State was Pennsylvania, followed by Kentucky, West Virginia, and North Carolina. Approximately 52% of the primary nickel consumed went into stainless and alloy steel production, 34% into nonferrous alloys and superalloys, 10% into electroplating, and 4% into other uses. End uses were as follows: transportation, 30%; chemical industry, 15%; electrical equipment, 10%; construction, 9%; fabricated metal products, 8%; household appliances, 8%; petroleum industry, 7%; machinery, 6%; and other, 7%. The estimated value of apparent primary consumption was \$2.70 billion.

Salient Statistics—United States:	2004	2005	2006	2007	2008^e
Production, refinery byproduct	W	W	W	W	W
Shipments of purchased scrap ¹	133,000	141,000	147,000	180,000	165,000
Imports: Primary	136,000	143,000	153,000	125,000	141,000
Secondary	18,800	15,500	20,300	16,200	22,200
Exports: Primary	8,000	7,630	8,050	13,100	14,000
Secondary	48,300	55,600	59,300	103,000	110,000
Consumption: Reported, primary	102,000	100,000	124,000	98,400	85,000
Reported, secondary	103,000	101,000	108,000	93,600	77,300
Apparent, primary	128,000	135,000	144,000	111,000	127,000
Total ²	232,000	237,000	252,000	205,000	204,000
Price, average annual, London Metal Exchange:					
Cash, dollars per metric ton	13,823	14,738	24,244	37,216	21,360
Cash, dollars per pound	6.270	6.685	10.997	16.881	9.689
Stocks: Consumer, yearend	11,900	13,500	14,100	14,100	14,300
Producer, yearend ³	6,580	5,940	6,450	6,600	6,700
Net import reliance ⁴ as a percentage of apparent consumption	49	48	49	21	33

Recycling: About 77,300 tons of nickel was recovered from purchased scrap in 2008. This represented about 38% of reported secondary plus apparent primary consumption for the year.

Import Sources (2004-07): Canada, 43%; Russia, 15%; Norway, 10%; Australia, 8%; and other, 24%.

Tariff: Item	Number	Normal Trade Relations
		12-31-08
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 8,800 tons of nickel ingot contaminated by low-level radioactivity plus 5,100 tons of contaminated shredded nickel scrap. Planned decommissioning activities at former nuclear defense sites are expected to generate an additional 20,000 tons of nickel in shredded scrap.

Events, Trends, and Issues: Although slightly lower than that of 2007, world nickel mine production was at a relatively high level in 2008 despite the global financial crisis. Stainless steel accounted for two-thirds of primary nickel use, with more than one-half of the steel going into the construction, food processing, and transportation sectors. U.S. production of austenitic (nickel-bearing) stainless steel slipped to 1.35 million tons in 2007, 21% less than the record-high 1.71 million tons in 2006. China was the leading consumer of nickel, with an estimated apparent consumption of 348,000 tons in 2007. China produced 5.52 million tons of austenitic stainless steel in 2007, exceeding the combined output of Japan and the United States. Nickel prices peaked at unprecedented levels in mid-2007, but gradually declined during the next 18 months as the world economy weakened. In October 2008, the London Metal Exchange cash mean for 99.8%-pure nickel averaged \$12,133 per metric ton (\$5.50 per pound), down 61% from the mean in October 2007.

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Declining metal prices, fears of recession, and the tightening of credit forced nickel producers to halt mining at less profitable operations and delay early stage development projects. Three world-class laterite mining complexes were in the final stages of commissioning. In early 2008, Australia's leading nickel producer began ramping up production at its new \$2.2 billion Ravensthorpe Mine, which is northwest of Esperance. Nickel and cobalt were being leached from the ore and converted onsite to a mixed hydroxide intermediate, which was then shipped to Yabulu, Queensland, for refining. The \$3.2 billion laterite mining complex at Goro, New Caledonia, was scheduled to begin production of mixed hydroxide in early 2009. The New Caledonian nickel was being recovered onsite as an oxide using advanced pressure-acid-leach technology. Work was also underway on two traditional ferronickel plants in the Brazilian States of Goias and Para. The Onca Puma mining complex in Para State was scheduled to begin production of ferronickel in January 2009. The credit crisis put severe financial pressures on motor vehicle manufacturers, causing them to reassess the post-2010 marketplace. Nickel-metal hydride (NiMH) batteries continue to be widely used in hybrid motor vehicles, despite inroads made by lithium-ion batteries. Sales in the United States of hybrid electric passenger vehicles have risen steadily to 350,000 in 2007 from 9,370 in 2000. Several automobile manufacturers were readying prototype plug-in hybrids or fully electric vehicles for commercial production. High prices for jet fuel encouraged major air carriers to order more fuel-efficient aircraft, increasing the demand for superalloys. The nuclear power industry was in the early stages of a renaissance because of high prices for natural gas. U.S. utilities were considering constructing 15 to 33 additional nuclear powerplants—facilities that would require sizeable amounts of austenitic stainless steel and other nickel-bearing alloys. Construction of new wind farms could require significant numbers of nickel-based batteries for energy storage and load leveling.

World Mine Production, Reserves, and Reserve Base: Estimates of the reserves and reserve base for Australia and Colombia, and for Spain (included in "Other countries"), were revised based on new mining industry information.

	Mine production		Reserves ⁵	Reserve base ⁵
	2007	2008 ^e		
United States	—	—	—	150,000
Australia	161,000	180,000	26,000,000	29,000,000
Botswana	38,000	36,000	490,000	920,000
Brazil	75,300	75,600	4,500,000	8,300,000
Canada	255,000	250,000	4,900,000	15,000,000
China	85,000	85,000	1,100,000	7,600,000
Colombia	101,000	74,900	1,400,000	2,700,000
Cuba	75,000	77,000	5,600,000	23,000,000
Dominican Republic	47,100	47,000	720,000	1,000,000
Greece	21,200	20,100	490,000	900,000
Indonesia	229,000	211,000	3,200,000	13,000,000
New Caledonia ⁶	125,000	92,600	7,100,000	15,000,000
Philippines	79,500	88,400	940,000	5,200,000
Russia	280,000	276,000	6,600,000	9,200,000
South Africa	37,900	38,000	3,700,000	12,000,000
Venezuela	20,000	20,000	560,000	630,000
Zimbabwe	7,120	6,530	15,000	260,000
Other countries	27,700	28,600	2,200,000	6,100,000
World total (rounded)	1,660,000	1,610,000	70,000,000	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: To offset high nickel prices, engineers have begun substituting low-nickel, duplex, or ultrahigh-chromium stainless steels for austenitic grades in a few construction applications. Nickel-free specialty steels are sometimes used in place of stainless steel within the power generating and petrochemical industries. Titanium alloys or specialty plastics can substitute for nickel metal or nickel-based alloys in highly corrosive chemical environments. Cost savings in manufacturing lithium-ion batteries allow them to compete against NiMH in certain applications.

^eEstimated. W Withheld to avoid disclosing company proprietary data. — 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.

⁶Overseas territory of France.