

Mineral Industry Surveys

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NICKEL IN OCTOBER 2002

In October, reported domestic nickel consumption on a daily average basis was slightly less than that of September, according to the U.S. Geological Survey. Average daily nickel consumption of cathode, pellets, briquets, and ferronickel for stainless steel was 72.1 metric tons per day (t/d)—15% less than the 84.7 t/d for September, but 15% greater than the 62.8 t/d (revised) for October 2001. Consumption of elemental nickel to make nickel-base corrosion-resistant alloys was 32% greater than the corresponding tonnage reported for September. The 32% increase for corrosion-resistant alloys was more than offset by the decrease in consumption for stainless steel. Sales to plating companies averaged 29.7 t/d, about 4% greater than the September sales figure. Total consumption for the first 10 months of 2002 was down 13% from the 72,800 t reported for the corresponding period of 2001.

On October 31, U.S. consumer stocks of cathode, pellets, briquets, and powder totaled 1,970 t—17% less than the 2,370 t (revised) for September 30 and slightly less than the 1,990 t reported for yearend 2001. Stocks in London Metal Exchange (LME) warehouses worldwide totaled 21,174 t—slightly more than the tonnage on September 30. LME stocks were 135% greater than on March 31, 2001, when they bottomed out at 9,000 t after a 16-month slide. Preliminary data collected by the International Nickel Study Group indicated that, at the end of September 2002, world nickel producers (excluding those in Austria, China, the former Yugoslavia, and the Ural area of Russia) had approximately 84,400 t of nickel in primary products in stock, of which 61,300 t or 73% were Class I materials. Class I materials are refined products with a nickel (Ni) content of 99% or greater (electrolytic cathode, pellets, briquets, rondelles, powder, etc.). Class II materials include ferronickel, oxide sinter, and East Asian utility nickel—products with a Ni content less than 99%.

Percentages reported in the above paragraphs may not be verifiable owing to concealment of individual company proprietary data and late reporting of data.

The United States imported 96,600 t of primary nickel in the first 9 months of 2002, 5% less than the 102,000 t for the

corresponding period of 2001. Class I materials accounted for 87% of total primary imports received during the first 9 months of 2002. Trade data for October 2002 will appear in a subsequent report.

Update: Sales of hybrid automobiles are forecast to grow in North America, increasing demand for nickel-based batteries

Since 1997, demand for hybrid automobiles has grown dramatically in Japan and North America, expanding opportunities for nickel-metal hydride (NiMH) batteries. The NiMH battery is in competition with the valve-regulated lead-acid battery and the more expensive, lithium-ion battery.

At the present time, only three hybrid passenger cars can be readily purchased in North America—the two-seat Honda Insight, the five-seat Honda Civic Hybrid, and the five-seat Toyota Prius. Major automobile manufacturers, however, are planning to offer many more models over the next 5 years (Thackray, John, 2002§¹). In January 2003, auto industry executives made several key announcements about the future of hybrid vehicles. The announcements were made in conjunction with the 2003 North American International Auto Show in Detroit, MI. The announcements were a strong endorsement of hybrid technology—a technology that significantly improves gasoline mileage by linking the power of the internal combustion engine to the power of the electric motor.

The recently introduced 2003 Civic Hybrid is equipped with a 50-liter (13.2-gallon) fuel tank, giving it a cruising range of more than 1,050 kilometers (650 miles). This equates to about 46 miles per gallon in city traffic and 51 miles per gallon on the open highway. The 144-volt NiMH battery pack contains 120 cells, each with a potential of 1.2 volts. The battery pack and power control module are located together behind the back seat. A rear-shelf vent allows the cells to be warmed by ambient air

¹References that include a section twist (§) are found in the Internet References Cited section.

from the cabin to help improve their cold-weather performance. When the gasoline engine is operating, the motor becomes a generator and automatically recharges the battery pack. The battery pack comes with an 8-year/129,000-kilometer (80,000-mile) limited warranty (American Honda Motor Co., Inc., 2003§).

The Ford Motor Company is planning to launch a hybrid version of its Escape sport utility vehicle (SUV) in December 2003. On January 8, Toyota Motors Sales, U.S.A., said that it would begin marketing a hybrid version of its luxury SUV, the Lexus RX330, in late 2004. General Motors Corporation (GM) is expected to make its first foray into hybrids in 2004-05, by offering an electric powertrain option with its Saturn Vue SUV. GM also was planning to offer some form of hybrid electric power on four other popular, high-sales volume models by 2007 (Electric Vehicle Progress, 2003). The four models under consideration are the 2007 Chevrolet Malibu (a passenger car) and three pickup trucks—the 2005 Chevrolet Silverado, the 2005 GMC Sierra, and a new model to be introduced in 2006, the Chevrolet Equinox (Hakim, 2002a, b; 2003).

The Chrysler Group unit of DaimlerChrysler has been less optimistic about the future of hybrids and more cautious in its research and development programs, focusing its efforts instead on improving diesel technology. DaimlerChrysler engineers have taken a simpler and lower cost approach to hybrids than Honda and Toyota, designing vehicles with segregated powertrains. The gasoline engine drives the rear wheels, while the motor and battery pack power the front axle. DaimlerChrysler is considering marketing a hybrid mega-pickup truck with special features that would appeal to the construction industry. The proposed hybrid would be equipped with a built-in field generator capable of supplying electrical power to large saws, drills, lathes, and other heavy-duty contractor tools (Thackray, 2002§).

About 39,000 hybrid vehicles are currently on U.S. highways. Even if only part of the announced plans materialize, the number of hybrid vehicles in North America could rise above 1,000,000 by 2007. Toyota has produced more than 100,000 Prius sedans since 1997 and is gearing up to manufacture 300,000 units a year. Continuing high prices for gasoline, concerns about possible disruptions of oil production in the Persian Gulf, and new restrictions on automobile emissions have helped to boost

hybrid sales.

Some of the best opportunities for hybrid conversion may lie with vehicles that consume large amounts of fuel, such as city buses and full-size trucks. Bus manufacturer New Flyer of America, Inc. has supplied hybrid buses to at least three transit systems on the Pacific Coast—Orange County Transportation Authority (Southern California), Tri-Met Transit (Portland, OR), and King County Metro Transit (Seattle, WA). The buses are powered by an advanced hybrid-electric powertrain system manufactured by the Allison Transmission Division of GM. The U.S. Army has awarded a contract to GM for the development of a prototype hybrid electric truck. The truck was to be equipped with a fuel cell capable of generating auxiliary power for surveillance and communications equipment. UQM Technologies Inc. is working on unmanned hybrid combat vehicles for both the U.S. Army and the U.S. Marine Corps. The UQM work is part of a much larger development project overseen by Carnegie Mellon University (Electric Vehicle Progress, 2002).

All of these activities are expected to spur demand for nickel metal foam, nickel oxide, and other nickel starting materials.

References Cited

- Electric Vehicle Progress, 2002, New motor technology stands to broaden applications for electric and hybrid propulsion in farm and defense: *Electric Vehicle Progress*, v. 24, no. 19, October 1, p. 1, 6-7.
- Electric Vehicle Progress, 2003, GM back in the game with hybrid models: *Electric Vehicle Progress*, v. 25, no. 2, January 15, p. 1, 3.
- Hakim, Danny, 2002a, G.M. to offer hybrid power in 5 models by 2007: *New York Times*, December 24, Section C, p. 1.
- Hakim, Danny, 2002b, Hybrid cars are attracting a broad range of Americans: *New York Times*, December 11, Section C, p. 1.
- Hakim, Danny, 2003, S.U.V. from Toyota in 2004 to use hybrid technology: *New York Times*, January 8, Section C, p. 1.

Internet References Cited

- American Honda Motor Co., Inc., 2003, Honda Civic Hybrid 2003 gasoline-electric, accessed January 14, 2003, at URL <http://www.hondacars.com/models/modeloverview.asp>.
- Thackray, John, 2002 (October), Hybrid autos rev up, *Electronic Business*, accessed January 10, 2003, at URL <http://proquest.umi.com>. [Copyright Cahners Business Information (a division of Reed Elsevier, Inc.)].

TABLE 1
CONSUMPTION OF NICKEL (EXCLUSIVE OF SCRAP), BY FORM AND USE 1/

(Metric tons, nickel content)

| Period | Cathodes, pellets, briquets, and powder | Ferronickel | Oxide-sinter, salts, and other forms | Total | Total year to date |
|---|--|-------------|---|----------|--------------------------|
| 2001: | | | | | |
| October | 5,490 | 757 | 160 | 6,410 | 72,800 |
| November | 5,000 | 608 | 323 | 5,930 | 78,700 |
| December | 4,460 | 537 | 215 | 5,210 | 83,900 |
| January-December | 71,300 | 10,100 | 2,500 | 83,900 | XX |
| 2002: | | | | | |
| January | 5,080 | 774 | 292 | 6,150 | 6,150 |
| February | 5,000 | 890 | 281 | 6,170 | 12,300 |
| March | 5,030 | 723 | 375 | 6,130 | 18,500 |
| April | 5,370 | 879 | 286 | 6,540 | 25,000 |
| May | 5,030 | 722 | 87 | 5,840 | 30,800 |
| June | 5,450 | 873 | 261 | 6,580 | 37,400 |
| July | 5,510 r/ | 730 | 272 | 6,510 r/ | 43,900 |
| August | 5,530 r/ | 843 | 236 | 6,610 r/ | 50,500 r/ |
| September | 5,430 | 754 | 65 | 6,250 | 56,800 |
| October: | | | | | |
| Steel: | | | | | |
| Stainless and heat resisting | 1,490 | 750 | W | 2,240 | 24,300 |
| Alloy (excludes stainless) | 208 | -- | -- | 208 | 2,530 |
| Superalloys | 1,370 | -- | W | 1,370 | 12,300 |
| Copper-nickel alloys | W | -- | -- | W | W |
| Electric, magnetic, and expansion alloys | 14 | -- | -- | 14 | 111 |
| Other nickel & nickel alloys | W | -- | W | W | W |
| Cast iron | W | -- | -- | W | W |
| Electroplating (sales to platers) | 922 | -- | -- | 922 | 9,520 |
| Chemical and chemical uses | W | -- | -- | W | W |
| Other uses | 1,620 | -- | 68 | 1,690 | 14,500 |
| Total reported | 5,620 2/ | 750 | 68 | 6,440 | 63,200 |
| Total all companies (calc) 3/ | XX | XX | XX | 9,190 | 90,200 |
| 2002: January-October | 53,100 | 7,940 | 2,220 | 63,200 | XX |
| 2001: January-October | 61,800 | 8,990 | 1,960 | 72,800 | XX |

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Other uses" category. XX Not applicable. -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Of consumption, 4,640 metric tons were consumed as cathodes and pellets, the remainder as briquets and powder.

3/ Figures represent calculated apparent consumption; based on the revised proportion of reported primary consumption (70.11%) to apparent primary consumption for 2000.

TABLE 2
ENDING STOCKS OF NICKEL (EXCLUSIVE OF SCRAP) HELD BY CONSUMERS,
BY FORM AND USE 1/ 2/

(Metric tons, nickel content)

| Period | Cathodes, pellets, briquets, and powder | Ferronickel | Oxide-sinter, salts, and other forms | Total |
|--|---|-------------|--|----------|
| 2001: | | | | |
| October | 2,770 | 391 | 226 | 3,390 |
| November | 2,480 | 330 | 198 | 3,010 |
| December | 1,990 | 522 | 289 | 2,800 |
| 2002: | | | | |
| January | 1,800 | 832 | 282 | 2,920 |
| February | 2,110 | 454 | 106 | 2,670 |
| March | 2,230 | 152 | 134 | 2,510 |
| April | 2,490 | 513 | 94 | 3,100 |
| May | 2,250 | 82 | 127 | 2,460 |
| June | 1,840 | 63 | 138 | 2,040 |
| July | 1,580 | 98 | 98 | 1,770 r/ |
| August | 1,910 r/ | 112 | 84 | 2,100 r/ |
| September | 2,370 r/ | 89 | 78 | 2,530 r/ |
| October: | | | | |
| Steel (stainless, heat resisting and alloy) | 880 | 126 | (3/) | 1,010 |
| Nonferrous alloys 4/ | 1,070 | (3/) | (3/) | 1,070 |
| Foundry (cast irons) | (3/) | -- | (3/) | (3/) |
| Chemical (catalysts, ceramics, plating salts, etc.) and unspecified uses | 21 | 14 | 76 | 111 |
| Total | 1,970 | 140 | 76 | 2,180 |

r/ Revised. -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Stocks held by companies that consume nickel in more than one end-use category are credited to the major category. Stocks are subject to revisions owing to inventory adjustment.

3/ Included in the "Chemical and unspecified uses" category.

4/ Includes superalloys, nickel-copper and copper-nickel alloys, permanent magnet alloys, and other nickel alloys.

TABLE 3
CONSUMPTION AND ENDING STOCKS OF PURCHASED SECONDARY NICKEL, BY USE 1/

(Metric tons, nickel content)

| Period | Consumption | | | Stocks | | |
|-----------------------|---------------------|------------------------|----------------|---------------------|------------------------|----------------|
| | Ferrous scrap 2/ | Nonferrous scrap 3/ | Total scrap | Ferrous scrap 2/ | Nonferrous scrap 3/ | Total scrap |
| 2001: | | | | | | |
| October | 5,150 | 1,540 | 6,690 | 3,170 | 100 | 3,270 |
| November | 3,970 | 829 | 4,800 r/ | 3,330 | 92 | 3,420 |
| December | 3,950 | 784 | 4,730 | 3,750 | 93 | 3,840 |
| January-December | 55,100 r/ | 11,300 | 66,400 | XX | XX | XX |
| 2002: | | | | | | |
| January | 4,940 | 784 | 5,720 | 3,180 | 86 | 3,270 |
| February | 4,920 | 810 | 5,730 | 3,070 | 88 | 3,160 |
| March | 5,050 | 767 | 5,810 | 2,960 | 102 | 3,060 |
| April | 5,190 | 740 | 5,930 | 2,980 | 109 | 3,090 |
| May | 5,020 | 620 | 5,640 | 3,690 | 97 | 3,790 |
| June | 6,340 | 549 | 6,890 | 3,340 | 103 | 3,440 |
| July | 5,950 | 713 | 6,660 | 3,320 | 97 | 3,410 |
| August | 6,140 | 685 | 6,830 | 3,110 | 105 | 3,210 |
| September | 4,820 | 621 | 5,440 | 3,400 | 110 | 3,510 |
| October | 5,210 | 647 | 5,860 | 3,540 | 105 | 3,640 |
| 2002- January-October | 53,600 | 6,940 | 60,500 | XX | XX | XX |
| 2001- January-October | 47,100 | 9,710 | 56,800 | XX | XX | XX |

r/ Revised. XX Not applicable.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Nickel content is calculated from an average nickel content and the reported gross weight of scrap.

3/ Combined consumption and stocks of aluminum-base, copper-base, and nickel-base scrap.

TABLE 4
U.S. IMPORTS FOR CONSUMPTION OF NICKEL, BY COUNTRY 1/

(Metric tons, nickel content) 2/

| Period and country of origin | Cathodes, pellets, and briquets | Powder and flakes | Ferro-nickel | Metal-lurgical-grade oxide | Waste and scrap | Stainless steel scrap | Chemicals | Total 3/ | Total year to date 4/ | Wrought nickel |
|------------------------------|---------------------------------|-------------------|--------------|----------------------------|-----------------|-----------------------|-----------|----------|-----------------------|----------------|
| 2001: | | | | | | | | | | |
| September | 7,980 | 438 | 1,080 | 120 | 238 | 294 | 202 | 10,400 | 109,000 | 156 |
| October | 11,200 | 617 | 160 | 263 | 434 | 265 | 279 | 13,200 | 122,000 | 142 |
| November | 9,160 | 434 | 1,330 | 162 | 429 | 174 | 322 | 12,000 | 134,000 | 54 |
| December | 8,360 | 640 | 707 | 188 | 344 | 193 | 276 | 10,700 | 144,000 | 95 |
| January-December | 111,000 | 8,310 | 11,600 | 1,350 | 5,580 | 3,180 | 3,200 | 144,000 | XX | 1,140 |
| 2002: | | | | | | | | | | |
| January | 6,550 | 597 | 446 | 400 | 443 | 283 | 244 | 8,960 | 8,960 | 74 |
| February | 11,900 | 428 | 620 | 128 | 341 | 235 | 235 | 13,900 | 22,900 | 109 |
| March | 5,760 | 813 | 679 | 54 | 315 | 275 | 277 | 8,180 | 31,000 | 30 |
| April | 6,220 | 551 | 983 | -- | 221 | 349 | 274 | 8,590 | 39,600 | 116 |
| May | 6,600 | 590 | 1,240 | 14 | 222 | 478 | 297 | 9,450 | 49,100 | 53 |
| June | 8,950 | 391 | 1,160 | 238 | 174 | 460 | 228 | 11,600 | 60,700 | 43 |
| July | 11,800 | 627 | 1,080 | 214 | 367 | 874 | 225 | 15,200 | 75,900 | 69 |
| August | 7,750 | 602 | 1,790 | 127 | 152 | 762 | 171 | 11,400 | 87,200 | 72 |
| September: | | | | | | | | | | |
| Australia | 842 | 40 | -- | -- | -- | -- | -- | 882 | 7,870 | -- |
| Brazil | -- | -- | -- | -- | 6 | -- | -- | 6 | 684 | -- |
| Canada | 4,370 | 293 | -- | 2 | 24 | 470 | 37 | 5,190 | 45,600 | -- |
| Colombia | -- | -- | 242 | -- | -- | 4 | -- | 246 | 1,960 | -- |
| Dominican Republic | -- | -- | 697 | -- | -- | -- | -- | 697 | 4,950 | -- |
| Finland | 160 | 20 | -- | -- | -- | -- | 10 | 190 | 3,000 | -- |
| France | 222 | -- | 100 | -- | 16 | -- | 6 | 344 | 1,940 | 13 |
| Germany | 180 5/ | 75 | -- | -- | 17 | -- | 31 | 303 | 1,290 | 61 |
| Japan | (6/) | 1 | (6/) | (6/) | 1 | -- | 29 | 31 | 389 | 6 |
| Mexico | -- | -- | -- | -- | -- | 140 | 1 | 141 | 966 | -- |
| New Caledonia | -- | -- | 300 | -- | -- | -- | -- | 300 | 600 | -- |
| Norway | 4 | -- | -- | -- | -- | -- | -- | 4 | 6,140 | -- |
| Russia | 7,120 | 92 | -- | -- | 32 | -- | -- | 7,250 | 23,200 | -- |
| South Africa | 20 | 20 | -- | -- | -- | -- | -- | 40 | 298 | -- |
| Sweden | -- | 5 | -- | -- | -- | -- | -- | 5 | 43 | -- |
| United Kingdom | -- | 19 | -- | -- | 55 | -- | 8 | 82 | 790 | (6/) |
| Venezuela | -- | -- | 234 | -- | -- | 17 | -- | 251 | 1,640 | -- |
| Zimbabwe | 94 | -- | -- | -- | -- | -- | -- | 94 | 943 | -- |
| Other | 19 5/ | 1 | -- | -- | 9 | 10 | 72 | 111 | 1,150 | 5 |
| Total | 13,000 | 566 | 1,570 | 2 | 160 | 641 | 194 | 16,200 | 103,000 | 85 |
| 2002: January-September | 78,600 | 5,170 | 9,580 | 1,180 | 2,390 | 4,360 | 2,150 | 103,000 | XX | 653 |
| 2001: January-September | 82,500 | 6,610 | 9,400 | 734 | 4,370 | 2,540 | 2,320 | 109,000 | XX | 844 |

XX Not applicable. -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ The nickel contents are assumed to be as follows: metallurgical-grade oxide (77%), waste and scrap (50%), and stainless steel scrap (7.5%). The chemical category includes chlorides (25%), sulfates (22%), and other salts (22%), supported catalysts (22%), and oxide, sesquioxide, and hydroxide (65%).

3/ Excludes wrought nickel.

4/ May include revisions for prior months.

5/ All or part of these data have been referred to the Census Bureau for verification.

6/ Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 5
U.S. EXPORTS OF NICKEL, BY COUNTRY 1/

(Metric tons, nickel content) 2/

| Period and country of destination | Cathodes, pellets, and briquets | Powder and flakes | Ferro-nickel | Metal-lurgical-grade oxide | Waste and scrap | Stainless steel scrap | Chemicals | Total 3/ | Total year to date | Wrought nickel |
|-----------------------------------|---------------------------------|-------------------|--------------|----------------------------|-----------------|-----------------------|-----------|----------|--------------------|----------------|
| 2001: | | | | | | | | | | |
| September | 156 | 115 | 1 | 161 | 1,030 | 1,970 | 178 | 3,610 | 44,800 | 151 |
| October | 170 | 90 | 14 | 142 | 1,740 | 2,680 | 346 | 5,180 | 49,900 | 177 |
| November | 158 | 85 | -- | 132 | 1,100 | 1,350 | 148 | 2,970 | 52,900 | 124 |
| December | 125 | 72 | (4/) | 131 | 1,290 | 2,310 | 198 | 4,130 | 57,000 | 163 |
| January-December | 1,400 | 1,380 | 50 | 1,940 | 15,700 | 32,900 | 3,680 | 57,000 | XX | 2,400 |
| 2002: | | | | | | | | | | |
| January | 344 | 135 | 6 | 122 | 1,110 | 1,030 | 233 | 2,990 | 2,990 | 192 |
| February | 170 | 81 | 3 | 152 | 989 | 3,720 | 229 | 5,350 | 8,330 | 167 |
| March | 245 | 151 | (4/) | 64 | 1,470 | 2,040 | 219 | 4,190 | 12,500 | 262 |
| April | 187 | 113 | -- | 67 | 1,280 | 3,890 | 226 | 5,770 | 18,300 | 139 |
| May | 65 | 119 | 10 | 111 | 1,360 | 1,900 | 213 | 3,780 | 22,100 | 271 |
| June | 105 | 134 | (4/) | 19 | 1,550 | 2,500 | 155 | 4,470 | 26,500 | 283 |
| July | 131 | 140 | 1 | 9 | 1,560 | 2,040 | 204 | 4,080 | 30,600 | 200 |
| August | 77 | 222 | 1 | 42 | 826 | 1,510 | 168 | 2,840 | 33,400 | 230 |
| September: | | | | | | | | | | |
| Australia | -- | (4/) | -- | -- | -- | -- | -- | (4/) | 81 | -- |
| Belgium | -- | 2 | -- | -- | -- | 2 | 32 | 36 | 338 | (4/) |
| Canada | 20 | 33 | 1 | 52 | 562 | 191 | 21 | 880 | 11,100 | 10 |
| China | -- | -- | 1 | -- | -- | 415 | 6 | 422 | 3,920 | 5 |
| France | -- | 11 | -- | -- | -- | 1 | 5 | 17 | 297 | 70 |
| Germany | -- | 9 | -- | -- | 84 | 21 | 2 | 116 | 888 | (4/) |
| India | -- | (4/) | -- | -- | -- | 44 | -- | 44 | 827 | -- |
| Italy | -- | (4/) | -- | (4/) | -- | 1 | -- | 2 | 48 | -- |
| Japan | 2 | 3 | -- | 2 | 20 | 27 | 15 | 69 | 1,520 | (4/) |
| Korea, Republic of | -- | 1 | -- | -- | -- | 39 | 26 | 66 | 6,120 | 1 |
| Mexico | 101 | 19 | -- | -- | -- | 3 | 11 | 134 | 1,320 | 129 |
| Netherlands | -- | 4 | (4/) | -- | -- | -- | 3 | 7 | 656 | 2 |
| South Africa | -- | (4/) | -- | -- | -- | -- | (4/) | 1 | 22 | -- |
| Spain | -- | -- | -- | -- | -- | -- | -- | -- | 676 | -- |
| Sweden | -- | -- | -- | -- | 31 | 6 | -- | 37 | 516 | -- |
| Taiwan | -- | (4/) | -- | -- | 1 | 836 | 8 | 845 | 6,550 | (4/) |
| United Kingdom | -- | 8 | -- | -- | 19 | 3 | (4/) | 30 | 428 | 1 |
| Other | 41 | 32 | -- | 1 | -- | 75 | 24 | 174 | 1,070 | 31 |
| Total | 164 | 122 | 3 | 55 | 717 | 1,660 | 153 | 2,880 | 36,300 | 249 |
| 2002: January-September | 1,490 | 1,220 | 23 | 642 | 10,900 | 20,300 | 1,800 | 36,300 | XX | 1,990 |
| 2001: January-September | 948 | 1,130 | 36 | 1,530 | 11,600 | 26,500 | 2,990 | 44,800 | XX | 1,940 |

XX Not applicable. -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ The nickel contents are assumed to be as follows: metallurgical-grade oxide (77%), waste and scrap (50%), and stainless steel scrap (7.5%). The chemical category includes chlorides (25%), sulfates (22%), and other salts (22%), supported catalysts (22%), and oxide, sesquioxide, and hydroxide (65%).

3/ Excludes wrought nickel.

4/ Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF NICKEL ALLOYS, BY COUNTRY 1/

(Metric tons, gross weight)

| Period and country of origin | Unwrought alloyed ingot | Bars, rods, and profiles | Wire | Plates and sheets | Foil | Tubes and pipes | Other alloyed articles | Total | Total year to date |
|------------------------------|-------------------------|--------------------------|-------|-------------------|------|-----------------|------------------------|--------|--------------------|
| 2001: | | | | | | | | | |
| September | 357 | 161 | 247 | 202 | (2/) | 193 | 129 | 1,290 | 15,600 |
| October | 321 | 271 | 452 | 312 | 1 | 234 | 182 | 1,770 | 17,300 |
| November | 341 | 268 | 467 | 122 | (2/) | 153 | 143 | 1,490 | 18,800 |
| December | 350 | 354 | 342 | 300 | 1 | 140 | 126 | 1,610 | 20,400 |
| January-December | 4,110 | 3,860 | 5,030 | 3,070 | 15 | 2,600 | 1,770 | 20,400 | XX |
| 2002: | | | | | | | | | |
| January | 353 | 231 | 399 | 329 | -- | 203 | 155 | 1,670 | 1,670 |
| February | 183 | 177 | 408 | 227 | 1 | 248 | 154 | 1,400 | 3,070 |
| March | 256 | 207 | 407 | 293 | (2/) | 327 | 159 | 1,650 | 4,720 |
| April | 390 | 229 | 531 | 254 | (2/) | 233 | 151 | 1,790 | 6,510 |
| May | 179 | 248 | 456 | 289 | 1 | 337 | 162 | 1,670 | 8,180 |
| June | 232 | 294 | 401 | 287 | 15 | 511 | 122 | 1,860 | 10,000 |
| July | 133 | 259 | 624 | 361 | 31 | 124 | 196 | 1,730 | 11,800 |
| August | 170 | 215 r/ | 360 | 356 | 34 | 179 | 161 | 1,480 | 13,200 |
| September: | | | | | | | | | |
| Australia | 11 | -- | -- | -- | -- | -- | -- | 11 | 871 |
| Belgium | -- | -- | 1 | -- | -- | -- | -- | 1 | 113 |
| Canada | -- | (2/) | 2 | -- | -- | 2 | 4 | 8 | 181 |
| China | -- | -- | 5 | -- | -- | -- | 17 | 22 | 202 |
| France | -- | 4 | 48 | 5 | -- | 4 | (2/) | 61 | 891 |
| Germany | -- | 128 | 114 | 189 | 34 | 70 | 2 | 537 | 5,210 |
| Italy | -- | -- | 1 | -- | -- | 8 | 7 | 16 | 585 |
| Japan | 6 | -- | 6 | -- | -- | 145 | (2/) | 157 | 1,490 |
| Mexico | -- | -- | -- | -- | -- | -- | 80 | 80 | 731 |
| Netherlands | -- | -- | -- | -- | -- | -- | 2 | 2 | 48 |
| South Africa | 20 | -- | -- | -- | -- | -- | -- | 20 | 275 |
| Sweden | -- | 8 | 217 | 12 | -- | 11 | -- | 248 | 1,990 |
| United Kingdom | 28 | 11 | 2 | 1 | -- | 3 | 1 | 46 | 1,440 |
| Other | (2/) | 2 | 16 | -- | 1 | 1 | 18 | 38 | 464 |
| Total | 65 | 153 | 412 | 207 | 35 | 244 | 131 | 1,250 | 14,500 |
| 2002: January-September | 1,960 | 2,010 | 4,000 | 2,600 | 118 | 2,410 | 1,390 | 14,500 | XX |
| 2001: January-September | 3,100 | 2,960 | 3,770 | 2,340 | 13 | 2,080 | 1,320 | 15,600 | XX |

r/ Revised. XX Not applicable. -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 7
U.S. EXPORTS OF NICKEL ALLOYS, BY COUNTRY 1/

(Metric tons, gross weight)

| Period and country of destination | Unwrought alloyed ingot | Bars, rods, and profiles | Wire | Plates and sheets | Foil | Tubes and pipes | Other alloyed articles | Total | Total year to date |
|-----------------------------------|-------------------------|--------------------------|------------|-------------------|----------|-----------------|------------------------|--------------|--------------------|
| 2001: | | | | | | | | | |
| September | 1,610 | 667 | 97 | 543 | 6 | 155 | 390 | 3,470 | 26,600 |
| October | 1,300 | 601 | 171 | 770 | 13 | 107 | 950 | 3,910 r/ | 30,500 |
| November | 1,190 | 641 | 135 | 623 | 23 | 124 | 333 | 3,070 | 33,600 |
| December | 954 | 591 | 82 | 404 | 7 | 164 | 160 | 2,360 | 36,000 |
| January-December | 13,400 | 7,890 | 1,660 | 7,030 | 146 | 1,900 | 3,970 | 36,000 | XX |
| 2002: | | | | | | | | | |
| January | 861 | 599 | 93 | 572 | 9 | 134 | 247 | 2,520 | 2,520 |
| February | 808 | 600 | 106 | 596 | 43 | 115 | 340 | 2,610 | 5,120 |
| March | 884 | 626 | 178 | 505 | 11 | 197 | 653 | 3,050 | 8,180 |
| April | 618 | 451 | 96 | 476 | 12 | 204 | 278 | 2,140 r/ | 10,300 |
| May | 862 | 495 | 99 | 638 | 32 | 136 | 297 | 2,560 | 12,900 |
| June | 1,070 | 393 | 142 | 567 | 8 | 127 | 363 | 2,670 | 15,500 |
| July | 437 | 518 | 94 r/ | 392 | 8 | 144 | 307 | 1,900 | 17,400 |
| August | 951 | 527 | 142 | 545 | 15 | 128 | 426 | 2,730 | 20,200 |
| September: | | | | | | | | | |
| Australia | 20 | 1 | 1 | (2/) | -- | (2/) | 4 | 26 | 565 |
| Belgium | -- | 41 | 6 | 1 | -- | 1 | 1 | 50 | 1,230 |
| Canada | 9 | 62 | 13 | 30 | 1 | 43 | 66 | 224 | 2,110 |
| France | 86 | 59 | 1 | 29 | (2/) | 4 | 8 | 187 | 3,060 |
| Germany | 550 | 66 | 2 | 35 | -- | 4 | 2 | 659 | 3,080 |
| India | 4 | 2 | -- | (2/) | (2/) | -- | (2/) | 7 | 92 |
| Ireland | -- | (2/) | (2/) | 1 | -- | (2/) | (2/) | 1 | 38 |
| Italy | 19 | 4 | (2/) | 80 | -- | (2/) | 2 | 105 | 1,120 |
| Japan | 6 | 11 | 4 | 80 | -- | 1 | 14 | 116 | 784 |
| Korea, Republic of | 14 | 15 | -- | 59 | -- | 1 | 4 | 93 | 548 |
| Mexico | (2/) | (2/) | 128 | 2 | -- | 46 | 128 | 304 | 2,410 |
| Netherlands | -- | (2/) | -- | 5 | (2/) | (2/) | (2/) | 5 | 56 |
| Singapore | (2/) | 8 | 1 | 1 | -- | 1 | 21 | 32 | 144 |
| Spain | (2/) | 3 | -- | 1 | -- | 1 | 1 | 6 | 51 |
| Sweden | -- | (2/) | -- | 5 | -- | 1 | (2/) | 6 | 273 |
| Switzerland | 12 | -- | -- | 23 | -- | 1 | 2 | 38 | 531 |
| Taiwan | (2/) | -- | -- | 54 | 1 | 3 | 6 | 64 | 320 |
| United Kingdom | 55 | 249 | 2 | 191 | (2/) | 4 | 3 | 504 | 3,670 |
| Other | 13 | 47 | 16 | 136 | 2 | 22 | 71 | 307 | 2,820 |
| Total | 788 | 568 | 174 | 733 | 4 | 133 | 333 | 2,730 | 22,900 |
| 2002: January-September | 7,280 | 4,780 | 1,120 | 5,020 | 141 | 1,320 | 3,250 | 22,900 | XX |
| 2001: January-September | 9,920 | 6,050 | 1,270 | 5,230 | 103 | 1,500 | 2,520 | 26,600 | XX |

r/ Revised. XX Not applicable. -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 8
NICKEL CONSUMPTION IN CAST AND WROUGHT PRODUCTS

| | Percent | |
|-------------------------------------|---------|------|
| | Wrought | Cast |
| October 2002: | | |
| Stainless and heat resisting steels | 80 | 20 |
| Alloy steels | 98 | 2 |
| Superalloys | 85 | 15 |
| Copper-nickel alloys | 97 | 3 |
| Other nickel-base alloys | 100 | (1/) |

1/ Less than 1/2 unit.

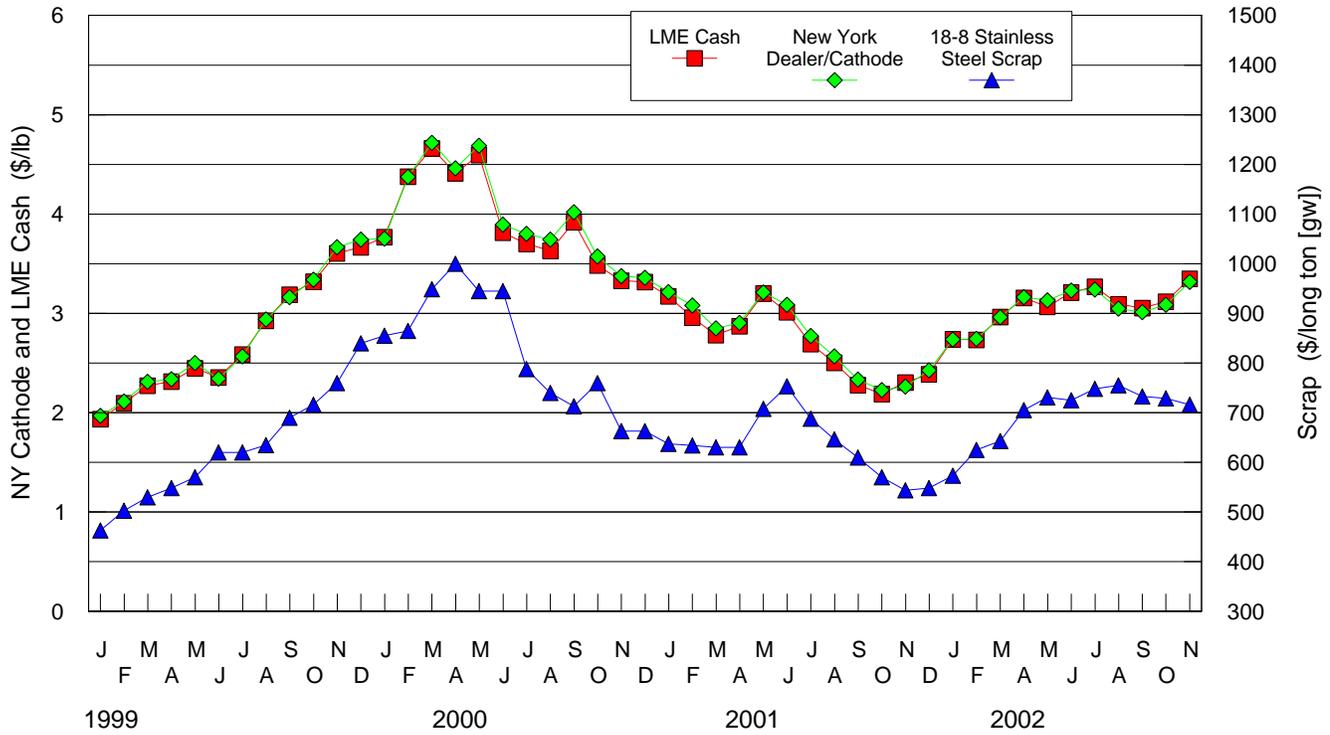
TABLE 9
NICKEL PRICES

| Date | Cathode NY Dealer \$/lb. | LME Cash \$/t | LME Cash \$/lb. | 18/8 Stainless steel scrap Pittsburgh \$/long ton(gw) |
|--------------------------|--------------------------------|---------------------|-----------------------|--|
| 2002: | | | | |
| Average for week ending: | | | | |
| October 4 | 3.02-3.15 | 6,569.500 | 2.980 | 720-745 |
| October 11 | 3.04-3.09 | 6,530.000 | 2.962 | 720-735 |
| October 18 | 3.01-3.21 | 6,704.500 | 3.041 | 720-735 |
| October 25 | 3.19-3.31 | 7,003.500 | 3.177 | 720-735 |
| November 1 | 3.33-3.40 | 7,235.000 | 3.282 | 720-735 |
| November 8 | 3.34-3.47 | 7,342.000 | 3.330 | 700-725 |
| November 15 | 3.32-3.43 | 7,228.000 | 3.279 | 700-725 |
| November 22 | 3.31-3.47 | 7,306.000 | 3.314 | 700-725 |
| November 29 | 3.43-3.48 | 7,389.500 | 3.352 | 700-725 |
| Average for month of: | | | | |
| January | 2.736 | 6,043.182 | 2.741 | 573 |
| February | 2.745 | 6,029.250 | 2.735 | 625 |
| March | 2.963 | 6,537.500 | 2.965 | 643 |
| April | 3.163 | 6,958.214 | 3.156 | 705 |
| May | 3.130 | 6,761.364 | 3.067 | 731 |
| June | 3.213 | 7,119.861 | 3.230 | 725 |
| July | 3.268 | 7,142.717 | 3.240 | 748 |
| August | 3.094 | 6,717.143 | 3.047 | 755 |
| September | 3.053 | 6,640.238 | 3.012 | 733 |
| October | 3.118 | 6,804.457 | 3.086 | 729 |
| November | 3.349 | 7,313.929 | 3.318 | 716 |

Source: Platts Metals Week and American Metal Market.

1999-2002 AVERAGE MONTHLY PRICES

(Derived from Metals Week and American Metal Market quotations)



1999-2002 STOCKS

