

# Mineral Industry Surveys

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## CHROMIUM IN APRIL 2002

On the basis of gross weight, consumption of chromium ferroalloys and metal in April 2002 decreased slightly compared with revised consumption in March 2002, according to the U.S. Geological Survey.

Included in this Mineral Industry Surveys are U.S. salient chromium statistics, U.S. consumption by end use and consumer stocks of chromium ferroalloys and metal at the end of April 2002, and U.S. foreign trade data for selected chromium-containing materials in March 2002.

### Update

The Defense National Stockpile Center (DNSC) issued Amendment No. 001 to Basic Ordering Agreement for Ferrochromium, DLA-Ferrochromium-004. In addition to information about the submission and evaluation of quotes, this document describes 36,400 metric tons of high-carbon ferrochromium that is for sale. The material is stored at Warren, OH. The material is divided in 5 lots, has an average chromium content of 68.1%, and range of chromium content from 67.8% to 71.4%. Lot sizes range from 253 tons to

31,096 tons.

The International Chromium Development Association (ICDA) prepared a brief report oriented to the general public about the effect of *Chemical transformations of chromium in soils on mobility, bio-availability and remediation*. Copies are available upon request while they last. Contact the author of this Mineral Industry Surveys report. The article discusses new developments in the understanding of chemical and biological processes that govern the chemistry of chromium in soils and natural waters. The oxidation states of chromium in natural waters and soils [Cr(III) and Cr(IV)] and the interconversion between the two are keys to understanding the mobility, toxicity, bioavailability, and remediation of environments enriched with chromium-containing wastes.

### Reference Cited

James, B.R., 2002, Chemical transformations of chromium in soils—Relevance to mobility, bio-availability and remediation: Chromium File from the International Chromium Development Association, no. 8, February, 8 p.

TABLE 1  
U.S. SALIENT CHROMIUM STATISTICS 1/

(Metric tons, gross weight)

	2001	2002				
	January- December 2/	February	March	First quarter	April	January- April 2/
<b>Production:</b>						
Stainless steel production 3/	1,820,000	148,000	168,000	464,000	169,000	636,000
<b>Components of U.S. supply:</b>						
Stainless steel scrap receipts	710,000	63,700	65,100	186,000	68,900	255,000
Stainless steel scrap consumption	1,070,000	91,400	95,900	274,000	96,300	371,000
<b>Imports for consumption:</b>						
Chromite ore	189,000	396	42,800	43,600	NA	43,600 4/
<b>Ferrochromium:</b>						
More than 4% carbon	236,000	72	25,100	40,600	NA	40,600 4/
More than 3%, but not more than 4% carbon	20	--	--	--	NA	-- 4/
More than 0.5%, but not more than 3% carbon	2,290	--	1,410	2,210	NA	2,210 4/
Not more than 0.5% carbon	17,200	1,460	2,180	4,320	NA	4,320 4/
Ferrochromium silicon	14,600	492	4,960	5,450	NA	5,450 4/
Total ferroalloy imports	271,000	2,030	33,600	52,600	NA	52,600 4/
Chromium metal 5/	8,190	352	697	1,810	NA	1,810 4/
Stainless steel	761,000	75,800	76,700	218,000	NA	218,000 4/
Stainless steel scrap	98,000	3,140	3,660	10,600	NA	10,600 4/
<b>Distribution of U.S. supply:</b>						
<b>Consumption:</b>						
Chromium ferroalloys & metal	367,000 r/	28,200 r/	31,300 r/	87,300	30,600	118,000
<b>Exports:</b>						
Chromite ore	61,000	988	234	1,570	NA	1,570 4/
<b>Chromium ferroalloys:</b>						
High-carbon ferrochromium	8,390	246	269	855	NA	855 4/
Low-carbon ferrochromium	7,880	145	308	562	NA	562 4/
Ferrochromium silicon	86	3	--	17	NA	17 4/
Total ferroalloy exports	16,400	394	577	1,430	NA	1,430 4/
Chromium metal	1,040	44	27	124	NA	124 4/
Stainless steel	249,000	18,600	19,300	57,400	NA	57,400 4/
Stainless steel scrap	438,000	49,600	27,200	90,600	NA	90,600 4/
<b>Stocks at end of period:</b>						
<b>Industry:</b>						
Chromium ferroalloys and metal, consumer	28,000	25,000	19,000	XX	13,600	XX
<b>Government stockpile:</b>						
Chromite ore	NA	NA	NA	XX	NA	XX
Chromium ferroalloys	NA	NA	NA	XX	NA	XX
Chromium metal	NA	NA	NA	XX	NA	XX

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

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

2/ May include revised data.

3/ Data on stainless steel production reported by American Iron and Steel Institute; monthly, quarterly, and year-to-date production of stainless and heat-resisting raw steel.

4/ Includes data for January through March; April data not available.

5/ Includes waste and scrap and other.

TABLE 2  
U.S. REPORTED CONSUMPTION AND STOCKS OF CHROMIUM PRODUCTS IN 2002 1/

(Metric tons, gross weight unless otherwise noted)

	March	April	January- April 2/
<b>Consumption by end use:</b>			
<b>Alloy uses:</b>			
<b>Iron alloys:</b>			
<b>Steel:</b>			
Carbon steel	427 t/	454	1,800
High-strength low-alloy steel	1,070 t/	1,040	4,350
Stainless and heat-resisting steel	26,100	25,700	97,700
Full alloy steel	1,610 t/	1,490	5,820
Electrical steel	W	W	W
Tool steel	529	308	2,010
Cast irons	W	W	W
Superalloys	652	625	2,620
Other alloys 3/	93 t/	100	372
<b>Total</b>	<b>31,300 t/</b>	<b>30,600</b>	<b>118,000</b>
<b>Total, chromium content</b>	<b>17,800 t/</b>	<b>17,500</b>	<b>66,800</b>
<b>Consumption by material:</b>			
Low-carbon ferrochromium	1,820 t/	1,640	6,800
High-carbon ferrochromium	24,100	23,700	91,600
Ferrochromium silicon	5,000 t/	4,880	18,100
Chromium metal	308	222	1,110
Chromite ore	W	W	W
Chromium-aluminum alloy	34	49	159
Other chromium materials	W	W	W
<b>Total</b>	<b>31,300 t/</b>	<b>30,600</b>	<b>118,000</b>
<b>Total, chromium content</b>	<b>17,800 t/</b>	<b>17,500</b>	<b>66,800</b>
<b>Consumer stocks:</b>			
Low-carbon ferrochromium	1,560	1,610	XX
High-carbon ferrochromium	16,600	11,400	XX
Ferrochromium silicon	640	356	XX
Chromium metal	159	197	XX
Chromite ore	22 t/	19	XX
Chromium-aluminum alloy	14	14	XX
Other chromium materials	38	33	XX
<b>Total</b>	<b>19,000</b>	<b>13,600</b>	<b>XX</b>
<b>Total, chromium content</b>	<b>11,300</b>	<b>8,300</b>	<b>XX</b>

t/ Revised. W Withheld to avoid disclosing company proprietary data. XX Not applicable. -- Zero.

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

2/ May include revised data.

3/ Includes structural and hard-facing materials, and aluminum, copper, magnetic, nickel, and other alloys.

TABLE 3  
U.S. GOVERNMENT STOCKPILE INVENTORY 1/ OF CHROMIUM MATERIALS 2/

(Metric tons)

Period	Chromite ore			Chromium ferroalloys			Chromium metal	
	Chemical	Metal-lurgical	Refractory	High-carbon ferro-chromium	Low-carbon ferro-chromium	Ferro-chromium silicon	Alumino-thermic	Electrolytic
2001:								
April	200,000	164,000	237,000	603,000	266,000	25,700	2,290	5,050
May	200,000	175,000	237,000	603,000	261,000	22,100	2,290	5,050
June	200,000	175,000	237,000	603,000	261,000	18,800	2,290	5,050
July	198,000	169,000	235,000	603,000	261,000	16,500	2,290	5,050
August	198,000	144,000	219,000	603,000	257,000	14,000	2,270	5,050
September	198,000	144,000	219,000	601,000	248,000	12,900	2,250	5,050
October	NA	NA	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA	NA	NA
2002:								
January	NA	NA	NA	NA	NA	NA	NA	NA
February	NA	NA	NA	NA	NA	NA	NA	NA
March	NA	NA	NA	NA	NA	NA	NA	NA
April	NA	NA	NA	NA	NA	NA	NA	NA

NA Not available.

1/ Includes specification and non-specification grade materials and materials set aside for disposal but not yet shipped.

2/ Data are rounded to no more than three significant digits.

Source: Defense National Stockpile Center.

TABLE 4  
U.S. EXPORTS OF CHROMITE ORE, CHROMIUM FERROALLOYS, AND METAL 1/

Period	Chromite ore		Chromium ferroalloys 2/			Chromium metal 3/	
	Gross weight	Value	Gross weight	Chromium content	Value	Gross weight	Value
	(metric tons)	(thousands)	(metric tons)	(metric tons)	(thousands)	(metric tons)	(thousands)
2001:							
March	540	\$239	278	166	\$307	108	\$1,010
April	1,190	512	4,490	3,090	2,660	170	1,390
May	686	320	1,480	1,010	1,070	147	1,570
June	1,170	428	613	393	611	85	869
July	471	253	893	573	717	72	999
August	26,500	1,760	300	178	326	26	442
September	205	302	408	246	424	74	571
October	13,000	810	689	437	611	38	570
November	550	244	851	571	750	29	430
December	168	56	232	144	186	62	490
January-December	61,000	6,680	16,400	8,800	12,500	1,040	10,700
2002:							
January	350	210	463	288	472	53	450
February	988	572	394	233	393	44	224
March	234	106	577	354	513	27	447
January-March	1,570	888	1,430	875	1,380	124	1,120

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

2/ Includes low-, medium-, and high-carbon ferrochromium, and ferrochromium silicon.

3/ Includes wrought and unwrought and waste and scrap.

Source: U.S. Census Bureau.

TABLE 5  
U.S. IMPORTS FOR CONSUMPTION OF CHROMITE ORE, FERROCHROMIUM, AND CHROMIUM METAL 1/

(Metric tons)

	2001	2002			January- March
	January- December 2/	January	February	March	
<b>Chromite ore:</b>					
Not more than 40% chromic oxide:					
Gross weight	1,600	20	--	246	266
Chromic oxide content	575	7	--	44	51
More than 40% but less than 46% chromic oxide:					
Gross weight	3,100	23	--	10,500	10,500
Chromic oxide content	1,430	12	--	4,410	4,420
46% or more chromic oxide:					
Gross weight	184,000	415	396	32,000	32,800
Chromic oxide content	88,600	207	198	14,900	15,300
<b>Total, all grades:</b>					
Gross weight	189,000	458	396	42,800	43,600
Chromic oxide content	90,600	226	198	19,300	19,700
<b>Ferrochromium:</b>					
Low-carbon: 3/					
Not more than 0.5%:					
Gross weight	17,200	685	1,460	2,180	4,320
Chromium content	11,800	459	1,000	1,530	3,000
More than 0.5%, but not more than 3%:					
Gross weight	2,290	802	--	1,410	2,210
Chromium content	1,440	450	--	974	1,420
<b>Total, low-carbon:</b>					
Gross weight	19,500	1,490	1,460	3,580	6,530
Chromium content	13,200	909	1,000	2,510	4,420
Medium-carbon: 4/					
Gross weight	20	--	--	--	--
Chromium content	13	--	--	--	--
High-carbon: 5/					
Gross weight	236,000	15,500	72	25,100	40,600
Chromium content	137,000	8,450	51	17,400	25,900
<b>Total, all grades:</b>					
Gross weight	256,000	17,000	1,540	28,700	47,200
Chromium content	150,000	9,360	1,060	19,900	30,300
<b>Chromium metal:</b>					
Other than waste and scrap	8,150	747	325	697	1,770
Waste and scrap	43	13	27	--	40
<b>Total, all grades</b>	<b>8,190</b>	<b>760</b>	<b>352</b>	<b>697</b>	<b>1,810</b>

-- Zero.

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

2/ May include revised data.

3/ Ferrochromium containing not more than 3% carbon.

4/ Ferrochromium containing more than 3%, but not more than 4% carbon.

5/ Ferrochromium containing more than 4% carbon.

Source: U.S. Census Bureau.

TABLE 6  
U.S. IMPORTS FOR CONSUMPTION OF CHROMITE ORE IN 2002, BY GRADE AND BY COUNTRY 1/

Grade and country	March			January-March 2/		
	Gross weight (metric tons)	Cr <sub>2</sub> O <sub>3</sub> (metric tons)	Value 3/ (thousands)	Gross weight (metric tons)	Cr <sub>2</sub> O <sub>3</sub> (metric tons)	Value 3/ (thousands)
Not more than 40% chromic oxide:						
Canada	--	--	--	20	7	\$7
Philippines	246	44	\$48	246	44	48
Total	246	44	48	266	51	55
More than 40% but less than 46% chromic oxide, South Africa						
	10,500	4,410	689	10,500	4,420	693
46% or more chromic oxide, South Africa						
	32,000	14,900	1,470	32,800	15,300	1,580
All grades:						
Canada	--	--	--	20	7	7
Philippines	246	44	48	246	44	48
South Africa	42,500	19,300	2,160	43,400	19,700	2,270
Total	42,800	19,300	2,200	43,600	19,700	2,320

-- Zero.

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

2/ May include revised data.

3/ Customs import value generally represents a value in the foreign country and therefore excludes U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

Source: U.S. Census Bureau.

TABLE 7  
U.S. IMPORTS FOR CONSUMPTION OF FERROCHROMIUM IN 2002, BY GRADE AND BY COUNTRY 1/

Grade and country	March			January-March 2/		
	Gross weight (metric tons)	Chromium content (metric tons)	Value 3/ (thousands)	Gross weight (metric tons)	Chromium content (metric tons)	Value 3/ (thousands)
High-carbon ferrochromium: 4/						
Kazakhstan	23,900	16,600	\$7,710	24,000	16,700	\$7,770
Russia	1,150	781	1,030	1,150	781	1,030
South Africa	--	--	--	9,300	4,720	2,010
Venezuela	--	--	--	20	14	12
Zimbabwe	--	--	--	6,140	3,700	2,230
Total	25,100	17,400	8,740	40,600	25,900	13,100
Low-carbon ferrochromium: 5/						
More than 0.5%, but not more than 3% carbon:						
Kazakhstan	1,210	851	830	1,210	851	830
Russia	--	--	--	69	48	55
South Africa	200	123	100	932	525	388
Total	1,410	974	930	2,210	1,420	1,270
Not more than 0.5% carbon:						
China	--	--	--	20	13	25
France	4	3	5	4	3	5
Germany	1,090	767	1,990	1,280	897	2,390
Japan	80	58	161	321	227	664
Kazakhstan	550	396	424	550	396	424
Russia	401	278	377	1,890	1,290	1,700
South Africa	48	33	101	263	168	196
Total	2,180	1,530	3,060	4,320	3,000	5,410
All grades:						
China	--	--	--	20	13	25
France	4	3	5	4	3	5
Germany	1,090	767	1,990	1,280	897	2,390
Japan	80	58	161	321	227	664
Kazakhstan	25,700	17,800	8,960	25,800	17,900	9,030
Russia	1,550	1,060	1,410	3,100	2,120	2,790
South Africa	248	156	201	10,500	5,410	2,600
Venezuela	--	--	--	20	14	12
Zimbabwe	--	--	--	6,140	3,700	2,230
Total	28,700	19,900	12,700	47,200	30,300	19,700

See footnotes at end of table.

TABLE 7--Continued  
 U.S. IMPORTS FOR CONSUMPTION OF FERROCHROMIUM IN 2002, BY GRADE AND BY COUNTRY 1/

-- Zero.

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

2/ May include revised data.

3/ Customs import value generally represents a value in the foreign country and therefore excludes U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

4/ Ferrochromium containing more than 4% carbon.

5/ Ferrochromium containing not more than 3% carbon.

Source: U.S. Census Bureau.

TABLE 8  
 U.S. IMPORTS FOR CONSUMPTION OF CHROMIUM METAL IN 2002,  
 BY GRADE AND BY COUNTRY 1/

Grade and country	March		January-March 2/	
	Gross weight (metric tons)	Value 3/ (thousands)	Gross weight (metric tons)	Value 3/ (thousands)
<b>Waste and scrap:</b>				
Japan	--	--	21	\$141
Korea, Republic of	--	--	2	5
Russia	--	--	18	352
Total	--	--	40	498
<b>Other than waste and scrap:</b>				
China	94	\$349	239	929
France	200	1,580	544	4,360
Germany	2	7	24	293
Italy	1	59	2	92
Japan	5	61	5	61
Kazakhstan	131	528	265	1,080
Russia	123	468	387	1,930
Taiwan	1	6	1	10
United Kingdom	141	852	302	1,960
Total	697	3,910	1,770	10,700
<b>All grades:</b>				
China	94	349	239	929
France	200	1,580	544	4,360
Germany	2	7	24	293
Italy	1	59	2	92
Japan	5	61	26	202
Kazakhstan	131	528	265	1,080
Korea, Republic of	--	--	2	5
Russia	123	468	405	2,280
Taiwan	1	6	1	10
United Kingdom	141	852	302	1,960
Total	697	3,910	1,810	11,200

-- Zero.

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

2/ May include revised data.

3/ Customs import value generally represents a value in the foreign country and therefore exclude U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise into the United States.

Source: U.S. Census Bureau.

TABLE 9  
U.S. TRADE OF STAINLESS STEEL, BY PRODUCT, IN 2002 1/

Stainless steel product	March		January-March 2/	
	Gross weight (metric tons)	Value 3/ (thousands)	Gross weight (metric tons)	Value 3/ (thousands)
<b>Exports:</b>				
Ingot	465	\$2,050	1,720	\$13,700
Flat-rolled (width > 600 mm)	5,680	12,900	17,100	41,700
Flat-rolled (width < 600 mm)	7,850	18,500	23,500	50,600
Bars and rods in irregular coils	90	553	363	1,710
Other bars and rods	1,740	10,100	4,610	26,300
Wire	953	6,280	2,530	18,600
Tubes, pipes, hollow profiles	2,530	9,520	7,510	28,300
Total	19,300	60,000	57,400	181,000
Stainless steel scrap	27,200	17,000	90,600	59,200
Grand total	46,500	77,000	148,000	240,000
<b>Imports:</b>				
Ingot	37,700	40,300	92,900	98,800
Flat-rolled (width > 600 mm)	18,400	26,300	55,700	79,100
Flat-rolled (width < 600 mm)	2,900	9,080	8,000	25,000
Bars and rods in irregular coils	5,420	8,610	20,400	32,200
Other bars and rods	4,830	11,900	18,000	43,000
Wire	2,260	7,040	7,600	23,800
Tubes, pipes, hollow profiles	5,090	20,600	15,000	60,300
Total	76,700	124,000	218,000	362,000
Stainless steel scrap	3,660	2,090	10,600	5,960
Grand total	80,300	126,000	228,000	368,000

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

2/ May include revised data.

2/ Export value is free alongside ship (f.a.s.). Import value is Customs import value, which generally represents a value in the foreign country and therefore excludes U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

Source: U.S. Census Bureau.