

CHROMIUM STATISTICS
 By Thomas G. Goonan and John F. Papp
 [Metric tons (t), contained chromium unless otherwise noted]
 Last modification: January 13, 2003

Year	Primary production	Secondary production	Imports	Exports	Industry stocks	Government stocks	Reported consumption		Apparent chromium consumption			World production
							Chromite ore	Chromium ferroalloy and metal	Mass	Unit value (\$/t)	Unit value, adjusted (98\$/t)	
1900	44		5,540						5,580	56	1,100	16,500
1901	116		6,390						6,510	59	1,200	27,900
1902	99		12,500						12,600	47	890	26,400
1903	47		7,230						7,280	42	760	29,500
1904	39		7,640						7,680	46	840	36,600
1905	7		17,100						17,100	43	780	44,500
1906	34		13,700						13,700	41	750	49,700
1907	91		13,200						13,300	37	650	34,700
1908	113		8,800						8,910	40	730	20,700
1909	188		12,500						12,700	38	690	33,300
1910	64		12,200						12,300	35	610	33,600
1911	38		12,000						12,000	35	610	25,100
1912	63		17,300						17,400	30	510	38,000
1913	80		20,700						20,800	30	494	45,500
1914	186		25,500						25,700	28	457	48,500
1915	1,030		24,100						25,100	33	532	57,400
1916	14,800		36,500						51,300	44	658	87,000
1917	13,800		22,700						36,400	59	752	81,300
1918	25,900		31,500						57,400	118	1,270	96,500
1919	1,600		19,600						21,200	72	679	52,900
1920	787		48,500						49,300	41	333	53,200
1921	89		26,100						26,200	25	227	41,400
1922	112		28,600						28,700	26	252	43,300
1923	71		40,700						40,800	28	267	63,500
1924	91		37,600						37,700	29	276	90,200
1925	34		47,600						47,600	26	243	95,300
1926	44		68,100						68,200	25	229	112,000
1927	63		70,000						70,100	25	234	124,000
1928	208		68,600	1,380					67,500	25	238	140,000
1929	85		101,000	927					99,700	27	257	197,000
1930	25		103,000	781					102,000	34	333	173,000
1931	90		71,500	698					70,900	46	493	127,000
1932	53		30,600	978					29,700	53	631	101,000
1933	257		35,800						36,000	40	501	123,000
1934	111		57,800						57,900	39	474	183,000
1935	161		80,900						81,100	45	536	241,000

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							Chromite ore	Chromium ferroalloy and metal	Mass	Unit value (\$/t)	Unit value, adjusted (98\$/t)	
1936	81		98,300						98,400	45	528	317,000
1937	720		172,000						173,000	43	487	392,000
1938	262		114,000						114,000	43	497	362,000
1939	1,070		93,900						95,000	41	481	347,000
1940	849		210,000			16,600	157,000		211,000	42	489	457,000
1941	3,960		310,000	530		20,800	220,000		309,000	41	455	509,000
1942	32,100		279,000	1,350		83,000	239,000		248,000	56	560	637,000
1943	43,300		251,000	8,390		90,900	262,000		278,000	65	613	542,000
1944	12,200		227,000	596		719,000	232,000		231,000	70	648	411,000
1945	3,800		253,000	4,190		896,000	220,000	79,300	75,900	71	645	318,000
1946	1,120		207,000	1,980	87,700	565,000	197,000	67,300	537,000	59	492	352,000
1947	259		308,000	2,990	105,000	672,000	213,000	62,300	181,000	70	511	521,000
1948	992		427,000	4,850	160,000	778,000	232,000	67,400	262,000	86	581	644,000
1949	119		334,000	2,190	194,000	884,000	172,000	48,200	191,000	76	521	650,000
1950	112		374,000	904	160,000	990,000	258,000	81,200	301,000	75	507	720,000
1951	1,870		394,000	907	169,000	1,100,000	321,000	107,000	280,000	81	506	823,000
1952	5,540		456,000	1,240	196,000	1,200,000	308,000	142,000	326,000	96	589	963,000
1953	15,500		604,000	785	269,000	1,310,000	354,000	156,000	439,000	111	677	1,130,000
1954	42,000		387,000	3,140	334,000	1,410,000	241,000	114,000	255,000	93	564	924,000
1955	39,700		493,000	5,150	296,000	1,520,000	423,000	165,000	459,000	98	598	1,040,000
1956	54,500		595,000	5,790	382,000	1,630,000	499,000	162,000	502,000	109	653	1,200,000
1957	44,400		640,000	1,640	494,000	1,730,000	480,000	132,000	465,000	118	686	1,370,000
1958	38,500		356,000	1,830	467,000	1,840,000	332,000	106,000	313,000	128	723	1,130,000
1959	27,900		475,000	8,710	550,000	1,950,000	359,000	153,000	305,000	156	872	1,150,000
1960	27,400		387,000	13,300	546,000	2,050,000	323,000	137,000	304,000	120	659	1,250,000
1961	21,700		369,000	8,420	519,000	2,160,000	317,000	147,000	304,000	93	508	1,220,000
1962		35,300	405,000	4,370	542,000	2,490,000	300,000	150,000	79,400	91	492	1,280,000
1963		38,900	396,000	6,000	523,000	2,250,000	323,000	169,000	687,000	78	415	1,170,000
1964		40,900	419,000	4,360	416,000	2,270,000	396,000	208,000	548,000	75	395	1,290,000
1965		55,400	466,000	3,450	390,000	2,210,000	434,000	221,000	817,000	96	497	1,490,000
1966		54,700	590,000	10,400	443,000	2,190,000	404,000	233,000	604,000	99	497	1,360,000
1967		47,300	390,000	10,700	433,000	2,170,000	383,000	202,000	462,000	103	502	1,430,000
1968		58,000	352,000	20,100	347,000	2,130,000	371,000	208,000	511,000	120	563	1,560,000
1969		94,100	351,000	29,100	300,000	2,080,000	398,000	218,000	522,000	119	528	1,670,000
1970		74,200	427,000	29,000	294,000	2,030,000	394,000	194,000	527,000	116	487	1,910,000
1971		78,200	420,000	16,000	402,000	1,960,000	308,000	180,000	441,000	156	628	2,000,000

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							Chromite ore	Chromium ferroalloy and metal	Mass	Unit value (\$/t)	Unit value, adjusted (98\$/t)	
1972		67,500	399,000	14,300	363,000	1,910,000	320,000	217,000	540,000	187	729	1,970,000
1973		70,800	359,000	18,300	263,000	1,840,000	389,000	286,000	584,000	209	767	2,030,000
1974		85,100	397,000	13,300	235,000	1,710,000	398,000	327,000	624,000	254	840	2,230,000
1975		44,700	530,000	49,800	412,000	1,610,000	232,000	183,000	454,000	489	1,480	2,530,000
1976		65,400	475,000	44,600	443,000	1,530,000	262,000	225,000	539,000	447	1,280	2,430,000
1977		65,400	460,000	59,000	509,000	1,390,000	254,000	244,000	546,000	412	1,110	2,600,000
1978		60,900	426,000	24,300	461,000	1,390,000	250,000	270,000	511,000	391	978	2,990,000
1979		65,500	384,000	25,600	351,000	1,390,000	295,000	294,000	536,000	450	1,010	2,590,000
1980		59,100	421,000	29,900	249,000	1,290,000	233,000	229,000	631,000	668	1,320	2,830,000
1981		66,000	463,000	33,200	261,000	1,290,000	209,000	230,000	483,000	679	1,220	2,550,000
1982		62,000	214,000	11,300	195,000	1,290,000	135,000	143,000	331,000	608	1,030	2,390,000
1983		75,900	211,000	12,000	171,000	1,290,000	83,400	208,000	299,000	779	1,280	2,540,000
1984		81,400	323,000	34,400	128,000	1,250,000	136,000	210,000	446,000	779	1,220	2,950,000
1985		86,100	304,000	40,200	122,000	1,260,000	143,000	188,000	351,000	722	1,090	3,180,000
1986		85,100	363,000	38,700	119,000	1,270,000	107,000	191,000	397,000	675	1,000	3,530,000
1987		99,000	322,000	10,600	123,000	1,240,000	141,000	231,000	438,000	750	1,080	3,450,000
1988		124,000	449,000	15,500	161,000	1,220,000	160,000	243,000	553,000	1,070	1,470	3,870,000
1989		97,300	380,000	27,200	156,000	1,260,000	163,000	214,000	415,000	1,170	1,540	4,320,000
1990		101,000	346,000	16,300	141,000	1,270,000	120,000	226,000	433,000	1,090	1,350	3,950,000
1991		96,100	310,000	18,200	134,000	1,250,000	115,000	208,000	413,000	1,140	1,360	4,060,000
1992		102,000	324,000	17,900	133,000	1,280,000	116,000	218,000	378,000	1,060	1,230	3,420,000
1993		92,000	330,000	20,900	118,000	1,210,000	109,000	218,000	485,000	907	1,020	3,080,000
1994		99,000	273,000	33,200	118,000	1,170,000	104,000	206,000	387,000	961	1,060	3,090,000
1995		112,000	415,000	26,700	110,000	1,120,000	105,000	193,000	553,000	1,330	1,430	4,530,000
1996		98,000	362,000	51,000	107,000	1,070,000	87,200	190,000	464,000	995	1,030	3,660,000
1997		120,000	350,000	30,300	99,600	1,020,000	108,000	225,000	494,000	1,350	1,370	4,330,000
1998		104,000	384,000	62,400	83,100	929,000	83,600	192,000	528,000	1,080	1,080	4,460,000
1999		118,000	476,000	60,300	84,400	910,000		217,000	551,000	859	840	4,750,000
2000		139,000	453,000	86,300	46,300	825,000		220,000	589,000	904	856	4,680,000
2001		122,000	239,000	43,000	48,800	816,000		196,000	325,000	1,020	942	3,970,000

Chromium Worksheet Notes

Data Sources

The sources of data for the chromium worksheet are the mineral statistics publications of the U.S. Bureau of Mines and the U.S. Geological Survey—Minerals Yearbook (MYB) and its predecessor, Mineral Resources of the United States (MR); and Mineral Commodity Summaries (MCS) and its predecessor, Commodity Data Summaries (CDS). The years of publication and corresponding years of data coverage are listed in the References sections below. Blank cells in the worksheet indicate that data either were not available or were withheld from publication because they are proprietary. For those years and categories for which data were not reported, values reported in the worksheet were inferred by linear interpolation.

Primary Production

Primary production is an estimate of U.S. chromite ore production measured in contained chromium. U.S. chromite ore production has been intermittent. Production was last reported in 1961. Government purchase programs during World War I (1914–18), World War II (1939–45), and stockpile-building period (1951–61) associated with the Korean War (1950–1952) and the Cold War, were responsible for most production from U.S. chromite deposits. Chromite ore production was estimated from chromite ore shipments reported in gross weight. The grade of domestic chromite ore shipments was assumed to be the same as that of imports for the same year.

Secondary Production

Secondary production is an estimate of chromium supply from recycled materials measured in contained chromium. Secondary chromium production was estimated from stainless steel scrap receipts reported in gross weight that were first reported in 1962. Stainless steel was not produced in large quantities until after World War II. The chromium content of stainless steel scrap was assumed to be 17% (Papp, 1991).

Imports

Imports are an estimate of the amount of chromite ore and value-added products—chromium chemicals, ferroalloys, and metal—imported into the United States measured in contained chromium. Imports reported here exclude steel mill and manufactured products that contain chromium-alloyed steel and steel scrap. Over the years, the U.S. has imported most of its chromium requirements, either as chromite ore, to be converted domestically into value-added products, or as the value-added products themselves. In most years, the chromic oxide content of chromite ore and the chromium content of value-added materials were reported. For those years for which contents were not reported, they were estimated based on those years in which they were reported.

Exports

Exports are an estimate of the amount of chromite ore and value-added products exported from the United States measured in contained chromium. Exports of chromium-containing materials were not reported prior to 1941 in the sources referenced. Exports exclude steel mill and manufactured products that contain chromium-alloyed steel and steel scrap. The reported chromium content of chromium-containing export materials was used where it was available. Where it was not reported, an approximation of chromium content was made based on imports of a similar material.

Stocks

Stocks are an estimate of the amount of industry and government chromium-containing material stocks reported at the end of each year and measured in contained chromium. Industry stocks were classified by industry and by material; government stocks, by material.

The appearance of stocks data for each year suggests a continuous series of information. Actually, overlapping data series for particular materials or material within an industry that start and stop contribute to one stocks series. Chromite ore consumer stocks contribute over the 1946 through 1999 time period; however, chromite ore producer stocks were never reported. Chromium ferroalloy consumer stocks contribute over the 1956 through the present time period and metal consumer stocks contribute over the 1972 through the present time period. Chromium ferroalloy and metal producer stocks contribute over the 1956 through 1997 time period.

U.S. Government stocks were first accounted for in a complete way in 1944 when those stocks included only chromite ore and high-carbon ferrochromium. There was a hiatus in reporting Government stocks from 1947 through 1960 for chromite ore and from 1947 through 1964 for high-carbon ferrochromium. Government stocks were not reported in 1966 and 1978. Low-carbon ferrochromium, ferrochromium silicon, and chromium metal were first reported in 1965. For those time periods during which Government stocks could be interpolated, they were.

Stock changes were estimated by material for Government stocks and by material and industry for industrial stocks, and then accumulated. Since it takes two years to compute a stock change, the current and previous year, a stock change could be estimated starting in the second year of a data series. Because materials drop in and out of the stocks data series, computing stock change as current- minus previous-year stocks can give misleading results.

Reported Consumption

Reported consumption is an estimation of the amount of chromium contained in the reported consumption of chromite ore and chromium ferroalloys and metal. Reported consumption of chromite ore began in 1940 and ended in 1998. Reported consumption of chromium ferroalloys and metal started in 1945 and continues to the present.

Apparent Consumption

Apparent consumption, as defined here, is the sum of production (i.e., primary plus secondary), plus net imports (i.e., imports minus exports), plus stock change (i.e., previous-year minus current-year) measured in contained chromium. Chromium apparent consumption is an accounting balance of chromium-containing materials on a national scale that indicates national chromium consumption. Apparent consumption reported here is calculated from the primary production, secondary production, imports, and exports data series presented here; however, stock change is not computed from the stocks data presented here. (See the stocks section for an explanation of the estimation of stock change.)

Using general category names like production, imports, exports, and stocks, hides the fact that there have been changes in which materials have been accounted for over the time period. For example, chromite ore contributes to imports over the entire time period while chromium ferroalloy imports were not reported before 1911 and exports were not reported before 1913. As one goes back in time, certain of the variables that go into the calculation of apparent consumption drop out due to lack of reported data. For example, secondary production drops out in 1961; stock adjustments drop out in 1941; and exports drop out between 1940 and 1933 then dropped out again in 1927. Primary production dropped in 1961. These changes can be seen in the chromium mineral statistics table. There are more subtle changes that cannot be seen. For example, the materials that constitute imports, exports, and stocks change over time.

Unit Value (\$/t)

Unit value for chromium is estimated annually based on the U.S. dollar (expressed as current dollars) value and chromium content of reported exports, imports, and production. Estimation of unit value is based on the same materials that comprise apparent consumption. Unit value is a mass-weighted average of the unit values of the various materials exported and imported, and chromite ore domestically produced.

Unit Value (98\$/t), Adjusted

The Consumer Price Index, with 1998 as the base year, is used to adjust unit value in current dollars to the unit value in constant 1998 dollars.

World Production

World production is an estimate of world chromite ore mine production measured in contained chromium. World production reported in gross weight was converted to contained chromium by assuming that its chromic oxide content was the same as that of chromite ore imported into the United States.

References

- Papp, J.F., 1991, Chromium, nickel, and other alloying elements in U.S.-produced stainless and heat-resisting steel: U.S. Bureau of Mines Information Circular 9275, 41 p.
- U.S. Bureau of Mines, 1927–34, Mineral Resources of the United States, 1924–31.
- U.S. Bureau of Mines, 1933–96, Minerals Yearbook, 1932–94.
- U.S. Bureau of Mines, 1962–77, Commodity Data Summaries, 1962–77.
- U.S. Bureau of Mines, 1978–95, Mineral Commodity Summaries, 1978–95.
- U.S. Bureau of Mines, 1985, Mineral Facts and Problems, 1985 ed.
- U.S. Bureau of Mines, 1993, Statistical compendium.
- U.S. Geological Survey, 1901–27, Mineral Resources of the United States, 1900–23.
- U.S. Geological Survey, 1997–2000, Minerals Yearbook, v. I, 1995–98.
- U.S. Geological Survey, 1997–2000, Mineral Commodity Summaries, 1997–2000.
- U.S. Geological Survey, 1999, Metal Prices in the United States through 1998.
- U.S. Geological Survey and U.S. Bureau of Mines, 1996, Mineral Commodity Summaries, 1996.

For more information, please contact:

Thomas G. Goonan
Minerals and Materials Analysis Section, USGS
(303) 236-8747 x 228
goonan@usgs.gov

John F. Papp
USGS Chromium Commodity Specialist
(703) 648-4963
jpapp@usgs.gov