

Mineral Industry Surveys

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NICKEL IN JANUARY 2004

In January, reported domestic consumption, on a daily average basis, was 5% less than that of December 2003, according to the U.S. Geological Survey. Average daily nickel consumption of cathode, pellets, briquets, and ferronickel for stainless steel was 57.6 metric tons per day (t/d)—16% less than the 68.4 t/d for December and 10% less than the 64.2 t/d (revised) for January 2003. Consumption of elemental nickel to make superalloys and corrosion-resistant nickel-base alloys decreased by 8% and 5%, respectively, from December levels, on a daily average basis. Sales to plating companies averaged 26.5 t/d, about 8% less than the December sales figure of 28.9 t/d.

On January 31, U.S. consumer stocks of cathode, pellets, briquets, and powder totaled 1,220 metric tons (t)—9% less than the 1,340 t (revised) on December 31, 2003, and 18% less than the 1,500 t reported for yearend 2002. Stocks in London Metal Exchange (LME) warehouses worldwide totaled 15,384 t—36% less than the 24,072 t on December 31, 2003. Data collected by the International Nickel Study Group indicated that, at yearend 2003, world nickel producers (excluding those in Austria, China, The Former Yugoslav Republic of Macedonia, Serbia, and the Ural area of Russia) had 91,400 t of nickel in primary products in stock, of which 62,500 t, or 68%, was Class I material (electrolytic cathode, pellets, briquets, rondelles, powder, etc.). The other 32% was Class II materials (ferronickel, oxide sinter, and East Asian utility nickel—products with a nickel content of less than 99%).

The United States imported 125,000 t of primary nickel in 2003, 4% more than the 121,000 t for 2002. Class I materials accounted for 86% of total primary nickel imports received during 2003. Trade data for January 2004 will appear in a subsequent report.

BHP Billiton commits to the development of Ravensthorpe

On March 23, the BHP Billiton Group announced that it would develop its Ravensthorpe nickel project in Western Australia and expand production capacity at its Yabulu nickel-cobalt refinery near Townsville, Queensland, to accommodate the output from Ravensthorpe. When the Ravensthorpe/Yabulu

project is completed, BHP Billiton would become the third largest nickel producer in the world after MMC Norilsk Nickel of Russia and Inco Limited of Canada. The capital cost of the integrated project is expected to be about \$1.4 billion. Of the \$1.4 billion, about \$1.0 billion would be required to develop the first of Ravensthorpe's three deposits and to build an onsite ore treatment facility (BHP Billiton Plc, 2004).

The remaining \$350 million would be used to expand the Yabulu refinery, extending the life of the refinery by 25 years. The additional production could be available by yearend 2007. Yabulu will continue to process lateritic ores from other parts of the Asia-Pacific region. Since 1986, Yabulu has imported some 43 million metric tons of ore from Indonesia, New Caledonia, and the Philippines. When the expansion is completed, Yabulu will be able to produce 76,000 metric tons per year (t/yr) of nickel and 3,500 t/yr of cobalt.

The Ravensthorpe minesite is about 45 kilometers (km) inland from Western Australia's Southern Coast and about 155 km west of the port of Esperance. About \$85 million has been spent on the project since 1998 for testwork and feasibility studies. Limited site activities began in early May 2004. The treatment plant will have two separate processing circuits—one for the iron-rich, high silica limonitic ores, and one for the underlying magnesium-rich saprolitic ores. The limonitic ores will be crushed, scrubbed, cycloned and screened to remove unwanted, barren silica. The nickel and cobalt then will be recovered from the upgraded limonite by pressure acid leaching (PAL). The saprolitic ores will be beneficiated in a similar manner, but the nickel and cobalt will be recovered by leaching at atmospheric pressure. The saprolitic ore will be leached with a mixture of the PAL discharge and additional acid. Ravensthorpe is being designed to produce up to 220,000 t/yr of mixed nickel and cobalt hydroxide intermediate product.

Reference Cited

BHP Billiton Plc, 2004, The Ravensthorpe nickel project and Yabulu refinery expansion—Overview: Melbourne, Victoria, Australia, briefing paper, March, 9 p.

TABLE 1
CONSUMPTION OF NICKEL (EXCLUSIVE OF SCRAP), BY FORM AND USE¹

(Metric tons, nickel content)

Period	Cathodes, pellets, briquets, and powder	Ferronickel	Oxide-sinter, salts, and other forms	Total	Total year to date
2003:					
January	4,820	529	75	5,430	5,430
February	4,410	390	23	4,820	10,200
March	4,350	653	29 ^r	5,030 ^r	15,300
April	4,790	400	46	5,230	20,500
May	4,330	524	25	4,870	25,400
June	4,050	498	43	4,590	30,000
July ^r	4,070	900	25	5,000	35,000
August	4,250	873	28	5,150	40,100 ^r
September	4,140	844	29	5,020	45,100 ^r
October	4,670	911	33 ^r	5,620	50,800 ^r
November	4,420	1,190	30	5,640	56,400 ^r
December	4,090	902	30	5,020	61,400 ^r
January-December	52,400	8,620	416	61,400	XX
2004:					
January:					
Steel:					
Stainless and heat resisting	1,190	595	W	1,790	1,790
Alloy (excludes stainless)	W	--	--	W	W
Superalloys	768	--	W	768	768
Copper-nickel alloys	W	--	--	W	W
Electric, magnetic, and expansion alloys	9	--	--	9	9
Other nickel & nickel alloys	W	--	W	W	W
Cast iron	W	--	--	W	W
Electroplating (sales to platers)	821	--	--	821	821
Chemical and chemical uses	W	--	--	W	W
Other uses	1,340	--	34	1,380	1,380
Total reported	4,130 ²	595	34	4,760	4,760
Total all companies (calc) ³	XX	XX	XX	7,320	7,320

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

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

²Of consumption, 3,350 metric tons were consumed as cathodes and pellets, the remainder as briquets and powder.

³Figures represent calculated apparent consumption; based on the revised proportion of reported primary consumption (65.01%) to apparent primary consumption for 2001.

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
2003:					
January		1,360	100	44	1,500
February		1,430	54	35 ^r	1,520
March		1,230	148	48 ^r	1,430
April		1,440	50 ^r	48 ^r	1,540
May		1,430	58	42 ^r	1,530
June		1,810	102 ^r	73 ^r	1,990 ^r
July		1,520 ^r	91	57 ^r	1,670 ^r
August		1,700	140	51 ^r	1,890
September		1,250	99	52 ^r	1,400
October		1,310	109	60 ^r	1,480
November		1,310	227	59 ^r	1,600 ^r
December		1,340 ^r	260 ^r	46	1,650 ^r
2004:					
January:					
Steel (stainless, heat resisting and alloy)		462	(3)	(3)	462
Nonferrous alloys ⁴		738	(3)	(3)	738
Foundry (cast irons)		(3)	--	--	(3)
Chemical (catalysts, ceramics, plating salt, etc.) and unspecified uses		22	186	55	263
Total		1,220	186	55	1,460

^rRevised. -- Zero.

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

²Stocks 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 adjustments.

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

⁴Includes 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 USE¹

(Metric tons, nickel content)

Period	Consumption			Stocks		
	Ferrous scrap ²	Nonferrous scrap ³	Total scrap	Ferrous scrap ²	Nonferrous scrap ³	Total scrap
2003:						
January	4,690	645	5,340	3,420	107	3,530
February	4,030	758	4,790	3,080	96	3,180
March	6,420 ^r	649	7,070 ^r	2,930	105	3,040
April	5,310	674	5,980	3,210	93	3,310
May	4,920	773	5,690 ^r	3,150	102	3,250
June	4,030 ^r	645	4,680	3,100	109	3,210
July	4,340	682	5,020	3,370	105	3,480
August	4,770 ^r	755	5,530	3,310	115	3,430
September	3,810	739	4,540 ^r	3,290	108	3,400
October	5,350 ^r	763	6,110 ^r	3,110	101	3,210
November	4,960	674	5,630 ^r	2,950	97	3,050
December	4,930 ^r	653	5,590	2,810	85	2,900
January-December	57,600	8,410	66,000	XX	XX	XX
2004, January	5,050	675	5,730	2,700	81	2,780

^rRevised. XX Not applicable.

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

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

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

TABLE 4
U.S. IMPORTS FOR CONSUMPTION OF NICKEL, BY COUNTRY¹

(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
2002:										
December	6,970	512	750	16	225	530	312	9,310	130,000	70
2003:										
January	5,950	928	605	10	341	322	223	8,380	8,380	55
February	7,060	954	916	8	323	424	269	9,960	18,300	115
March	17,400	1,130	1,310	34	420	476	309	21,100	39,400	93
April	7,770	678	1,700	--	496	533	321	11,500	50,900	64
May	6,160	933	1,530	7	412	461	378	9,880	60,800	37
June	10,800	368	692	(5)	226	408	327	12,800	73,600	41
July	6,240	294	1,840	11	352	420	312	9,470	83,000	49
August	7,420	762	913	(5)	477	475	544	10,600	93,600	62
September	9,990	1,030	1,180	(5)	570	744	248	13,800	107,000	48
October	7,270	565	1,010	20	326	715	255	10,200	118,000	34
November	7,030	625	932	--	318	889	324	10,100	128,000	28
December:										
Australia	272	--	--	--	--	--	10	282	12,000	--
Brazil	20	--	--	--	--	--	--	20	1,210	--
Canada	3,170	346	--	(5)	164	507	(5)	4,190	44,900	--
Colombia	--	--	182	--	--	--	--	182	2,890	--
Dominican Republic	--	--	289	--	--	--	--	289	8,020	--
Finland	320	77	--	--	--	--	124	521	7,620	--
France	59	--	--	--	30	--	19	108	3,000	1
Germany	(5)	13	--	--	122	(5)	29	164	1,100	18
Japan	--	9	--	--	7	--	19	35	614	7
Mexico	(5)	--	--	--	14	304	1	319	2,290	--
New Caledonia	--	--	--	--	--	--	--	--	1,670	--
Norway	2,180	--	--	--	--	--	--	2,180	17,300	--
Russia	70	239	--	--	--	--	--	309	27,600	--
South Africa	39	--	--	--	--	--	--	39	344	--
Sweden	--	8	--	--	--	--	--	8	81	--
United Kingdom	18	155	--	--	111	--	4	288	2,950	1
Venezuela	--	--	--	--	28	3	--	31	83	--
Zimbabwe	60	--	--	--	--	--	--	60	716	--
Other	21 ⁶	13	--	--	54	7	78	173	2,520	7
Total	6,230	860	471	(5)	530	821	284	9,190	137,000	34
2003: January-December	99,300	9,130	13,100	91	4,790	6,690	3,800	137,000	XX	659
2002: January-December	97,200	6,970	12,300	1,230	3,030	6,080	2,860	130,000	XX	879

XX Not applicable. -- Zero.

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

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

³Excludes wrought nickel.

⁴May include revisions for prior months.

⁵Less than 1/2 unit.

⁶All or part of these data have been referred to the U.S. Census Bureau for verification.

Source: U.S. Census Bureau.

TABLE 5
U.S. EXPORTS OF NICKEL, BY COUNTRY¹

(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
2002:										
December	75	65	7	3	983	2,080	423	3,630	45,900	175
2003:										
January	91	58	10	11	853	3,060	267	4,350	4,350	586
February	24	84	13	7	948	5,050	261	6,380	10,700	462
March	46	113	5	13	770	5,150	243	6,340	17,100	629
April	78	86	8	19	894	2,880	466	4,430	21,500	149
May	30	59	11	11	836	2,380	379	3,710	25,200	147
June	90	47	29	33	516	2,310	276	3,300	28,500	143
July	87	95	27	2	510	3,570	393	4,690	33,200	148
August	56	77	37	1	792	3,040	301	4,300	37,500	162
September	107	106	18	51	707	2,350	223	3,560	41,100	148
October	133	153	12	4	1,010	3,270	276	4,850	45,900	141
November	210	127	1	5	819	1,600	371	3,130	49,000	102
December:										
Australia	--	1	--	--	--	(4)	--	2	64	(4)
Belgium	--	8	--	--	--	--	--	8	285	--
Canada	4	19	--	--	695	128	167	1,010	11,900	3
China	--	(4)	--	--	30	626	25	681	6,560	(4)
Finland	--	--	--	--	--	923	(4)	923	5,920	--
Germany	(4)	21	--	(4)	--	5	--	26	373	2
India	--	--	--	--	--	65	50	114	1,070	(4)
Italy	--	(4)	--	--	--	--	--	(4)	511	--
Japan	2	13	--	4	9	83	7	117	1,460	8
Korea, Republic of	--	7	--	--	--	674	16	696	7,050	2
Mexico	19	3	--	--	--	7	11	40	870	19
Netherlands	--	--	--	--	(4)	20	4	24	1,340	--
South Africa	--	--	--	--	--	--	--	--	115	--
Spain	--	--	--	--	--	--	--	--	2,580	--
Sweden	--	(4)	--	--	32	--	--	32	417	--
Taiwan	--	(4)	--	(4)	1	540	--	540	9,730	7
United Kingdom	(4)	(4)	10	--	37	14	1	62	1,170	13
Other	19	20	--	--	5	105	160	312	2,220	18
Total	44	92	10	4	809	3,190	441	4,590	53,600	72
2003: January-December	996	1,100	182	160	9,460	37,800	3,900	53,600	XX	2,890
2002: January-December	1,740	1,480	46	685	13,700	25,700	2,580	45,900	XX	2,570

XX Not applicable. -- Zero.

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

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

³Excludes wrought nickel.

⁴Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF NICKEL ALLOYS, BY COUNTRY¹

(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
2002:									
December	170	192	510	353	21	147	153	1,550	18,800
2003:									
January	54	252	427	332	(2)	133	91	1,290	1,290
February	167	158	356	264	11	93	140	1,190	2,480
March	129	209	600	308	(2)	148	163	1,560	4,040
April	184	245	697	316	6	204	266	1,920	5,950
May	181	204	504	328	7	206	195	1,630	7,580
June	150	156	579	244	35	292	102	1,560	9,140
July	130	266	554	277	30	305	168	1,730	10,900
August	151	78	469	319	32	322	154	1,530	12,400
September	48	239	406	211	10	115	95	1,120	13,500
October	204	307	443	305	15	162	95	1,530	15,000
November	195	239	331	210	23	89	156	1,240	16,300
December:									
Australia	48	--	--	--	--	--	--	48	673
Belgium	--	--	(2)	--	--	--	--	(2)	183
Canada	--	(2)	6	--	--	23	5	34	257
China	--	--	--	(2)	--	--	32	32	313
France	235	1	69	2	--	15	1	323	1,550
Germany	(2)	77	143	110	44	73	2	449	6,010
Italy	--	61	4	--	--	1	8	74	1,090
Japan	20	1	4	--	--	326	(2)	351	1,010
Mexico	--	--	(2)	--	--	--	57	57	757
Netherlands	--	--	--	--	--	--	23	23	229
South Africa	--	--	--	--	--	--	--	--	390
Sweden	1	10	135	3	--	40	--	189	2,710
United Kingdom	10	16	22	100	(2)	14	4	166	2,380
Other	1	3	5	--	1	212 ³	15	236	706
Total	315	169	388	215	45	704	147	1,980	18,300
2003: January-December	1,910	2,520	5,760	3,330	215	2,770	1,770	18,300	XX
2002: January-December	2,540	2,640	5,230	3,520	196	2,850	1,810	18,800	XX

XX Not applicable. -- Zero.

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

²Less than 1/2 unit.

³All or part of these data have been referred to the U.S. Census Bureau for verification.

Source: U.S. Census Bureau.

TABLE 7
U.S. EXPORTS OF NICKEL ALLOYS, BY COUNTRY¹

(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
2002:									
December	415	316	78	302	14	115	426	1,660	29,100
2003:									
January	729	375	138	236	12	231	192	1,910	1,910
February	1,160	419	93	215	38	168	374	2,470	4,380
March	226	615	113	399	214	150	307	2,020	6,400
April	600	743	158	315	14	182	292	2,300	8,700
May	857	950	82	295	44	184	256	2,670	11,400
June	180	980	94	521	21	163	280	2,240	13,600
July	750	553	72	223	25	263	216	2,100	15,700
August	708	707	112	344	30	228	201	2,330	18,000
September	597	623	80	281	52	140	271	2,040	20,100
October	206	802	55	396	55	255	253	2,020	22,100
November	274	621	121	382	49	254	208	1,910	24,000
December:									
Australia	--	--	--	--	--	1	1	2	71
Belgium	32	47	2	1	--	(2)	(2)	82	1,080
Canada	4	42	13	21	2	49	50	181	2,700
France	124	70	--	47	(2)	1	1	243	2,540
Germany	17	23	3	32	1	3	2	81	4,690
India	1	7	4	3	--	1	(2)	16	150
Ireland	--	--	(2)	1	--	--	--	1	21
Italy	(2)	33	1	2	(2)	1	1	38	585
Japan	128	21	21	45	100	1	1	317	1,660
Korea, Republic of	(2)	8	1	25	--	4	3	41	428
Mexico	(2)	2	7	8	--	90	54	161	3,150
Netherlands	(2)	1	(2)	(2)	--	5	21	27	170
Singapore	2	15	1	3	--	(2)	2	23	212
Spain	20	--	--	5	(2)	--	1	26	168
Sweden	--	--	(2)	4	--	(2)	(2)	4	71
Switzerland	22	2	--	2	--	1	--	27	541
Taiwan	--	2	--	12	2	29	6	51	428
United Kingdom	11	217	1	63	2	6	4	304	4,360
Other	18	81	15	76	1	11	52	253	2,870
Total	379	571	69	350	108	203	199	1,880	25,900
2003: January-December	6,660	7,960	1,190	3,960	662	2,420	3,050	25,900	XX
2002: January-December	8,720	6,020	1,520	6,590	168 [†]	1,770	4,290	29,100	XX

XX Not applicable. -- Zero.

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

²Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 8
NICKEL CONSUMPTION IN CAST AND WROUGHT PRODUCTS

	Percent	
	Wrought	Cast
January 2004:		
Stainless and heat resisting steels	60	40
Alloy steels	98	2
Superalloys	87	13
Copper-nickel alloys	96	4
Other nickel-base alloys	100	(1)

¹Less than 1/2 unit.

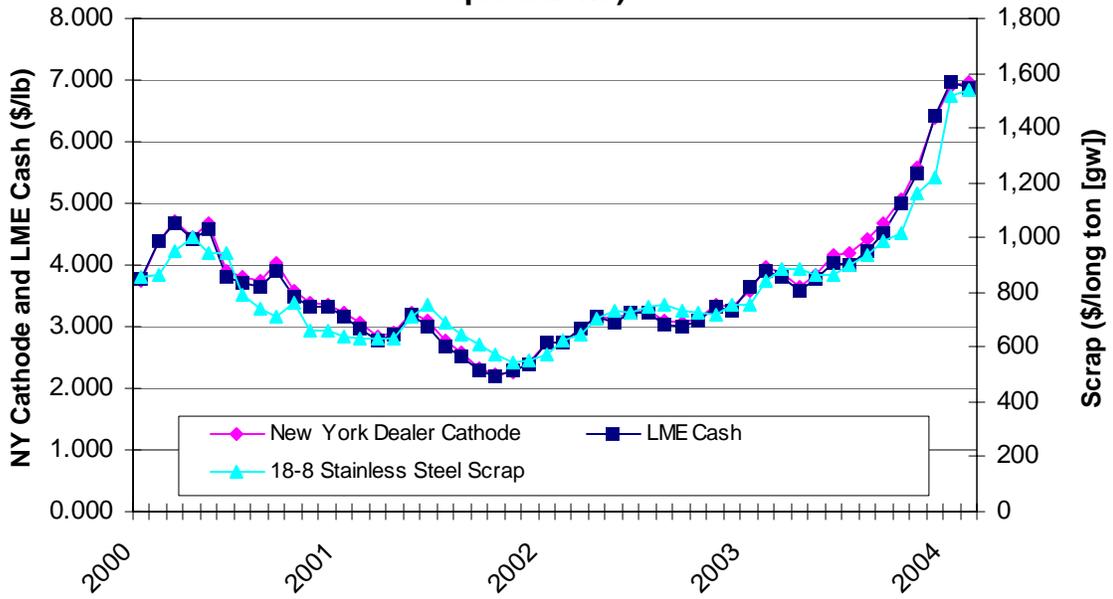
TABLE 9
NICKEL PRICES

Date	Platts Metals Week			18/8 Stainless	American
	Cathode NY Dealer \$/lb.	LME Cash mean ¹ \$/t	LME Cash mean ¹ \$/lb.	steel scrap Free market \$/long ton (gw)	18/8 Stainless steel scrap Pittsburgh \$/long ton (gw)
2003:					
Average for week ending:					
December 5	5.74-5.98	12,578.000	5.705	1,150-1,170	1,150-1,170
December 12	5.98-6.21	13,192.000	5.984	1,300-1,350	1,225-1,250
December 19	6.26-7.08	14,502.500	6.578	1,250-1,300	1,225-1,250
December 26	6.96-7.25	15,411.667	6.991	1,250-1,300	1,225-1,250
Average for month of:					
January	3.580	8,026.020	3.641	XX	757
February	3.978	8,623.000	3.911	840	840
March	3.865	8,378.810	3.801	886	885
April	3.655	7,910.125	3.588	885	885
May	3.826	8,330.625	3.779	839	861
June	4.155	8,874.762	4.026	874	867
July	4.178	8,797.391	3.990	893	897
August	4.418	9,351.375	4.242	918	935
September	4.668	9,965.341	4.520	978	985
October	5.066	11,047.174	5.011	1,041	1,013
November	5.568	12,086.500	5.482	1,153	1,160
December	6.390	14,162.500	6.424	1,262	1,222
Yearly average	4.446	9,629.469	4.368	961	942
2004:					
Average for week ending:					
January 2	7.01-7.78	16,625.000	7.541	1,250-1,300	1,225-1,250
January 9	7.22-8.28	16,451.000	7.462	1,525-1,585	1,450-1,475
January 16	6.65-7.66	14,859.500	6.740	1,475-1,550	1,450-1,475
January 23	6.85-7.02	14,844.500	6.733	1,475-1,550	1,450-1,475
January 30	6.88-7.00	14,879.500	6.749	1,475-1,550	1,450-1,475
February 6	7.01-7.33	15,179.000	6.885	1,500-1,550	1,575-1,595
February 13	7.09-7.33	15,453.500	7.010	1,570-1,590	1,575-1,595
February 20	7.21-7.42	15,525.000	7.042	1,500-1,550	1,575-1,595
February 27	6.56-7.13	14,423.000	6.542	1,500-1,535	1,575-1,595
Average for month of:					
January	6.900	15,326.548	6.952	1,517	1,463
February	6.968	15,145.125	6.870	1,537	1,585

XX Not applicable.

¹Mean of the cash buyer price and the cash seller & settlement price.

2000-2004 AVERAGE MONTHLY PRICES (Derived from Metals Week and American Metal Market quotations)



2000-2004 STOCKS

