

Information Circular 9430

Chromium Metal

By John F. Papp

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CHROMIUM METAL

By John F. Papp¹

ABSTRACT

Based on a review of historical domestic and international chromium metal production capacity, production, consumption, trade, and trade literature, world annual chromium metal production capacity in 1995 was estimated to have been 38,300 metric tons, a drop from 43,500 tons in 1994. World chromium metal production and consumption were estimated, on average from 1984 through 1992, to have been 21,000 tons per year. U.S. consumption was estimated, on average over the same time period, to have been 6,200 tons per year. The major world chromium metal producers between 1984 and 1995 were China, France, Germany, Japan, Russia, United Kingdom, and United States. From 1984 through 1992, world trade averaged 8,400 tons per year. Germany and the United States accounted for over 75 percent of imports on average during the same time period. U.S. chromium metal import value rose from under \$1 per kg before 1964 to over \$6 per kg in 1993. Over the same time period, prices rose from about \$4 per kg to about \$10 per kg. Chemical specifications have become more stringent. Detailed chromium metal trade, prices, value, chromium metal chemical specification, and production capacity by country are reported. A shift in trade patterns was anticipated as Japan exits production and displaces Germany as the second largest importer and as Russia increases its role in world trade.

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INTRODUCTION

Crocoite, a chromium-bearing mineral, was discovered in 1765, and chromium was identified as an element in 1797. Chromite, the ore mineral, was discovered in 1798. Chromium chemical manufacture (pigments) followed in 1800, chromite refractory manufacture in 1879. Chromium use in iron alloys was reported in 1821. Electrodeposition of chromium was reported in 1854 from chromous chloride solution and in 1905 from a chromic acid solution. Aluminothermic reduction of chromium oxide was demonstrated in 1856 and was commercially developed in 1895. From 1910-1915 stainless steel was discovered as were nickel- and cobalt-chromium alloys. Electrowinning techniques subsequently were developed in 1946. In 1950, Union Carbide built a plant to produce electrolytic chromium metal (2,000 short tons per year) based on a U.S. Bureau of Mines developed technology (electrodeposition from a chromium-alum bath). See figure 1.

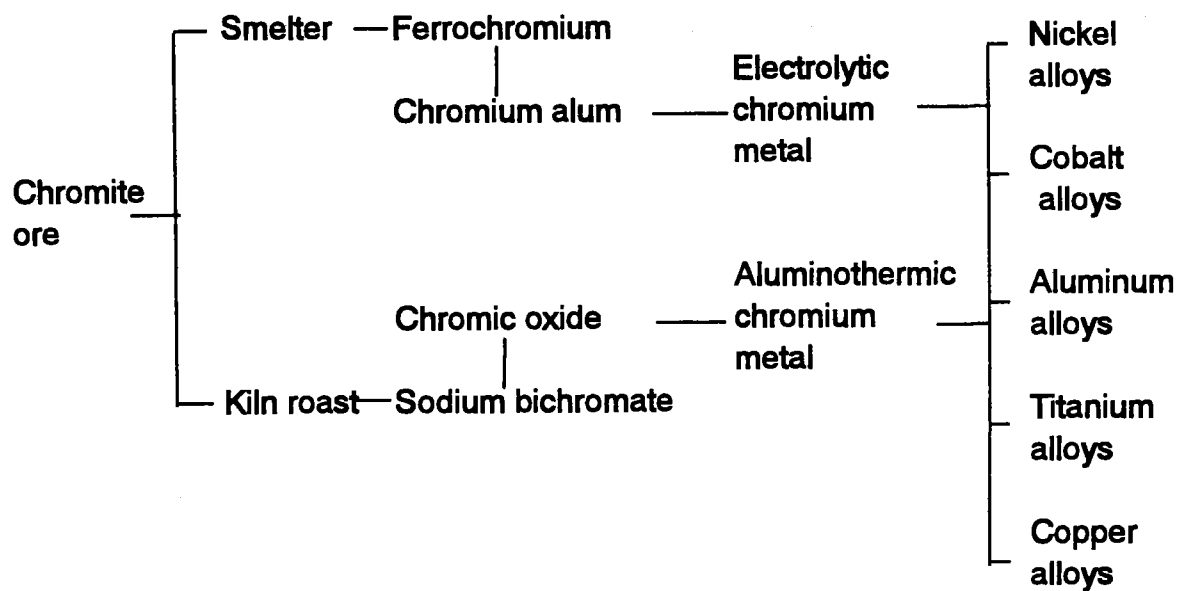
A wide variety of variations of reductants for the exothermic reduction process and of feed materials and electrolytes for the electrowinning process resulted in the current commercial production processes: aluminothermic reduction of chromic oxide to produce aluminothermic chromium metal and electrolytic deposition from a chromium-alum

Figure 1
Time Sequence of Major Chromium Events

1765	Crocoite discovered
1797	Chromium element identified
1798	Chromite discovered
1800	Chromium chemical manufacture
1821	Iron-chromium alloyed
1879	Chromite refractory manufacture
1854	Electrolytic deposition demonstrated
1856	Aluminothermic reduction demonstrated
1895	Aluminothermic reduction commercialized
1910-15	Stainless steel discovered
1946	Electrowinning process developed
1950	Electrolytic plant constructed

electrolyte made from high-carbon ferrochromium to produce electrolytic chromium metal. The aluminothermic process was used first. The electrolytic process was developed to provide a higher purity chromium metal than could be obtained by the aluminothermic process. The processes from chromite ore mining to chromium metal product are shown in figure 2.

Figure 2
Commercial Bulk Chromium Metal Production Processes



No quantitatively significant applications have been found for chromium metal or chromium-based alloys. However, chromium has, as an alloying element, found quantitatively significant use with iron and material property significant use with nickel, cobalt, aluminum, copper, and titanium alloys.

Chromium rich alloys have several disadvantages in that they require special handling; can not relieve stress, which results in brittle fracture; and have high room temperature brittleness. High-Cr alloys had negative characteristics with respect to melting, casting, working, creep resistance and brittleness. From 1955-65 improvements took place. Melting and casting materials and techniques were developed that could handle high-chromium alloys. Ductility at room temperature remained a problem. Nitrogen-induced brittle layer formation was a problem. There is not now, nor does there appear to be imminent, a commercially significant chromium metal application. Should technological developments compensate for the limitations of chromium rich alloys without compromising the advantageous properties of those alloys, strategic use in jet engines appears possible.

Chromium is alloyed with iron at up to 5 percent Cr (alloy steel) to improve physical properties and heat treatment (hardenability). Chromium is alloyed with iron at 10 percent-16 percent Cr (stainless steel) for oxidation resistance and atmospheric corrosion resistance. Chromium is alloyed with nickel at up to 20 percent Cr for excellent oxidation resistance (used for resistance heaters and furnace parts). Nickel-chromium alloys are wrought. Chromium is alloyed with cobalt at 25 percent to 30 percent Cr for resistance to deformation and to oxidation and corrosion at high temperature. Cobalt-chromium alloys are cast.

Nickel-chromium and cobalt-chromium alloys have found strategic application as the material of choice for military jet engine parts. The need for military and civilian jet aircraft and the essential role of chromium in the superalloys used to make those engines is the reason that chromium metal is classified as a strategic material. The National Aeronautics and Space Administration studied the importance of chromium to superalloys. They found 10 percent chromium to be the optimum chromium content of superalloys. Chromium alloyed in quantities of about 10 percent in superalloys was found to convey oxidation resistance. Chromium substantially in excess of that amount was found to diminish alloy strength.

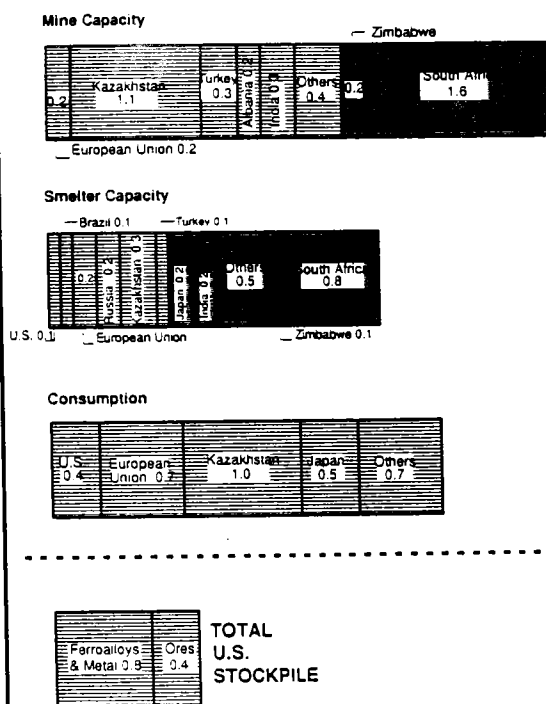
Chromium metal is a small part of the chromium industry. Regardless of the source of chromium metal, that source is dependent upon ferrochromium or chromic oxide producers who, in turn, are dependent on chromite ore supply. Chromite ore is produced primarily in South Africa and Kazakhstan. The ore is converted to ferrochromium

²Units are metric tons unless otherwise specified. Data are rounded in text, unrounded in appendix.

primarily in South Africa and Kazakhstan with major production also in India, Japan, and Russia. Chromite ore is converted to chromium chemicals primarily in the Kazakhstan, Russia, United Kingdom, and United States. Ferrochromium can then be converted to electrolytic chromium metal; chromic oxide, to aluminothermic chromium metal. The National Defense Stockpile contains chromium materials containing about 1.2 million tons² of chromium. About 7,000 tons of that material is chromium metal. See figure 3.

When reviewing the industry, it is helpful to think of it as consisting of two parts, one contained within the other. The high-quality chromium metal segment is complemented by the general chromium metal segment, which together make up the total chromium metal market. Material from the high-quality market can be moved into the general market, but not the other way around. The high-quality manufacturers, in other words, have "downward" mobility to sell their product, while the general manufacturers do not. This mobility may help maintain the high-quality manufacturers. The general consumers have "upward" mobility in purchasing chromium metal, whereas the high-quality consumers do not have such mobility. This means that a supply crisis could occur within the high-quality consumer industry that does not affect the general market. The hedge against such a crisis in the high-quality industry is that the high-quality manufacturers can move in and out of the high-quality sector, thereby maintaining production capacity in excess of demand. The hedge against such a crisis in the

Figure 3
Chromite Ore Production and Processing, and Chromium Consumption and Stockpiled
(Annual data in million metric tons of chromium content)



general segment is excess capacity. Because of these factors observations about the industry in the general segment should not be transferred to the high-quality segment without careful scrutiny.

The one aluminothermic chromium metal manufacturer may select a part of its regular production that is of higher quality and divert it to the high-quality market. If this

occurs, they too need the general market to maintain high-quality market manufacturing capability. They surely have a limit on how much of their production may be diverted to high-quality use, and that limit determines their high-quality capacity.

CHROMIUM METAL SPECIFICATIONS

There are two different commercial production processes used to manufacture chromium metal useful for alloying with nonferrous metals: oxide reduction and electrodeposition. The chromium metal produced by these processes was sufficiently different to result in the commercial development of both processes. The early production of chromium metal by the electrolytic process suffered from gas contamination (oxygen, hydrogen, and nitrogen). It was soon learned that annealing reduced hydrogen content, but that oxygen was not so easily removed. The differences among chromium metal commercial products based on different production techniques is shown in table 1. Table 1 shows higher oxygen content in electrodeposited chromium metal as compared with oxide reduced metal. Oxide reduced material showed higher aluminum (for aluminothermically produced chromium metal) and higher silicon (for silicothermically produced chromium metal).

The strategic nature of chromium metal used as an alloying element with cobalt-base and nickel-base alloys for jet engine applications resulted in chromium metal inclusion in the National Defense Stockpile (NDS). An NDS specification for chromium metal was published in 1956, 1957, 1961, 1971, 1984, and 1985. These specifications are shown in table 2 for electrolytic chromium metal and table 3 for aluminothermic chromium metal.

Table 2 shows that, for NDS electrolytic chromium metal, there was no change in chemical specifications from 1956 to 1957, nor from 1957 to 1961. However, from 1961 to 1971, the NDS electrolytic chromium metal chemical specification increased from one to three grades; chromium content increased; antimony, tin, arsenic, and bismuth were added to the chemical specifications; and the maximum weight percent of contaminants generally decreased. From 1971 to 1984, the three grades of electrolytic chromium metal were reduced to one grade; 15 new elements were added to the chemical specifications (silver, zinc, manganese, tellurium, barium, molybdenum, cobalt, titanium, nickel, thallium, vanadium, boron, zirconium, magnesium,

and selenium). From 1984 to 1985, several specifications were adjusted, cadmium was added, and zirconium and magnesium were removed from the chemical specifications. See figure 4.

Table 3 shows that, for NDS aluminothermic chromium metal, there was no change in chemical specifications from 1956 to 1957, nor from 1957 to 1961. However, from 1961 to 1971, the NDS aluminothermic chromium metal chemical specification for chromium and oxygen was increased while the chemical specification for 9 elements (iron, aluminum, carbon, silicon, phosphorus, lead, copper, nitrogen, and hydrogen) was decreased; and antimony, tin, arsenic, and bismuth were added. From 1971 to 1984, the chromium specification was increased again, while a chemical specification for 15 additional elements (silver, zinc, manganese, tellurium, barium, molybdenum, cobalt, titanium, nickel, thallium, vanadium, boron, zirconium, magnesium, and selenium) was added. From 1984-85, a chemical specification for cadmium was added and chemical specifications for zirconium and magnesium were removed. See figure 5.

These changes suggest that during 1961-71, chromium metal users tightened their specifications and during 1971-84, chromium metal users broadened their specifications. These changes parallel the industry trend of increasingly controlling superalloy chemistry to produce higher performance alloys.

Current commercial chromium metal chemical specifications for electrolytic and for aluminothermic chromium metal of various grades and from various sources are shown in tables 4 and 5 along with those of the American Society for Testing and Materials. Table 4 shows commercial chemical specifications typically identify only about 19 elements, while the American Institute for Testing and Materials identifies 27 elements. The current National Defense Stockpile chemical specifications identify 30 elements.

Table 1.—Chromium metal chemical specifications circa 1956

(Weight percent)

Element Name	Symbol	Aluminothermic			Electrolytic	Silicothermic
		U.S.	Germany	U.K.	U.S.	U.S.
Chromium	Cr	--	--	--	--	--
Aluminum	Al	0.37	0.34	0.09	0.0050	0.08
Antimony	Sb	--	--	--	--	--
Arsenic	As	--	--	--	--	--
Bismuth	Bi	--	--	--	--	--
Boron	B	--	--	--	--	--
Carbon	C	0.03	0.01	0.02	0.0040	0.04
Cobalt	Co	--	--	--	--	--
Columbium	Nb	--	--	--	--	--
Copper	Cu	0.004	--	--	0.0020	--
Hydrogen	H	--	--	--	0.0056	--
Iron	Fe	0.41	0.26	0.32	--	0.79
Lead	Pb	--	--	--	--	--
Manganese	Mn	--	--	--	--	--
Molybdenum	Mo	--	--	--	0.0100	--
Nitrogen	N	0.045	--	--	0.0060	--
Oxygen	O	--	--	--	0.3800	--
Phosphorus	P	--	--	--	--	--
Sulfur	S	0.018	0.015	0.017	0.0190	0.01
Silicon	Si	0.47	0.14	0.14	0.0100	0.71
Silver	Ag	--	--	--	--	--
Tantalum	Ta	--	--	--	--	--
Tin	Sn	--	--	--	--	--
Titanium	Ti	--	--	--	--	--
Vanadium	V	--	--	--	--	0.04
Zinc	Zn	--	--	--	--	--
Zirconium	Zr	--	--	--	--	--

NOTE.—Chromium specification is minimum, others are maximum.
 Sources: Udy (1956), Sulley (1954), Sulley & Brandes (1967, p. 59).

Table 2.—National Defense Stockpile electrolytic chromium metal chemical specifications
from 1956 through 1994

(Chromium minimum, other elements maximum weight percent)

Element	Sym- bol	1971								
		1956	1957	1961	type B	type C	type D	1984	1985	1994
Chromium	Cr	99.20	99.20	99.20	99.300	99.400	99.8000	99.5	99.5	99.5
Aluminum	Al	0.01	0.01	0.01	0.010	0.020	0.0040	0.01	0.01	0.01
Antimony	Sb	--	--	--	0.001	0.001	0.0010	0.001	0.001	0.001
Arsenic	As	--	--	--	0.001	0.001	0.0010	0.001	0.001	0.001
Barium	Ba	--	--	--	--	--	--	0.005	0.050	0.005
Bismuth	Bi	--	--	--	0.001	0.001	0.0010	0.00005	0.0001	0.00005
Boron	B	--	--	--	--	--	--	0.001	0.001	0.001
Cadmium	Cd	--	--	--	--	--	--	--	0.001	0.001
Carbon	C	0.02	0.02	0.02	0.020	0.050	0.0100	0.03	0.05	0.03
Cobalt	Co	--	--	--	--	--	--	0.001	0.001	0.001
Copper	Cu	0.01	0.01	0.01	0.005	0.005	0.0005	0.002	0.002	0.002
Hydrogen	H	0.008	0.008	0.008	0.010	0.002	0.0008	0.002	0.002	0.002
Iron	Fe	0.20	0.20	0.20	0.200	0.350	0.1000	0.30	0.30	0.30
Lead	Pb	0.003	0.003	0.003	0.002	0.001	0.0020	0.0005	0.0010	0.0005
Magnesium	Mg	--	--	--	--	--	--	0.01	--	0.001
Manganese	Mn	--	--	--	--	--	--	0.010	0.010	0.010
Molybdenum	Mo	--	--	--	--	--	--	0.002	0.002	0.002
Nickel	Ni	--	--	--	--	--	--	0.02	0.02	0.02
Nitrogen	N	0.03	0.03	0.03	0.050	0.020	0.0200	0.015	0.015	0.004
Oxygen	O	0.55	0.55	0.55	0.500	0.050	0.0450	0.05	0.05	0.050
Phosphorus	P	0.02	0.02	0.02	0.010	0.002	0.0010	0.001	0.002	0.001
Selenium	Se	--	--	--	--	--	--	0.0003	0.0005	0.0003
Silicon	Si	0.01	0.01	0.01	0.010	0.040	0.0080	0.01	0.02	0.01
Silver	Ag	--	--	--	--	--	--	0.00005	0.0010	<0.00005
Sulfur	S	0.03	0.03	0.03	0.030	0.010	0.0200	0.006	0.010	0.0035
Tellurium	Te	--	--	--	--	--	--	0.0003	0.0005	0.0003
Thallium	Tl	--	--	--	--	--	--	0.0003	0.0003	0.0003
Tin	Sn	--	--	--	0.001	0.002	0.0010	0.0010	0.001	0.0010
Titanium	Ti	--	--	--	--	--	--	0.002	0.002	0.002
Vanadium	V	--	--	--	--	--	--	0.01	0.01	0.01
Zinc	Zn	--	--	--	--	--	--	0.001	0.001	0.001
Zirconium	Zr	--	--	--	--	--	--	0.005	--	0.005
Other (each)		0.05	0.05	0.05	0.010	0.010	0.0100	--	--	--
O+N+H		--	--	--	--	--	--	--	--	--

Source: Defense Logistics Agency.

Figure 4
National Defense Stockpile Electrolytic Chromium Metal Chemical Specifications

1956 - 1985	
1956-57 & 1957-61	No change.
1961-71	One grade to three grades. Cr increased. Sb, Sn, As, and Bi added. Maximum weight percent generally declined.
1971-84	Three grades to one grade. Ag, Zn, Mn, Te, Ba, Mo, Co, Ti, Ni, Tl, V, B, Zr, Mg, & Se added.
1984-85	Specifications adjusted. Cd added. Zr and Mg deleted.
1985-94	Mg and Zr added. Ba, Bi, C, Pb, N, O, P, Se, Si, Ag, S, Te, & Sn adjusted down.

Table 3.—National Defense Stockpile aluminothermic chromium metal chemical specifications from 1956 to 1994

(Chromium minimum, other maximum weight percent)

Element	Sym- bol	1956	1957	1961	1971	1984	1985	1994
Chromium	Cr	98.75	98.75	98.75	99.250	99.40	99.40	99.40
Aluminum	Al	0.25	0.25	0.25	0.100	0.10	0.10	0.10
Antimony	Sb	--	--	--	0.001	0.001	0.001	0.001
Arsenic	As	--	--	--	0.001	0.001	0.001	0.001
Barium	Ba	--	--	--	--	0.0002	0.0002	0.0002
Bismuth	Bi	--	--	--	0.001	0.0005	0.0005	0.0005
Boron	B	--	--	--	--	0.001	0.001	0.001
Cadmium	Cd	--	--	--	--	--	0.001	0.001
Carbon	C	0.06	0.06	0.06	0.020	0.02	0.02	0.02
Cobalt	Co	--	--	--	--	0.001	0.001	0.001
Copper	Cu	0.02	0.02	0.02	0.002	0.003	0.003	0.003
Hydrogen	H	0.01	0.01	0.01	0.001	0.001	0.001	0.001
Iron	Fe	0.27	0.27	0.27	0.200	0.20	0.20	0.20
Lead	Pb	0.01	0.01	0.01	0.001	0.001	0.001	0.001
Magnesium	Mg	--	--	--	--	0.005	--	0.005
Manganese	Mn	--	--	--	--	0.004	0.004	0.004
Molybdenum	Mo	--	--	--	--	0.004	0.004	0.004
Nickel	Ni	--	--	--	--	0.007	0.007	0.007
Nitrogen	N	0.04	0.04	0.04	0.020	0.02	0.020	0.004
Oxygen	O	0.08	0.08	0.08	0.100	0.10	0.10	0.10
Phosphorus	P	0.03	0.03	0.03	0.005	0.005	0.005	0.005
Selenium	Se	--	--	--	--	0.00005	0.00005	<0.00005
Silicon	Si	0.20	0.20	0.20	0.100	0.10	0.10	0.10
Silver	Ag	--	--	--	--	0.0005	0.0005	0.0005
Sulfur	S	0.03	0.03	0.03	0.010	0.010	0.010	0.0035
Tellurium	Te	--	--	--	--	0.0001	0.0001	0.0001
Thallium	Tl	--	--	--	--	0.00005	0.00005	<0.00005
Tin	Sn	--	--	--	0.001	0.001	0.001	0.001
Titanium	Ti	--	--	--	--	0.006	0.006	0.006
Vanadium	V	--	--	--	--	0.02	0.02	0.02
Zinc	Zn	--	--	--	--	0.001	0.001	0.001
Zirconium	Zr	--	--	--	--	0.001	--	0.001
Other (each)		0.05	0.05	0.05	0.010	--	--	--
O+N+H		0.12	0.12	0.12	--	--	--	--

Source: Defense Logistics Agency.

Figure 5
National Defense Stockpile Aluminothermic Chromium Metal Chemical
Specifications

1956 -1985	
1956-1957 & 1957-61	No change.
1961-71	Cr & O2 increased. Fe, Al, C, Si, P, Pb, Cu, N2, & H2 decreased. Sb, Sn, As, & Bi added.
1971-1984	Cr increased. Ag, Zn, Mn, Te, Ba, Mo, Co, Ti, Ni, Tl, V, B, Zr, Mg, & Se added.
1984-85	Cd added. Zr and Mg deleted.
1985-94	Mg and Zr added. N, Se, Si, Ag, S, & Tl adjusted down.

Table 4.—Contemporary commercial chromium metal chemical specifications by producer and by grade

(Chromium minimum, other elements maximum weight percent)

Element	Sym- bol	Delachaux				Elkem			Metallurg			Tosoh		ASTM	
		Vacuum grade	Double degass	Low gas powder	Plate	Pellets	VG	Powder	Standard	Vacuum refining	Standard	Super vacuum	High purity	Grade A	Grade B
Chromium	Cr	99.5	99.7	99.8	99.1	99.5	99.5	99.0	99.2	99.4	99.32	99.82	99.80	99.0	99.4
Aluminum	Al	0.1	0.01	0.01	0.01	0.005	0.01	0.01	0.15	0.10	0.001	0.002	0.002	0.30	0.10
Antimony	Sb	0.0005	0.0005	--	--	--	--	--	--	--	--	--	--	0.005	0.003
Arsenic	As	0.0001	0.0001	--	--	--	--	--	--	--	--	--	--	0.005	0.003
Barium	Ba	0.00003	0.00003	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	Bi	0.00005	0.00005	--	--	--	--	--	--	--	--	--	--	0.003	0.001
Boron	B	0.00001	0.00001	--	--	--	--	--	--	--	--	--	--	0.005	0.003
Cadmium	Cd	0.0002	0.0002	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	C	0.01	0.04	0.01	0.02	0.05	0.02	0.02	0.03	0.03	0.005	0.014	0.007	0.050	0.050
Cobalt	Co	--	--	--	--	--	--	--	--	--	--	--	--	0.003	0.001
Columbium	Nb	--	--	--	--	--	--	--	--	--	--	--	--	0.050	0.050
Copper	Cu	0.002	0.001	--	--	--	--	--	--	--	0.0005	0.0003	0.0002	0.01	0.01
Hydrogen	H	0.0001	0.0001	--	0.01	0.002	0.02	0.02	--	--	0.007	0.0005	0.0003	0.01	0.003
Iron	Fe	0.2	0.15	0.12	0.20	0.25	0.25	0.25	0.025	0.25	0.13	0.13	0.09	0.35	0.35
Lead	Pb	0.0005	0.0005	--	0.003	0.001	0.01	0.01	--	--	0.001	0.0001	0.0001	0.003	0.001
Magnesium	Mg	0.001	0.001	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	Mn	0.0015	0.0015	--	0.01	0.010	0.01	0.01	--	--	--	--	--	0.01	0.01
Molybdenum	Mo	--	--	--	--	--	--	--	--	--	--	--	--	0.050	0.01
Nitrogen	N	0.02	0.008	0.005	0.05	0.010	0.05	0.05	0.01	0.02	0.028	0.002	0.002	0.050	0.020
Oxygen	O	0.1	0.045	0.045	0.50	0.05	0.60	0.60	0.15	0.1	0.47	0.015	0.015	0.50	0.10
Phosphorus	P	0.002	0.001	0.001	0.005	0.002	--	--	0.005	0.005	0.001	0.001	0.0001	0.010	0.010
Selenium	Se	0.0002	0.0002	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	S	0.01	0.004	0.005	0.030	0.010	0.04	0.04	0.005	0.01	0.027	0.002	0.0004	0.030	0.010
Silicon	Si	0.1	0.05	0.04	0.005	0.02	0.01	0.01	0.15	0.10	0.003	0.004	0.004	0.15	0.10
Silver	Ag	0.00005	0.00005	--	--	--	--	--	--	--	--	--	--	0.003	0.001
Tantalum	Ta	--	--	--	--	--	--	--	--	--	--	--	--	0.050	0.003
Tellurium	Te	0.0002	0.0002	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	Tl	0.0002	0.0002	--	--	--	--	--	--	--	--	--	--	--	--
Tin	Sn	0.0005	0.0005	--	--	0.001	--	--	--	--	--	--	--	0.001	0.001
Titanium	Ti	--	--	--	--	--	--	--	--	--	--	--	--	0.050	0.003
Vanadium	V	--	--	--	--	--	--	--	--	--	--	--	--	0.050	0.050
Zinc	Zn	0.0005	0.0005	--	--	--	--	--	--	--	--	--	--	0.005	0.003
Zirconium	Zr	--	--	--	--	--	--	--	--	--	--	--	--	0.050	0.003

Sources: ASTM standard A 481-73 (Reapproved 1985). Delachaux, product sheets (1994). Elkem, product sheet (1994). Tosoh, Roskill 1993. Metallurg, Roskill 1993.

Table 5.—Selected commercial chromium metal chemical specifications by producer and by grade

(Chromium minimum, other maximum weight percent)

Element	Symbol	Polema				Tula	Nippon Denko	
		EX	ERX-1	ERX-2	ERX-3	Flake	Standard	Request
Chromium	Cr	99.95	99.95	99.95	99.95	99.6	99.0	99.0
Aluminum	Al	0.006	0.006	0.006	0.006	0.004	0.3	--
Antimony	Sb	--	--	--	--	0.0005	--	--
Arsenic	As	--	--	--	--	0.001	--	--
Bismuth	Bi	--	--	--	--	0.0006	--	--
Carbon	C	0.020	0.008	0.008	0.008	0.0010	0.04	0.02
Cobalt	Co	--	--	--	--	0.0003	--	--
Copper	Cu	0.003	0.003	0.003	0.003	0.0003	--	--
Hydrogen	H	--	--	--	--	--	0.0007	0.0007
Iron	Fe	0.008	0.008	0.008	0.012	0.002	0.5	0.3
Lead	Pb	0.001	Tr	Tr	Tr	0.002	--	--
Manganese	Mn	--	--	--	--	0.0003	--	--
Molybdenum	Mo	--	--	--	--	0.0006	--	--
Nickel	Ni	0.005	0.005	0.005	0.007	0.001	--	--
Nitrogen	N	0.020	0.005	0.007	0.010	--	0.030	0.030
Oxygen	O	0.600	0.005	0.008	0.020	0.334	0.046	0.046
Phosphorus	P	--	--	--	--	--	0.05	0.003
Potassium	K	--	--	--	--	0.001	--	--
Silicon	Si	0.010	0.010	0.010	0.012	0.020	0.2	0.2
Silver	Ag	--	--	--	--	0.0003	--	--
Sodium	Na	--	--	--	--	0.001	--	--
Sulfur	S	0.010	0.002	0.002	0.005	0.0140	0.05	0.05
Tin	Sn	--	--	--	--	0.0001	--	--
Vanadium	V	--	--	--	--	0.0003	--	--
Zinc	Zn	--	--	--	--	0.0001	--	--

Tr Trace.

Sources: The TEX Report. Ferro Alloy Manual. pp. 243-4, October 1994.
Metallia U.S.A., Inc.

CHROMIUM METAL IN THE UNITED STATES

PRODUCTION

Commercial grades of chromium metal have been produced in the United States in bulk quantities by Elkem Metals Co. using the electrolytic process and by Shieldalloy Corp. using the aluminothermic process. Shieldalloy suspended production in 1990 leaving Elkem as the sole U.S. producer. (United States chromium metal production is estimated in the World Production and Consumption section under Chromium Metal Internationally.)

CONSUMPTION

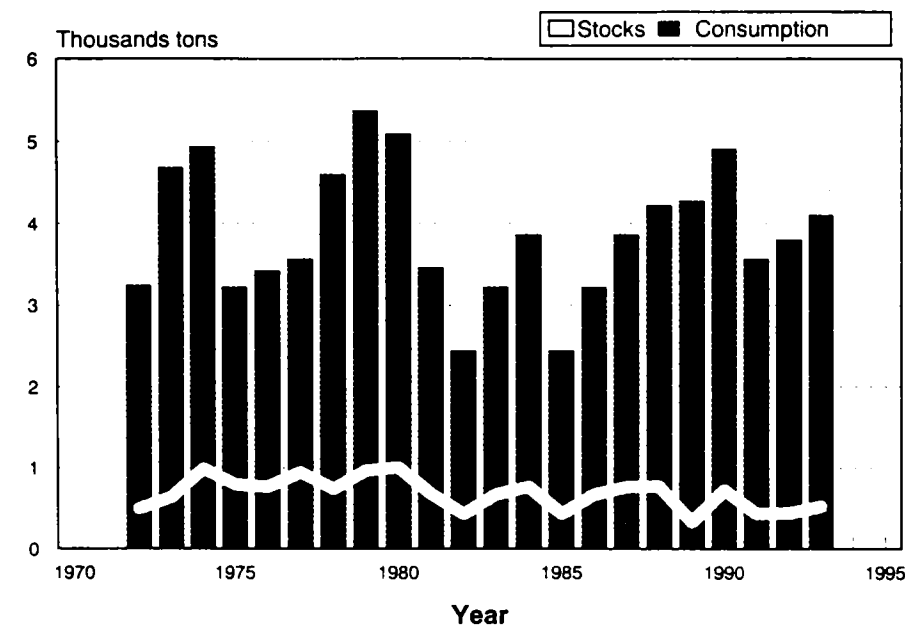
The U.S. Bureau of Mines has reported chromium metal consumption and stocks in the United States since 1972 and U.S. trade in chromium metal since 1963. U.S. reported chromium metal consumption has ranged from a low of about 2,500 tons to a high of about 5,400 tons from 1972 through 1993. See figure 6. Over the same time period, stocks have varied from a low of about 300 tons to a high of about 1,000 tons. Reported consumption and stock levels appear to have been cyclic without either upward or downward trend over the time period. The ratio of consumption to stocks has ranged from about four to about nine with a general upward trend over the time period. U.S. consumption exceeds reported consumption because consumption reported to the U.S. Bureau of Mines is voluntary and not all companies choose to report.

TRADE

The United States is primarily a chromium metal importing country. See figure 7. Imports are large relative to exports and are increasing. Chromium metal trade since 1963 shows that imports have consistently exceeded exports. In 1963, imports exceeded exports by a factor of over 10, from which it declined to nearly a factor of 2 in 1974 and 1975. It then increased to about 20 during 1989-90 and remained high following the suspension of Shieldalloy's domestic production in 1990. Reported consumption has declined from just over double imports to slightly less than imports. All other factors being equal, this suggests that imports have been taking an increasingly larger share of the domestic chromium metal market.

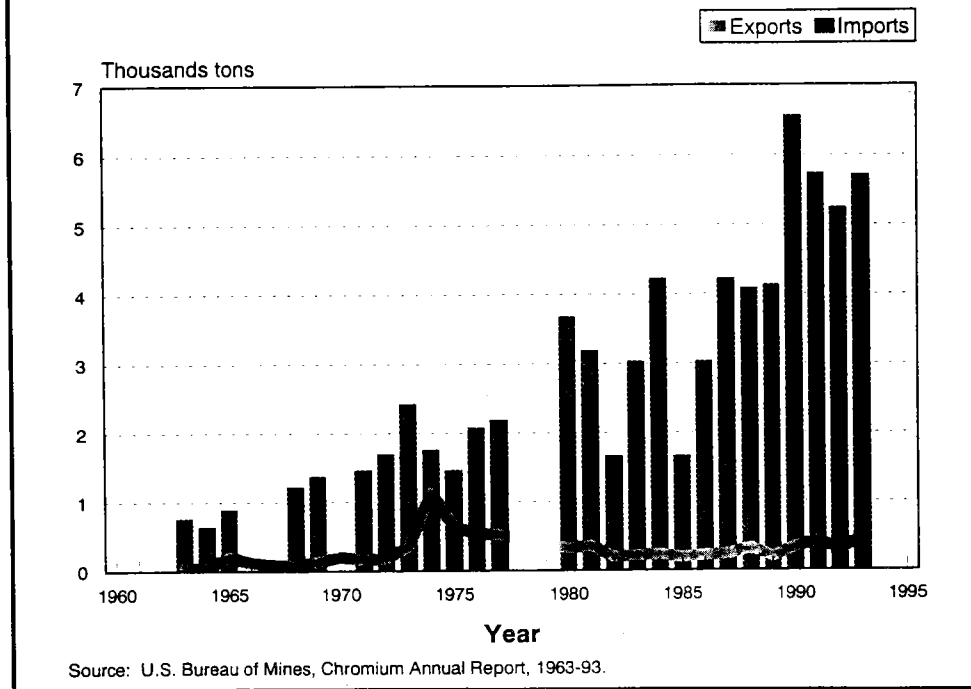
Apparent consumption includes trade analysis. Reported consumption is clear enough; it is consumption reported by consumers. Apparent consumption is consumption inferred from national trade, production, and stock data. Apparent consumption is production plus net trade plus stock change. Production includes both primary and secondary material. Primary production is new material produced from primary sources (e.g., chromium metal production from ferrochromium or from chromic oxide) while secondary is from recycled materials. Net trade is imports minus exports. Stock change is ending minus beginning stocks. Unfortunately, all of the information necessary to calculate U.S. chromium metal apparent con-

Figure 6
U.S. Reported Chromium Metal Consumption and Stocks



Source: U.S. Bureau of Mines, Chromium Annual Reports, 1973-93.

Figure 7
Quantity of U.S. Chromium Metal Imports and Exports



sumption is not available. Trade data are available, some stocks data are available, but no production data are available. Therefore, U.S. chromium metal apparent consumption can at best be estimated as imports minus exports and assume that, on average, over a time period stock changes balance out to zero. Production, if it is to be accounted for, must be estimated, perhaps as a fraction of production capacity. See table 6. Table 6 shows that the United States is a net importer of chromium metal and is by far the largest importer, taking about 55 percent of the world import trade.

See Appendix A.—Trade for detailed reported trade.

VALUE

Analysis of U.S. import statistics yields a value history for chromium metal. Free on board (FOB) value divided by import quantity yields a unit value. Such a unit value over the history of chromium metal imports yields a value trend. The import value trend shows that chromium metal value has been increasing in actual dollars since 1963 from about \$1,670/ton (\$1.67/kg or \$0.75/lb) to about \$6,500/ton (\$6.50/kg or \$2.95/lb). See figure 8. Over the 30-year time period from 1963 to 1993, the value of chromium metal imported into the United States increased by a factor of about 4. The average annual growth rate of import value

over the 30-year time period was about 10 percent. The value of exports has grown even more than that of imports. In the early part of the time period, export value was less than or about equal to that of imports. However, in the latter part of the time period, the value of exported chromium metal significantly exceeded that of imports.

These values may be compared with reported prices of chromium metal as shown in table 7. The table shows that reported prices generally lie between import and export value. The fact that reported historical price is higher than the import value may have resulted from one or more of several factors including: (1) FOB value does not include all of the costs associated with getting the material to market, so it should be less than market price; (2) Imported chromium metal may have, on average, been of lower grade than that for which prices have been quoted; (3) Chromium metal sellers may have offered discounts leading to sale prices being less than reported prices and more in line with import value; and (4) Importers may have undervalued their material. In any case, reported prices and values shifted from a range of \$1 per pound to \$2 per pound from 1963 through 1975 to a range of \$2 per pound to \$4.50 per pound from 1981 through 1994.

See Appendix B.—Prices for detailed reported prices and a graphical representation of average annual prices over the time period reported.

Table 6.—U.S. and international chromium metal 1984-92 average trade

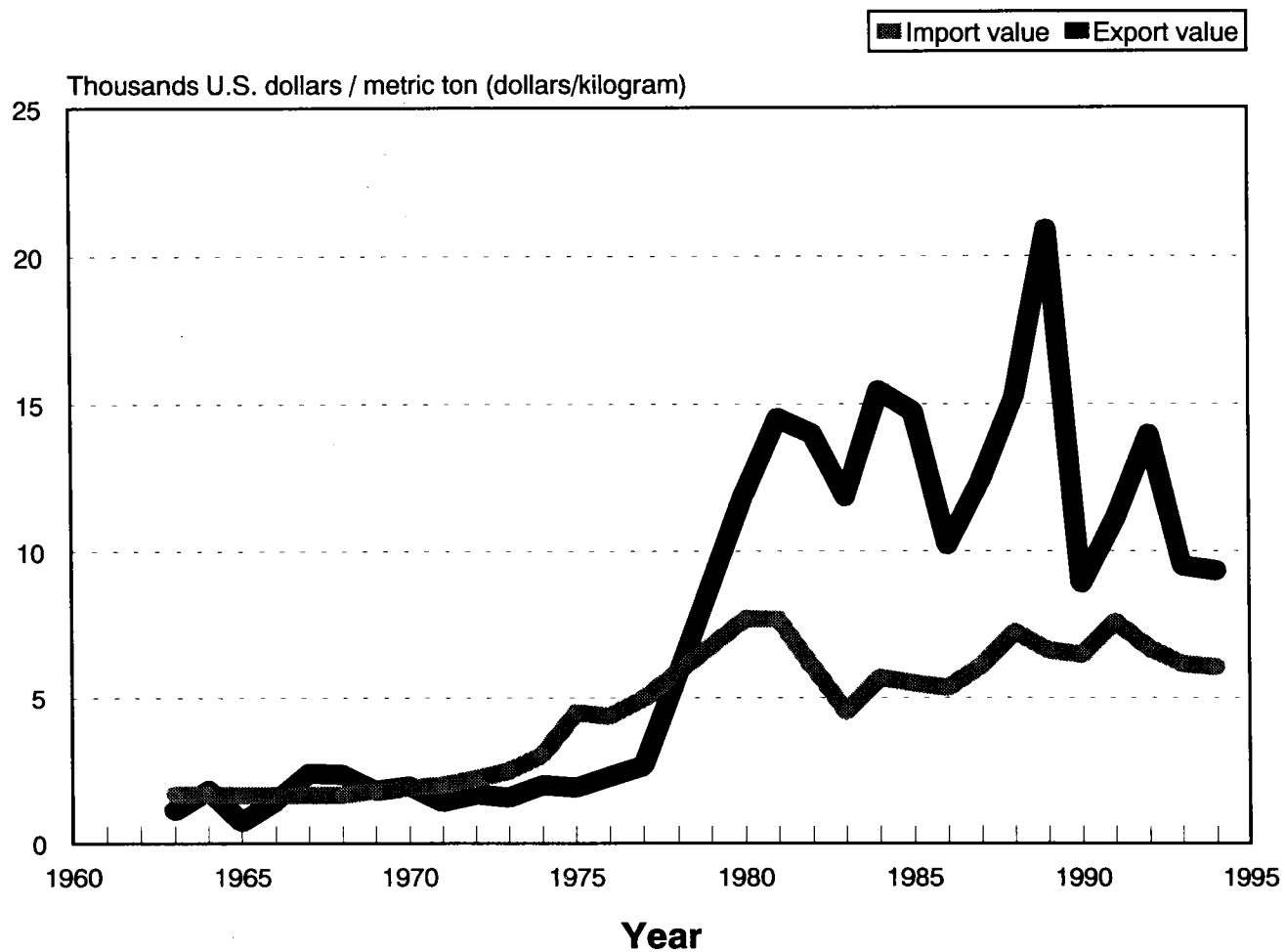
(Metric tons, gross weight unless noted otherwise)

Country	Imports (tons)	Exports (tons)	Net Trade (tons)	I/It ¹ (percent)	E/Et ² (percent)	I/Et ³ (percent)
United States	4,480	293	4,190	55	4	56
Belgium-Luxembourg	400	94	306	5	1	5
Brazil	28	0	28	0	0	0
Canada	53	15	39	1	0	1
China	0	1,320	-1,320	0	17	0
Denmark	3	0	2	0	0	0
Finland	0	5	-5	0	0	0
France	480	1,690	-1,210	6	21	6
Germany	1,642	430	1,210	20	5	21
Hong Kong	0	15	-15	0	0	0
India	55	0	55	1	0	1
Ireland	157	36	122	2	0	2
Italy	9	1	8	0	0	0
Japan	159	1,750	-1,590	2	22	2
Netherlands	88	107	-19	1	1	1
Norway	6	0	6	0	0	0
Romania	7	0	7	0	0	0
Russia	0	662	-662	0	8	0
Spain	63	0	63	1	0	1
Sweden	217	12	205	3	0	3
Switzerland	12	14	-2	0	0	0
United Kingdom	331	1,430	-1,100	4	18	4
Others	0	68	-68	0	1	0
Total	8,190	7,950	239	100	100	103

¹ I/It is imports divided by imports total.² E/Et is exports divided by exports total.³ I/Et is imports divided by exports total.

Sources: United States: Papp, J. F., Chromium Annual Reports, U.S. Bureau of Mines.
 Other than United States: Roskill, Chromium (6th Ed., 1988; 7th Ed., 1991, and 8th Ed., 1993).

Figure 8
Value of U.S. Chromium Metal Imports and Exports



NOTE.--Unit value based on U.S. FOB import value.

Table 7.—Chromium metal average annual prices and U.S. import value from 1963 through 1994

(Dollars per pound, gross weight unless noted otherwise)

Year	Import value	Export value	Average annual price or value								
			United States						Europe		
			Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
			1	2	3	4	1	2		1	2
1963	0.76	0.51	NA	NA	NA	NA	NA	NA	NA	NA	NA
1964	0.76	0.83	NA	NA	NA	NA	NA	NA	NA	NA	NA
1965	0.75	0.34	NA	NA	NA	NA	NA	NA	NA	NA	NA
1966	--	0.67	NA	NA	NA	NA	NA	NA	NA	NA	NA
1967	--	1.09	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
1968	0.75	1.07	NA	NA	0.96	1.00	1.38	NA	NA	NA	NA
1969	0.82	0.82	NA	NA	0.99	1.03	1.40	NA	NA	NA	NA
1970	--	0.89	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA
1971	0.91	0.64	1.30	1.56	NA	NA	NA	NA	NA	NA	NA
1972	1.00	0.76	1.30	1.56	NA	NA	NA	NA	NA	NA	NA
1973	1.13	0.77	1.37	1.52	NA	NA	NA	NA	NA	NA	NA
1974	1.37	0.90	1.77	1.84	1.72	1.79	1.85	NA	NA	NA	NA
1975	2.03	0.87	2.43	2.50	2.33	2.40	2.48	NA	NA	NA	NA
1976	1.97	--	2.49	2.56	2.44	2.51	2.58	NA	NA	NA	NA
1977	2.24	1.21	2.65	2.72	2.63	2.71	2.85	NA	NA	NA	NA
1978	--	--	2.84	2.96	2.79	2.89	3.05	NA	NA	NA	NA
1979	--	--	3.22	3.38	3.17	3.34	3.27	NA	NA	NA	NA
1980	3.48	5.43	3.80	3.99	3.61	3.90	3.78	NA	NA	NA	NA
1981	3.48	6.58	3.45	4.62	3.61	4.40	4.45	NA	NA	NA	NA
1982	2.73	6.34	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
1983	2.04	5.37	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
1984	2.57	7.00	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1985	2.48	6.68	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1986	2.41	4.63	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1987	2.77	5.63	3.45	4.62	3.61	4.40	4.45	NA	NA	NA	NA
1988	3.28	6.91	3.57	4.62	3.39	4.35	3.39	4.24	NA	NA	NA
1989	2.99	9.48	3.87	4.44	3.55	4.16	3.26	4.23	NA	NA	NA
1990	2.93	4.03	3.68	4.24	3.57	3.95	3.19	4.01	3.05	2.58	4.77
1991	3.44	5.02	3.70	4.50	3.75	4.50	2.86	3.70	3.22	2.70	4.72
1992	3.03	9.34	3.70	4.50	3.75	4.50	2.84	3.70	2.96	2.30	4.60
1993	2.78	4.30	3.70	4.50	3.44	4.50	2.65	3.70	3.41	2.09	4.65
1994	2.74	4.22	3.70	4.50	3.45	4.50	2.66	3.70	3.41	2.09	4.65

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

NATIONAL DEFENSE STOCKPILE

The United States has held chromium metal in the National Defense Stockpile since the Korean War. In 1965, the General Services Administration (the stockpile management organization preceding the Defense Logistics Agency) offered chromium metal for sale but received no acceptable bids. Shortages of chromium metal were experienced circa 1975. The shortages resulted in Department of Defense and United States Air Force studies that included conservation potential in jet engine applications. In 1984, an American Society for Metals review of the National Defense Stockpile characterized stockpiled chromium metal as follows:

- The stockpiled chromium metal was unsuitable for stringent purity requirement uses;
- Chromium metal has no substitute in vacuum melted super alloys;
- Stockpiled chromium metal was useable for air melted alloys;

- Stockpiled chromium metal was disqualified from use in stringent purity requirement applications principally because of excessive amounts of undesirable residuals.

In 1989, the Defense Logistics Agency started a program to convert nonspecification grade low-carbon ferrochromium to chromium metal. Conversion activity carried out under that program is shown in table 8. Chromium metal added to the National Defense Stockpile since 1989 is all electrolytic chromium metal that meets current industry chemical specifications. Material in the National Defense Stockpile whose acquisition predates 1989 is a mixture of aluminothermic and electrolytic chromium metal. It could be used in the event of a national emergency to offset current demand for lower grade metal thereby freeing production capacity to meet emergency demand for highest quality chromium metal. As of February 1995, the National Defense Stockpile contained about 7,685 tons of chromium metal, of which 3,763 tons predates the upgrading program started in 1989. Of that 7,685 tons, 2,667 tons were aluminothermic chromium metal, and 5,018 tons were electrolytic chromium metal.

Table 8.—Performance of the National Defense Stockpile low-carbon ferrochromium to chromium metal conversion program from 1989 through 1994

Time period	Low-carbon ferrochromium consumed (metric tons)	Chromium metal production (metric tons)	Cost (million dollars)
October 1989 - September 1990	2,129	1,048	\$7.3
October 1990 - September 1991	1,090	780	7.0
October 1991 - September 1992	2,049	1,022	10.1
October 1992 - September 1993	2,894	616	5.6
October 1993 - September 1994	(¹)	835	7.5

¹Stocks from previous period were used to produce chromium metal.

NOTE.—Low-carbon ferrochromium converted under this program is nonspecification grade. Program was completed in August 1994.

Source: Defense Logistics Agency.

CHROMIUM METAL INTERNATIONALLY

PRODUCTION

Chromium metal is produced in several countries, some of which have reported production values. The United Kingdom was reported to have had an annual production of about 1,000 tons circa 1954 and 1,750±250 tons circa 1967. Japan, a major electrolytic chromium metal producing nation and also an aluminothermic producer, has reported its production since 1956. See figure 9. Other countries for which production data are available include Brazil and India. See figure 10. Chromium metal production in Japan increased substantially over the reporting period, from under 1,000 tons annually from 1956-66 to over 4,000 tons in 1990-91. This is a growth rate of about 100 tons per year over a 30-year time period yielding an average annual

growth of 10 percent per year over that time period, matching the growth of import value reported in the previous section. Figure 11 shows the growth of import value and Japanese production from 1956 through 1993. (See the following section World Production and Consumption.)

CONSUMPTION

Chromium metal consumption for the United States is collected and published by the U.S. Bureau of Mines. Chromium metal domestic shipments and trade for Japan is reported by the Ministry of International Trade and Industry. See figure 9. On average, what is produced is consumed. (See the following section World Production and Consumption.)

Figure 9
Chromium Metal Production and Consumption Reported by Japan

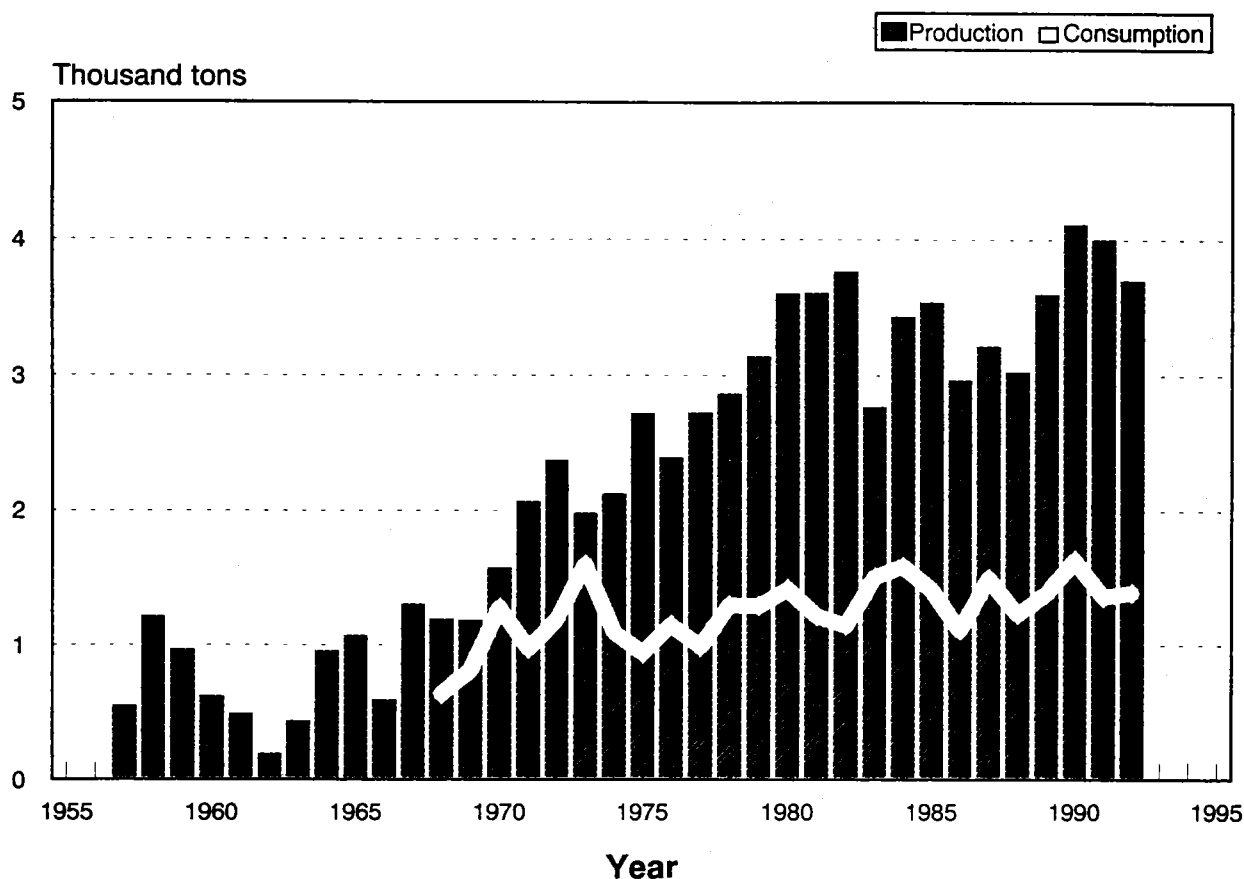


Figure 10
Chromium Metal Production Reported by Minor Producers

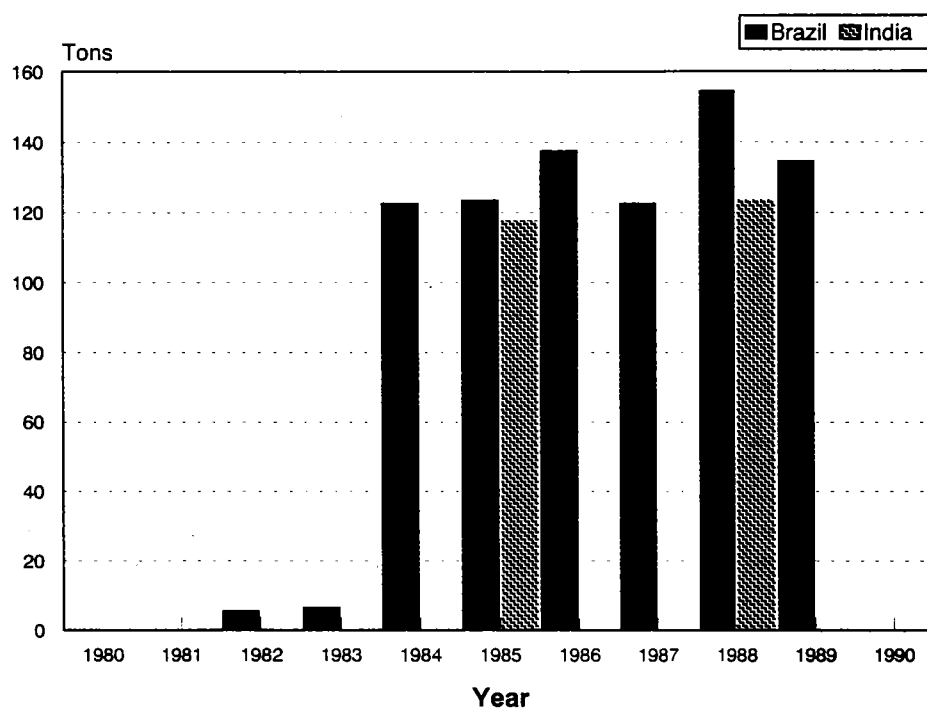
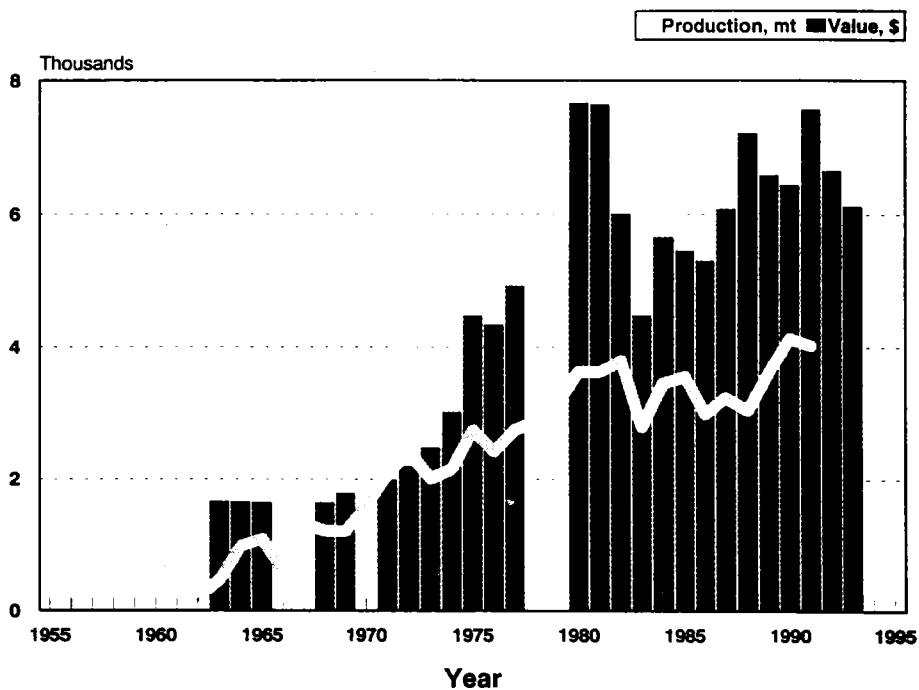


Figure 11
Japanese Production and U.S. Import Value



CAPACITY

Market transparency (i.e., market conditions that permit one to identify producers, consumers, products, and other market characteristics) permits one to estimate and compare production capacity by plant with production capacity by country. Market transparency is a problem for chromium metal. Western producers and their products can be identified. In some cases, production capacities or production estimates have been made. Since the dissolution of the former U.S.S.R., information about the Russian chromium metal industry has increased. The structure of the Chinese industry, however, remains unclear. Chromium metal is produced in sufficiently small volume that, with the exception of Russia and, possibly, China, there is not more than one major producer per country.

Production and trade data are collected and published on a national basis except when that information could reveal company proprietary information. As a result, there is little production information available. However, trade data are available. Unfortunately, the chromium metal trade category includes master alloys based on chromium and waste and scrap, which is sometimes combined with chromium metal and alloys based thereon. Careless or naive classification also results in chromium plated products being included with chromium metal. The collection of these different products into the chromium metal trade categories obscures the meaning of that information. Chromium master alloys for use in alloying aluminum or copper contain small amounts of chromium compared with chromium metal.

Capacities estimated here are based on trade data, trade journal reports, and industry sources. Companies typically neither report nor reveal production or production capacity. Chromium metal production capacity for the electrolytic process is limited by electrodeposition baths. Electrolytic chromium metal production capacity is stabilized by the difficulty and cost of adding production facilities. Chromium metal production capacity for the aluminothermic process is limited by the availability of chromic oxide. A reaction vessel is required for the production process. However, reaction vessels used to make other products can be switched to chromium metal production, and the addition of reaction vessels for aluminothermic chromium metal production is simpler and less costly than the addition of electrodeposition baths for electrolytic chromium metal production. Thus, production capacity based on production equipment is less meaningful for aluminothermic chromium metal production than it is for electrolytic chromium metal production. With these caveats in mind, world production capacity by country and by grade can be estimated as follows.

In 1994, the major world chromium metal producers included China, France, Great Britain, Japan, Russia, and the United States. China, France, and Great Britain produced only aluminothermic chromium metal. Japan and Russia produced both aluminothermic and electrolytic chromium metal. Japan closed its electrolytic chromium metal manufacturing in 1995. (See table 9.) The United States produced only electrolytic chromium metal. Figure 12 shows 1995 chromium metal production capacity of the major producer countries by type of production process. Figure 13 shows the distribution of production capacity in 1995 by production process and by country. The figures show that only Russia has major capacity for both processes. When Japan ceased electrolytic chromium metal production in 1995, Russia and the United States remained electrolytic chromium metal producers. Western world chromium supply was estimated at about 15,000 tons (Bebbington, 1990) with only about 1,500 tons attributed to Russia plus China. Today (in 1995), the world production capacity is estimated at 38,300 tons, more than twice 1990 estimated western world chromium supply even with the closure of Tosoh (Japan).

Table 9.—Chromium metal production capacity for major producing countries by country and by grade in December 1995

Country	Capacity		Total
	Aluminothermic	Electrolytic	
China	5,000	--	5,000
France	5,000	--	5,000
Germany	1,000	--	1,000
Japan	1,200	--	1,200
Russia	16,000	2,000	18,000
United Kingdom	5,000	--	5,000
United States	--	3,100	3,100
Total	33,200	5,100	38,300

A comparison between the capacities reported here and the trade data reported following this section shows that China's and Russia's production capacities are substantially larger than reported trade. The Chinese reported chromium metal and alloys exports in 1992 and 1993 exceeded 6,000 tons per year, substantially more than that reported by Roskill, BGS, or ICDA. Chinese chromium metal production capacity was based on those China's reported export statistics. Whatever the case with China's chromium metal production or production capacity, it is generally recognized that Chinese chromium metal supplies the low purity end of the consumer market. Reported Russian chromium metal production for one producer for selected years between 1985 and 1991 ranged from 12,000 tons to 16,000 tons suggesting an annual Russian production capacity of about 18,000 tons. Russian chromium metal production capacity was based on this reported production data.

Figure 12
Chromium Metal Annual Production Capacity in 1995 by Major Producers

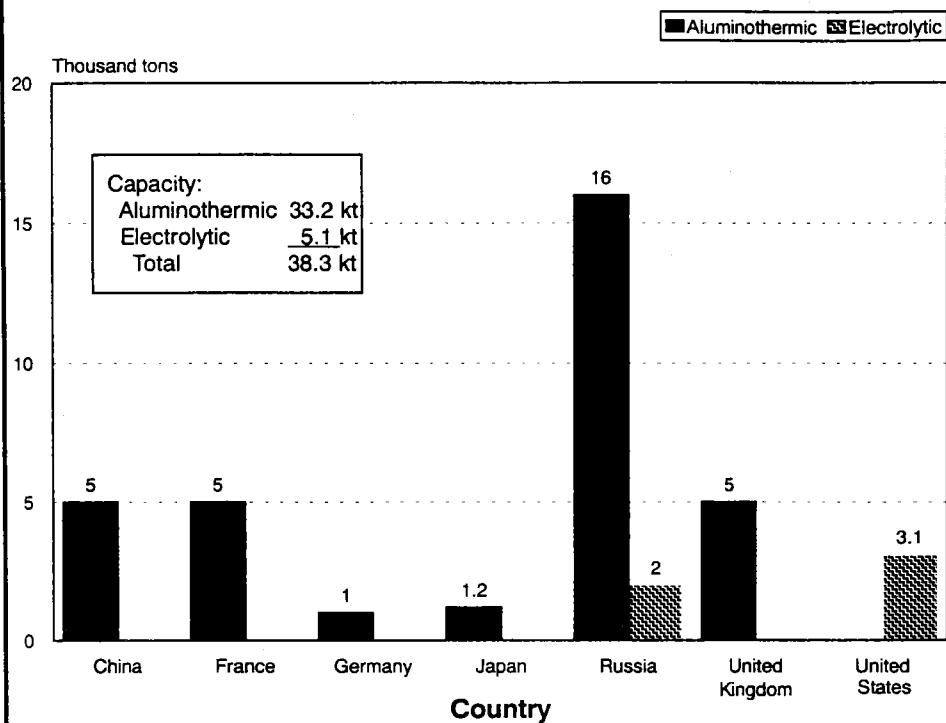
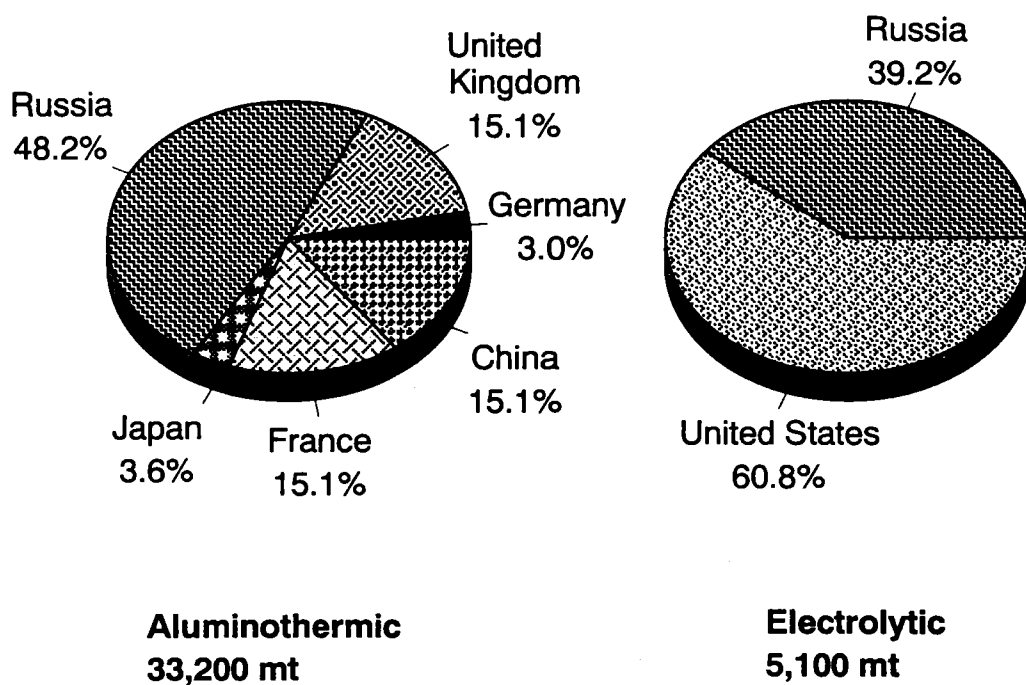


Figure 13
Chromium Metal Annual Production Capacity Distribution in 1995 by Grade and by Major Producer Country



TRADE

Imports and exports of chromium metal are readily available from the British Geological Survey (World Mineral Statistics) (BGS), Roskill Information Services (The Economics of Chromium) (Roskill), and the International Chromium Development Association (Statistical Bulletin) (ICDA). Net trade data averaged over time and all countries should be zero because everything that was imported by any country was exported by some other country. Thus, if both imports and exports are reported, averaging net trade (net trade is imports minus exports) yields a test on the veracity of the data. It may be assumed that the nearer that the time-country average of trade is to zero, the better the data. A 5-year time average of net trade for all reported countries by the sources listed above yields: ICDA, 0 tons; Roskill, 118 tons; and BGS, 1,289 tons. The ICDA average net trade is 0 because it reports backward calculated exports and country reported imports. Only Roskill and BGS publish country-reported imports and exports. Thus it appears that Roskill reports more complete trade data. There are unfortunately substantial differences (i.e., a factor of 2) for specific trade, country, year reported data among these

sources. Perhaps the adoption of the Harmonized Tariff System by major trading countries will mitigate these discrepancies.

Review of the trade data yields the same qualitative conclusions regardless of data source. Only the quantitative character changes. Trade data show that the major chromium metal net exporter countries have been China, France, Japan, Russia, and the United Kingdom each averaging in the range of from 1,000 to 2,000 tons annually in recent years. (Net exports are exports minus imports.) With the exception of the United States, these are the above identified major producer countries.

The major chromium metal net importer countries are Germany and the United States with Germany averaging over 1,000 tons annually and the United States averaging over 4,000 tons annually. (Net imports are imports minus exports.) On average, German chromium metal imports are about one-third those of the United States while German exports are double those of the United States. See figure 14. Together, the United States and Germany account for about 75 percent of the import market. See Appendix A.—Trade for detailed trade data.

Figure 14
Salient Characteristics of Chromium Metal Trade

1984 - 1993	
• General	- 8 thousand tons average annual world trade - Reported trade balance: 2 percent to 10 percent
• Trend	- Trade growth since 1984 - Substantial increase since 1989
• Exporters:	- Major (greater than 85 percent): China, France, Japan, Russia, United Kingdom, and Germany - China and United Kingdom about 1.3 thousand tons per year ('84 - '92) - France and Japan 1.7 thousand tons per year ('84 - '92) - Russia greater than 1 thousand tons per year and variable ('88 - '92) - Germany 0.4 thousand tons per year and variable ('84 - '92)
• Importers:	- Net: Germany, United States of America - Major: (greater than 75 percent): Germany and United States of America ('84 - '92) - United States of America (6 thousand tons per year), Germany (2 thousand tons per year) ('84 - '92) - United States of America: over 2 times greater than 2nd largest importer

NOTE.--Based on data from BGS, ICDA, Roskill, & USBM.

WORLD PRODUCTION AND CONSUMPTION

Average world chromium metal production (approximately equal to consumption) over the past few years exceeded 21,000 tons annually. This estimate of average world chromium metal annual production (consumption) was made as average annual world trade (imports or exports) plus average annual domestic consumption in major producing countries. Average annual domestic consumption is reported for Japan, estimated for the United States, and estimated by assuming similarity to the Japanese economic practice for the remaining major producers (China, France, Germany, Russia, and United Kingdom). This world production/consumption value was constructed as follows.

Chromium metal that is imported (or exported) can be used to estimate production. Assuming that chromium metal imports are consumed within the importing country (i.e., the chromium metal is not processed subsequently to become a chromium metal export), on average the difference between imports (or exports) and world production is production that is domestically consumed. "On average" here indicates a time average and is important because over short-time periods the origin of traded material could be stocks. "On average" here indicates that the time period should be sufficiently long that stock changes do not affect the magnitude of trade. Then, on average, imports (or exports) may be used to make a lower bound estimate of world chromium metal production (consumption).

Trade data averaged over several years suggests a lower bound on chromium metal production during 1984-92 of about 8,000 tons annually. Since production is either consumed within the country of production or is traded to another country, trade provides a lower bound estimate of production. Thus, using average imports as a first approximation, world production (consumption) during the 1984-92 time period averaged 8,400 tons per year.

Chromium metal production that is not traded, is consumed domestically. We can improve this estimate of world chromium production by adding in the amount of domestically consumed chromium metal. Japan is unique in that it reports domestic shipments of chromium metal. Adding Japanese reported average annual chromium metal domestic shipments of 1,400 tons for the same time period raises the lower bound estimate of average world chromium metal production to 9,800 tons.

Average annual chromium metal reported consumption for the United States is 3,800 tons, but this is not consumption of domestically produced chromium metal. It includes imported chromium metal. Net trade averaged 4,100 tons over the same period. Indeed, U.S. reported chromium metal consumption exceeds U.S. annual production capacity of about 3,100 tons. The United States is unique as the largest chromium metal consuming country and the only major world consumer that clearly consumes in excess of domestic production. (Reported consumption is, of course, less than total consumption because not all consumers elect to report their consumption.) U.S. consumption of domestically produced chromium metal is estimated to have averaged 2,100 tons annually. Adding U.S. estimated average annual domestic consumption of domestic production to our previous estimate of world production brings that estimate up to about 11,900 tons.

This estimate could be improved through the addition of average annual chromium metal consumption in the remaining major producer countries: China, France, Germany, Russia, and the United Kingdom. Assuming that the remaining major producer countries identified above have chromium metal industrial performance similar to that of Japan (i.e., on average they consume domestic production in the range of 25 percent to 30 percent of their domestic production capacity), average annual consumption for China, France, Germany, Russia, and United Kingdom was about 9,200 tons annually. Adding this amount to the lower bound estimate of world chromium metal production brings that estimate up to 21,000 tons annually.

On average, annual trade (8,400 tons) and annual domestic consumption (12,600 tons) together account for about 55 percent of world production capacity (38,300 tons). Thus, an estimate of average annual domestic consumption of 25 percent to 30 percent of production capacity does not contradict world trade and production capacity data. Furthermore, these estimates imply a chromium metal excess production capacity of about 45 percent of current capacity, on average.

Chromium metal trade trend was upward during 1982-93 from a low of 4,500 tons in 1983 to a high of 14,300 tons in 1991. Applying the reasoning above to the 1990-92 average trade of 12,000 tons, yields world production (consumption) at over 70 percent of current world production capacity.

MARKET TRENDS

SUPPLY

The recent chromium metal manufacturing market trend has been to reduce the number of chromium metal producers. Since production data are not available, it is not clear whether plants are closing because of low demand or if remaining plants are increasing capacity and production to compensate for that lost to the plant closures. The latter has been occurring in the primary chromium chemical and ferrochromium manufacturing industries, so it well may be occurring in chromium metal manufacturing too. In 1977, Union Carbide, the predecessor to Elkem Metals Co., (Marietta, Ohio) announced the startup of its process of carbon reduction of Cr_2O_3 in a vacuum, with an annual capacity of 2,800 short tons per year. In 1980, Nippon Denko (Hokuriku, Tokushima Prefecture) announced expanded capacity from 350 tons per year to 1,000 tons per year and Toyo Soda, the predecessor to Tosoh, (Yamagata, Yamagata Prefecture) expanded from 3,000 tons per year to 3,600 tons per year. In 1986, India Chromium Metals Private Ltd. (Rourela, Sundargarh District, Orissa State) started production with an annual capacity of 39 tons. Rationalization followed these expansions.

Continental Alloys S.A., a Luxembourg producer, ceased production in 1989. Three chromium metal producers once operated in the United Kingdom and two in the United States. In the United Kingdom, Metal Alloys Ltd. (South Wales) ceased production in 1990 and Murex Ltd. (Rainham, Essex County) ceased production in 1992, leaving only London & Scandinavian Metallurgical Co. Ltd. (Rotherham, South Yorkshire County). In the United States, Shieldalloy Metallurgical Corp. (Newfield, New Jersey) ceased chromium metal production in 1990 leaving Elkem Metals Co. as the sole U.S. bulk chromium metal producer.

Tosoh has announced that it will cease chromium metal production in 1995. No expansions or new plants have been announced. Tosoh is closing its electrolytic chromium metal facility at Yamagata City, Yamagata Prefecture, as part of an urban renewal program. Tosoh represented about 12 percent of world chromium metal production capacity and 44 percent of electrolytic chromium metal capacity in 1994. In the World Production and Consumption section, world excess production capacity was estimated at about 45 percent of world production capacity, on average. Assuming that this total market condition applies to the high-quality market of which Tosoh was a part, remaining capacity after the Tosoh closure is just adequate to meet demand.

Dissolution of the former Soviet Union in 1991 impacted chromium metal supply by putting Russian chromium metal producers in competition with Western chromium

metal suppliers and brought Russian chromium metal producers higher visibility in Western markets. As a result of reduced demand for chromium metal in the former Soviet Union following the 1991 dissolution, economic integration with the West promptly added about 18,000 tons per year of Russian production capacity (about 16,000 tons per year from Klyuchevsk Ferroalloy Works, Dvurechinsk, Sysertsky District, Sverdlovsk Oblast, and 2,000 tons per year from Polema, Tula Oblast) to world supply.

Should it be decided that chromium metal is no longer a strategic concern of the United States, current NDS chromium metal (amounting to about 7,685 tons in February 1995) might be sold, further increasing world supply in the short term.

One aluminothermic chromium metal producer (Delchaux, France) has marketed an improved, high-quality product to compete with electrolytic chromium metal for superalloy end use. In order for alloy manufacturers to use a material, that material and its supplier must be certified by the jet engine manufacturer. Aluminothermic chromium metal has always been certified for use in superalloy production albeit only for lower grades/applications. High-quality aluminothermic chromium metal for higher grades/applications superalloys was first certified by Pratt and Whitney in 1987. Other aluminothermic chromium metal producers may, at some time in the future, develop or license the technology necessary to enter the high-quality market, but they can not now do so.

DEMAND

The United States dominates world demand for chromium metal, and the aerospace industry dominates U.S. demand. Within the aerospace industry, chromium metal demand is divided between new jet engines and jet engine replacement parts in end use, and between commercial and military applications in end users. U.S. reported chromium metal consumption (see figure 6) does not appear to show either an increasing or a decreasing consumption trend during 1972-93.

Stockpiling in the United States and Japan has contributed to chromium metal demand. See Stockpiling section under Chromium Metal in the United States above. In 1983, Japan started a metals stockpiling program that included chromium metal. Japan has been steadily building stocks since then.

The dissolution of the former Soviet Union in 1991 and the formation of the Confederation of Independent States (CIS) impacted the chromium metal market. As a result of this political change, the confrontation between the former

Soviet Union and the United States has been eliminated and the necessity for strategic weapons diminished on both sides. Thus, military driven chromium metal demand has declined both in the CIS and in the United States. In addition to a decline in military driven demand for chromium metal in the CIS, economic restructuring has resulted in general lowering of economic activity. See figure 15.

Chromium metal demand in the United States can be measured by reported chromium metal consumption, superalloy demand for chromium materials (most of which is chromium metal but some of which is ferrochromium), or by chromium metal net trade. See figures 16, 17, and 18. Aerospace industry (includes civil and military aircraft, missiles, space, and related products and services) performance can be measured by aerospace industry sales. See figure 19. Since aerospace products are the major end use for chromium metal, one would expect chromium metal demand to follow aerospace industry performance. Each of these measures of U.S. chromium metal demand shows a downward trend from 1990 to 1993. This appears to be a downward trend from a time period peak in 1990. Compared with the 1983-1993 time period, this downward trend appears to be part of a cycle. Net trade in 1994 increased compared with that of 1992 and 1993, and preliminary reported consumption of chromium material in 1994 increased compared with that of 1992 and 1993. These two measures suggest recovery.

Aerospace industry performance shows steady growth from 1979 to 1991 and steady decline from 1992 through 1995. Within the aerospace industry, total aircraft sales peaked in 1991 (civilian sales peaked in 1992 and military sales peaked in 1990), missile sales peaked in 1990, space sales peaked in 1992, and related products and services peaked in 1991. The chromium market performance indicators show much more variation than do aerospace sales. Each of the chromium metal market measures show a peak in 1990. A peak which precedes the aerospace peak in 1991.

So it appears that measured chromium market activity is inconsistent with predicted declining demand because aerospace market performance is showing a steady decline while chromium market measures do not show a clear decline. It could be that: (1) the predicted decline of military demand has not yet reached the market place; (2) other market forces have compensated for the declining military demand in the time period and geographic area covered by the measured market activity (i.e., local market conditions differ from global market conditions). Globally, lack of market transparency required major assumptions about historical market activity. A longer time period is required to demonstrate the veracity of the predicted decline in chromium metal demand owing to strategic restructuring. Even then, since military demand is inferred from overall market measures, other market trends may mask changes in military demand.

Figure 15
Electrolytic Chromium Metal Market Trends

Supply

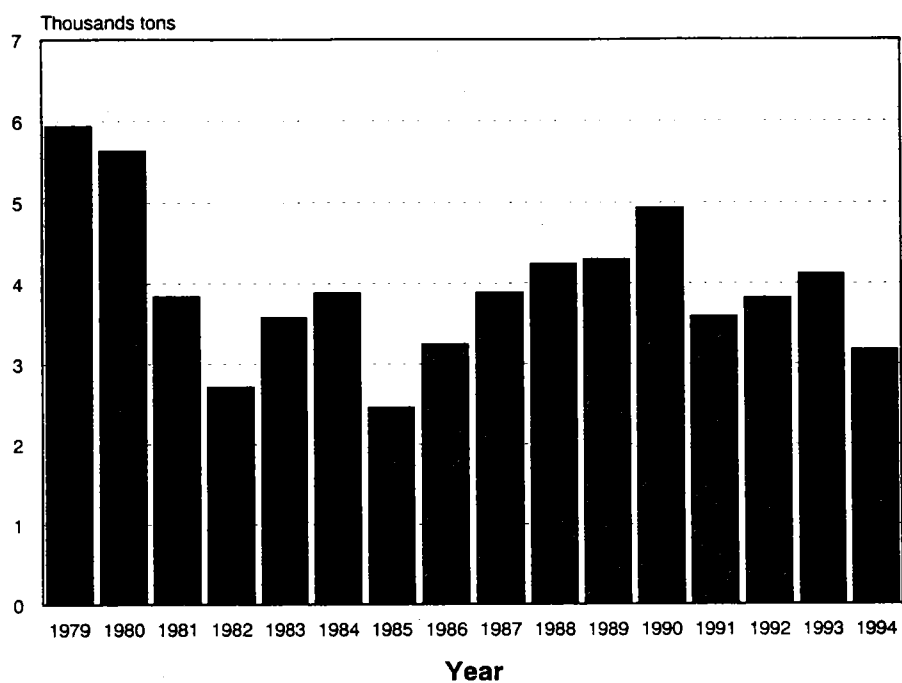
- ▶ TOSOH closure in 1995 (40 percent of world EI capacity)
- ▶ Al (vacuum melting) grade competing with EI grade

Demand

- ▶ Aerospace dominates
- ▶ 1990-92: US decline (reduced aerospace implies reduced demand)
- ▶ 1991-?: CIS demand collapse owing to restructuring and market reform

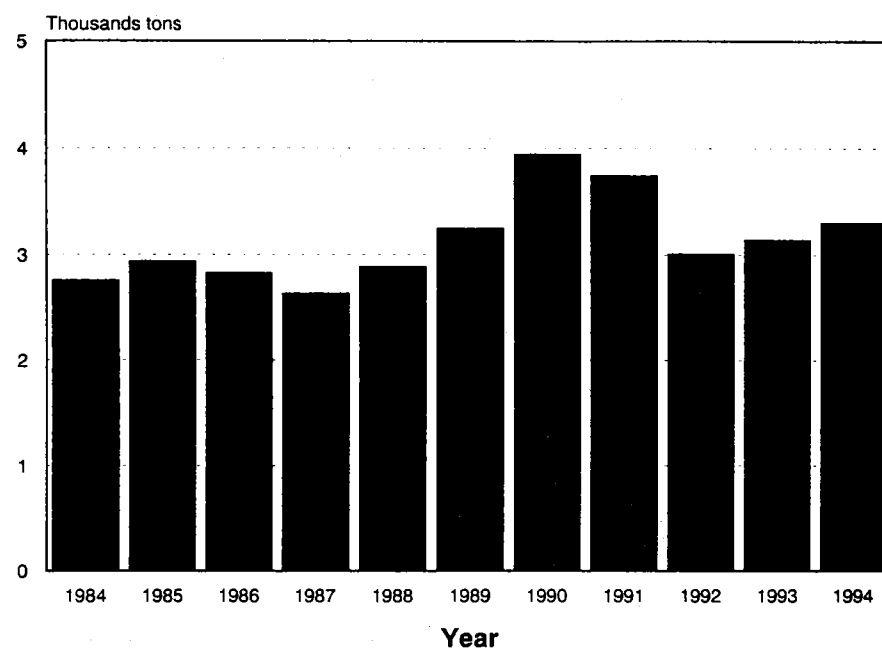
NOTE.--Al is aluminothermic. EI is electrolytic.

Figure 16
U.S. Reported Chromium Metal Consumption from 1979 through 1994



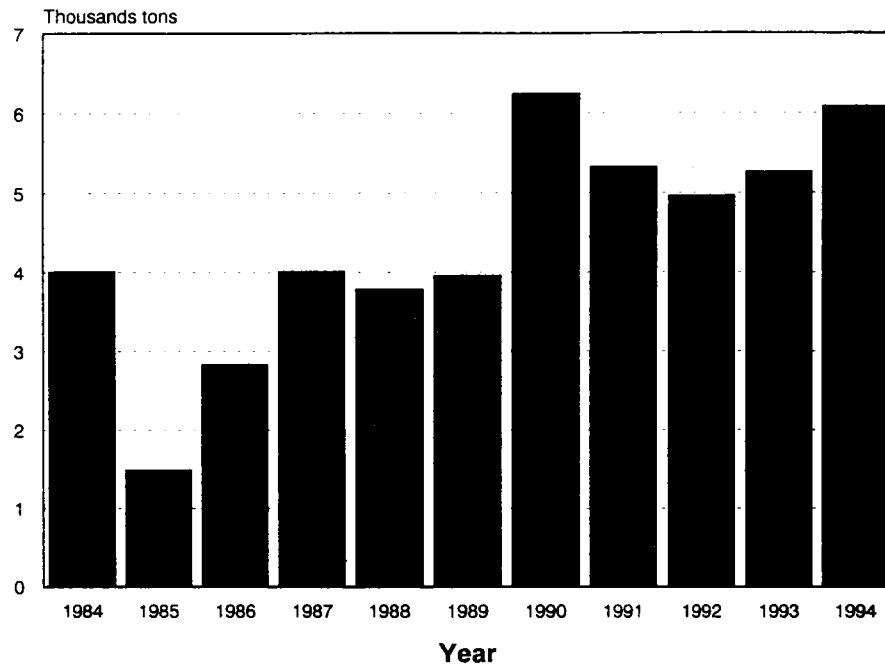
Source: U.S. Bureau of Mines, Chromium Annual Reports, 1984-94.

Figure 17
U.S. Superalloy Industry Reported Consumption of Chromium Materials from 1984 through 1994



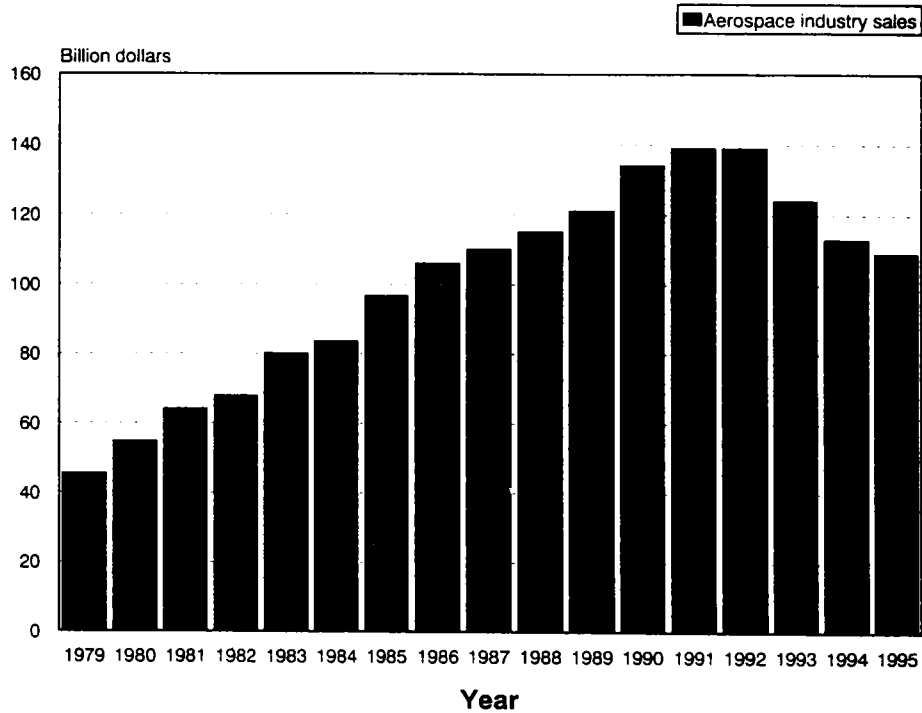
Source: U.S. Bureau of Mines, Chromium Annual Reports, 1984-94.

Figure 18
U.S. Chromium Metal Net Trade from 1984 through 1994



Source: U.S. Bureau of Mines, Chromium Annual Reports, 1984-94.

Figure 19
U.S. Aerospace Industry Sales from 1979 through 1995



Source: Aerospace Industries Assoc. of America, Inc.

SUMMARY

Chromium metal is produced primarily through one of two production processes: electrodeposition process to produce electrolytic chromium metal and aluminothermic reduction process to produce aluminothermic chromium metal. The aluminothermic reduction process is more widely used and more easily installed or expanded. Since the inception of commercial electrolytic chromium metal production in 1950, when electrolytic chromium metal was the high purity material, one aluminothermic chromium metal producer has improved its product and challenged electrolytic chromium metal as the major source of chromium metal for the superalloy industry. Superalloys are the major end use for chromium metal in the United States, and jet engines are the major end users of superalloys.

The major chromium metal producers in 1995 were China, France, Germany, Russia, United Kingdom, and the United States. The major consumers of traded chromium metal have been Germany and the United States. Japan is the only country for which chromium metal production, domestic shipments, and foreign trade data are available. For the United States, reported consumption and trade data are available. For other countries, only trade data are available. The United States is the world's largest consumer of chromium metal. The United States is the only major producing country that clearly consumes more than it produces. The United States and Germany, respectively, have been the largest chromium metal importers. Japan, having closed its 4,000-ton-per-year-capacity chromium metal plant, is expected to displace Germany as the second largest chromium metal importer.

The United States holds chromium metal in the National Defense Stockpile. Chromium metal is considered critical and strategic because it is required as an alloying element in the production of superalloys with which military jet engines are built, and the United States has no domestic mine supply of chromite ore from which chromium metal is ultimately produced. National Defense Stockpile chromium metal chemical specification changes from 1956

through 1985 indicate that the consumer industry has become more quality conscious over the years as demonstrated by increasing the number of trace elements which must be accounted for and by decreasing the permissible amounts of trace elements. The price of chromium metal shifted from a range of \$1 per pound to \$2 per pound in 1963 through 1975, to a range of \$2 per pound to \$4.50 per pound in 1981 through 1994.

World chromium metal production capacity was estimated at 38,300 tons in 1995, with average consumption over the 1984 through 1993 time period estimated to have been in the range of from 21,000 tons per year to 27,000 tons per year, of which the United States accounted for 6,200 tons per year. From 1984 through 1993, the chromium metal annual trade trend was upward, from a low of 4,500 tons to a high of 14,300 tons.

Chromium metal markets have been and continue to be impacted by the dissolution of the U.S.S.R. in 1991 followed by the integration of Russia and China into the international chromium metal industry. Closure of the Japanese electrolytic chromium metal producer in 1995 left the United States and Russia as the sole electrolytic chromium metal producers. The end of the cold war reduced military demand for chromium metal both in the United States and in the former U.S.S.R. With the implementation of new economic practices in the Confederation of Independent States, domestic chromium metal demand is expected to increase there. With strengthening world economic conditions, world chromium metal demand is expected to grow.

If Russian producers survive the economic changes taking place in the former Soviet Union, Russia is expected to take a major role in world chromium metal trade.

Despite reduced military demand for chromium metal resulting from changing strategic conditions in 1991, U.S. chromium metal demand has not deviated from historical business cycle changes through 1995.

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APPENDIX A-TRADE

Table A-1 shows chromium metal imports; table A-2, chromium metal exports. Net trade is imports minus exports. On average, that is over a long time period and among all trading countries, net trade should be zero because what was exported from one country was imported by another. Thus, the nearness of net trade to zero is a measure of the completeness of the trade data. Table A-3 shows chromium metal net trade.

Figures A-1 through A-7 show annual imports and exports as a percentage of annual total imports and exports for China, France, Germany, Japan, Russia, United Kingdom, and United States. The figures are organized by major trade position: importing countries are shown in figure A-1 for United States and figure A-2 for Germany; exporting countries are shown in figure A-3 for China, figure A-4 for France, figure A-5 for Japan, figure A-6 for Russia, and figure A-7 for United Kingdom.

The data tables and figures show that the United States and Germany were the major chromium metal importing countries, together accounting for over 75 percent of imports. China, France, Japan, Russia, and the United Kingdom were the major chromium metal exporting countries. China, France, Japan, and the United Kingdom dominated the export market together accounting for over 78 percent of exports.

Figures A-1 and A-2 show that over the time period, both U.S. and German import performance appear steady although German imports made a significant drop for a time period high to about 25 percent of import share to a time period low of about 12 percent from 1991 to 1993. Future performance will show whether this change is structural or transitory.

Figures A-3 through A-7 suggest that while France and Japan lost import share over the time period, Russia picked up export share. Russia (exports before 1991 were reported as U.S.S.R.) didn't start exporting until 1988 and appears to have peaked in 1991, the same year that the U.S.S.R. dissolved. It appears that chromium metal sales resulted from the dynamic political situation leading up to the dissolution of the U.S.S.R. in 1991. The large drop following the 1991 peak suggests that Russia may be exiting the chromium metal market. However, it remains to be shown whether Russia will play a major role in the chromium metal export market. Japan shows a substantial import market share only in the last year. As a result of the closure of Tosoh in 1995, both Japan's downward trend export share and their upward trend import share are expected to continue and even accelerate to new equilibria.

Table A-1.—Chromium metal imports from 1984 through 1994

(Metric tons)

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1984-92 average
Belgium-Luxembourg	230	456	537	406	373	392	421	406	379	206	400
Brazil	47	51	0	46	110	0	0	0	0	0	28
Canada	0	0	0	0	0	0	0	274	207	371	53
China	0	0	0	0	0	0	0	0	0	0	0
Denmark	0	1	0	18	1	4	0	0	0	0	3
Finland	0	0	0	0	0	0	0	0	0	0	0
France	289	196	232	252	261	520	995	1,231	345	438	480
Germany	1,287	1,449	1,160	1,141	1,330	1,642	2,312	3,058	1,399	1,385	1,642
Hong Kong	0	0	0	0	0	0	0	0	0	0	0
India	0	0	42	0	0	0	114	0	340	0	55
Ireland	0	0	0	6	0	0	158	262	991	0	157
Italy	5	17	58	0	0	0	0	0	0	0	9
Japan	0	0	0	0	0	0	550	794	91	1,468	159
Netherlands	15	38	29	22	14	32	302	238	105	694	88
Norway	0	0	11	39	0	0	0	0	0	0	6
Romania	0	60	0	0	0	0	0	0	0	0	7
Russia	0	0	0	0	0	0	0	0	0	0	0
Spain	0	563	0	0	0	0	0	0	0	10	63
Sweden	282	248	322	216	220	271	185	0	210	520	217
Switzerland	0	62	45	0	0	0	0	0	0	554	12
United Kingdom	38	71	59	35	391	713	662	483	525	0	331
United States	4,243	1,678	3,047	4,243	4,101	4,152	6,579	5,747	5,259	5,733	4,339
Others	0	0	0	0	0	0	0	0	0	0	0
Total	6,434	4,890	5,543	6,423	6,801	7,727	12,278	12,493	9,851	11,379	8,049

Sources: U.S. from Papp, J. F., Chromium Annual Reports.

Other countries: Roskill Report, Chromium (Sixth, Seventh, and Eighth Ed.)

1993 imports from the International Development Chromium Development Assoc.

Table A-2.—Chromium metal exports from 1984 through 1992

(Metric tons)

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1984-92 average
Belgium-Luxembourg	112	299	120	122	58	77	36	4	18	94
Brazil	0	0	0	0	0	0	0	0	0	0
Canada	0	0	0	0	61	72	0	0	0	15
China	930	492	1,006	1,150	1,086	1,155	2,341	1,486	2,245	1,321
Denmark	0	1	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	43	0	0	0	5
France	1,629	1,613	1,796	1,644	1,232	1,290	2,329	2,407	1,290	1,692
Germany	250	157	126	139	82	159	1,055	1,686	218	430
Hong Kong	0	0	136	0	0	0	0	0	0	15
India	0	0	0	0	0	0	0	0	0	0
Ireland	0	20	0	302	0	0	0	0	0	36
Italy	4	1	0	0	0	0	0	0	0	1
Japan	1,680	1,471	1,166	1,003	1,572	1,714	2,822	2,020	2,315	1,751
Netherlands	4	1	122	168	203	0	0	182	286	107
Norway	0	0	0	0	0	0	0	0	0	0
Romania	0	0	0	0	0	0	0	0	0	0
Russia	0	0	0	0	223	473	1,832	2,879	555	662
Spain	0	0	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	59	48	0	0	0	12
Switzerland	0	0	0	81	48	0	0	0	0	14
United Kingdom	174	241	335	451	1,970	1,920	2,344	3,195	2,267	1,433
United States	235	193	216	235	318	196	338	424	299	273
Others	0	0	0	234	103	278	0	0	0	68
Total	5,017	4,489	5,022	5,528	7,014	7,424	13,097	14,283	9,493	7,930

NOTE.—Russia: 1988-92 annual average exports exceed 1,000 tons.

Sources: U.S. from Papp, J. F., Chromium Annual Reports.

Other countries: Roskill Report, Chromium (Sixth, Seventh, and Eighth Ed.)

1993 imports from the International Development Chromium Development Assoc.

Table A-3.—Chromium metal net trade from 1984 through 1992

(Metric tons)

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1984-92 average
Belgium-Luxembourg	118	157	417	284	315	316	385	402	361	306
Brazil	47	51	0	46	110	0	0	0	0	28
Canada	0	0	0	0	-61	-72	0	274	207	39
China	-930	-492	-1,006	-1,150	-1,086	-1,155	-2,341	-1,486	-2,245	-1,321
Denmark	0	-0	0	18	1	4	0	0	0	2
Finland	0	0	0	0	0	-43	0	0	0	-5
France	-1,340	-1,417	-1,564	-1,392	-971	-770	-1,334	-1,176	-945	-1,212
Germany	1,037	1,292	1,034	1,002	1,248	1,484	1,257	1,372	1,181	1,212
Hong Kong	0	0	-136	0	0	0	0	0	0	-15
India	0	0	42	0	0	0	114	0	340	55
Ireland	0	-20	0	-296	0	0	158	262	991	122
Italy	1	16	58	0	0	0	0	0	0	8
Japan	-1,680	-1,471	-1,166	-1,003	-1,572	-1,714	-2,272	-1,226	-2,224	-1,592
Netherlands	11	37	-93	-146	-189	32	302	56	-181	-19
Norway	0	0	11	39	0	0	0	0	0	6
Romania	0	60	0	0	0	0	0	0	0	7
Russia	0	0	0	0	-223	-473	-1,832	-2,879	-555	-662
Spain	0	563	0	0	0	0	0	0	0	63
Sweden	282	248	322	216	161	223	185	0	210	205
Switzerland	0	62	45	-81	-48	0	0	0	0	-2
United Kingdom	-136	-170	-276	-416	-1,579	-1,207	-1,682	-2,712	-1,742	-1,102
United States	4,008	1,485	2,831	4,008	3,783	3,956	6,241	5,323	4,960	4,066
Others	0	0	0	-234	-103	-278	0	0	0	-68
Total	1,417	401	521	895	-213	303	-819	-1,790	358	119

NOTE.—Net trade is imports minus exports.

Figure A-1

United States Chromium Metal Trade, 1984-1993. Imports Reported as Percent of World Imports; Exports, as Percent of World Exports

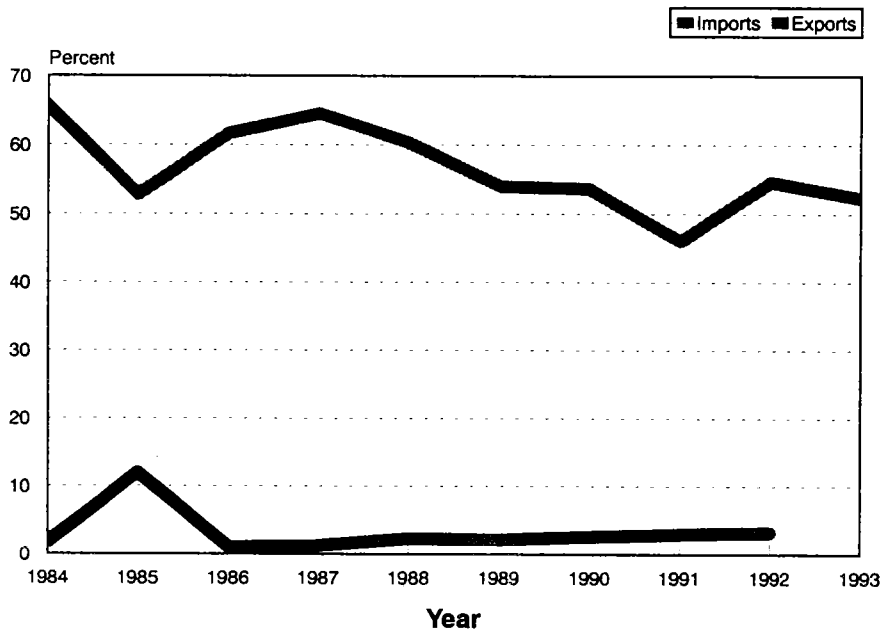


Figure A-2

Germany's Chromium Metal Trade, 1984-1993. Imports Reported as Percent of World Imports; Exports, as Percent of World Exports

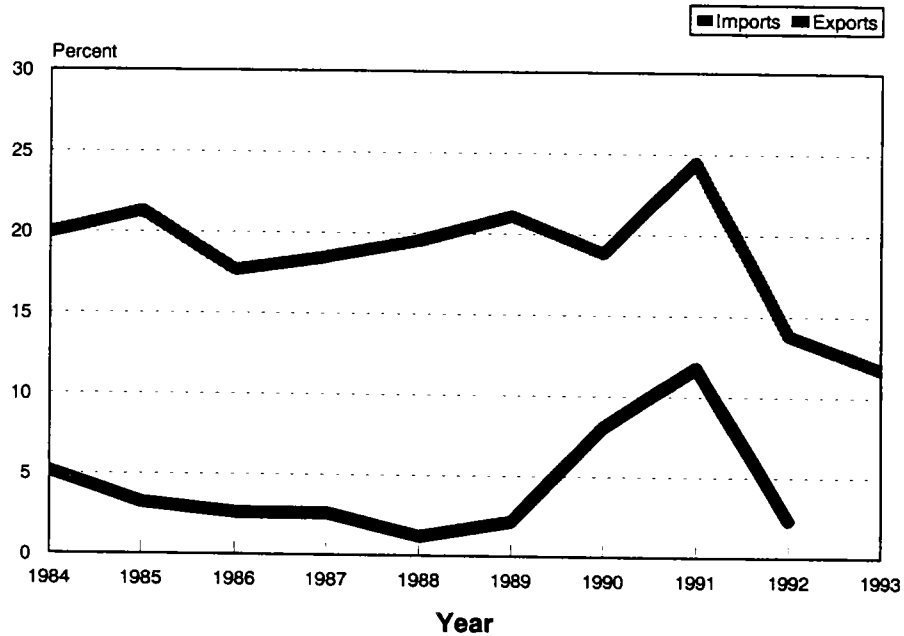


Figure A-3
China's Chromium Metal Trade, 1984-1993. Imports Reported as Percent of World Imports; Exports, as Percent of World Exports

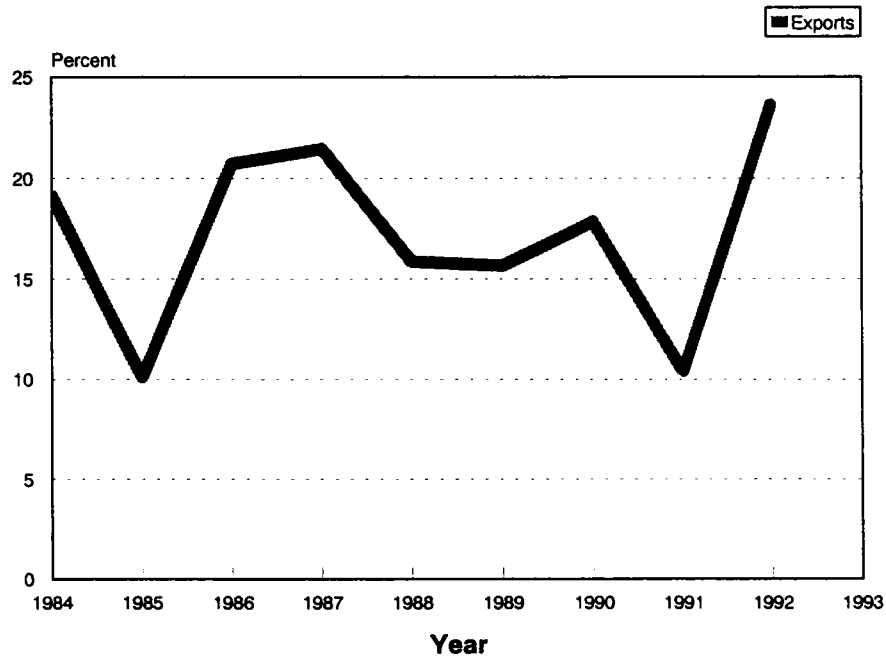


Figure A-4
France's Chromium Metal Trade, 1984-1993. Imports Reported as Percent of World Imports; Exports, as Percent of World Exports

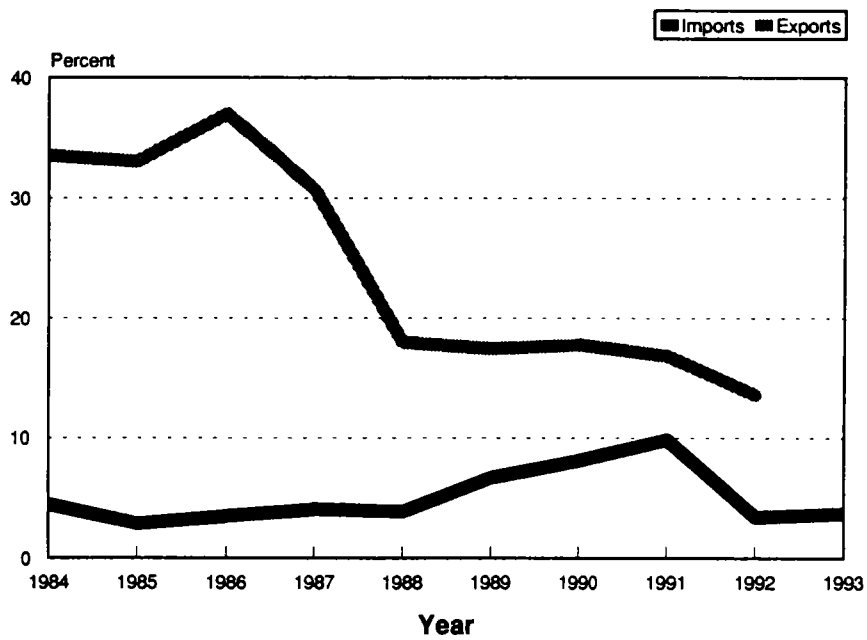


Figure A-5
Japan's Chromium Metal Trade, 1984-1993. Imports Reported as Percent of
World Imports; Exports, as Percent of World Exports

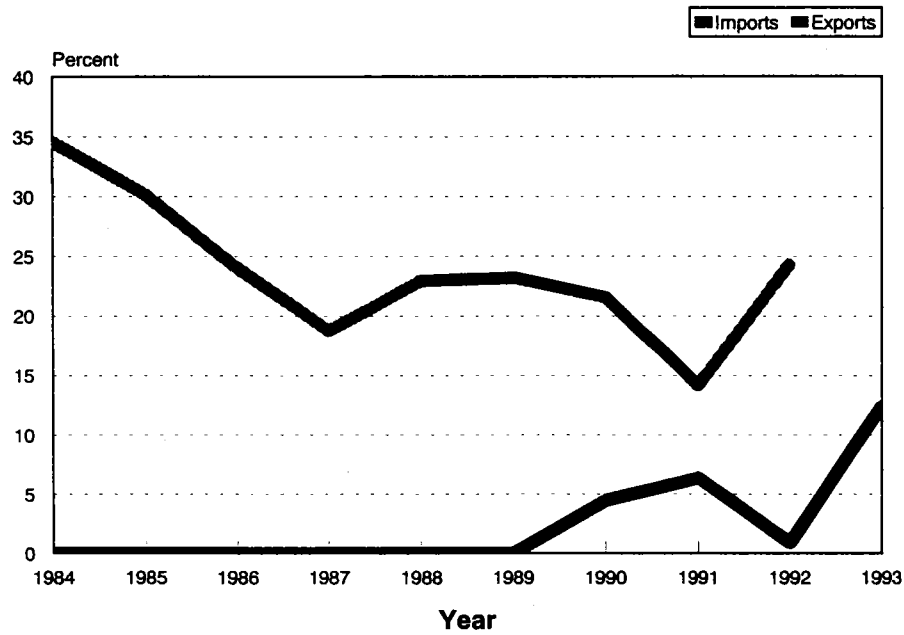


Figure A-6
Russia's Chromium Metal Trade, 1984-1993. Imports Reported as Percent of
World Imports; Exports, as Percent of World Exports

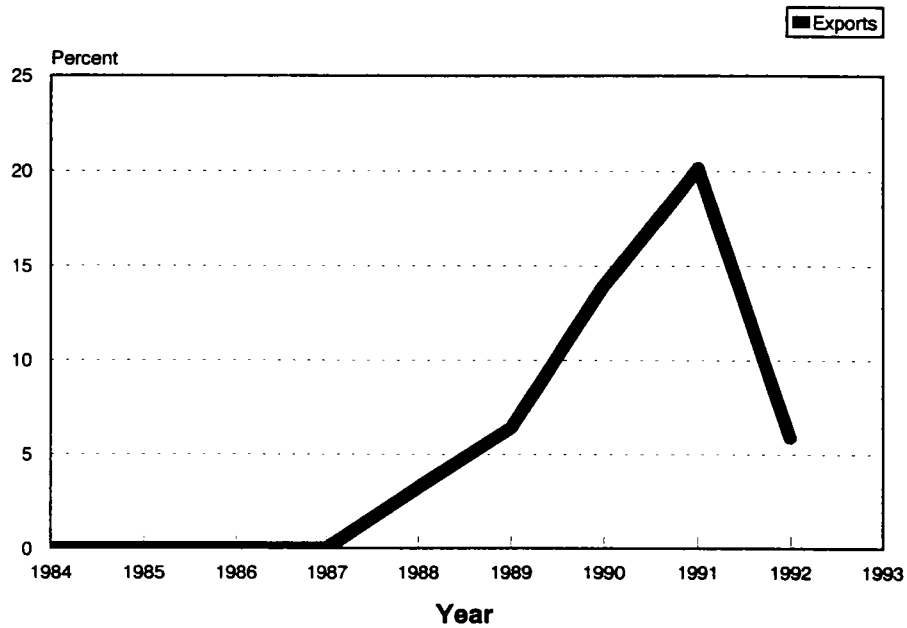
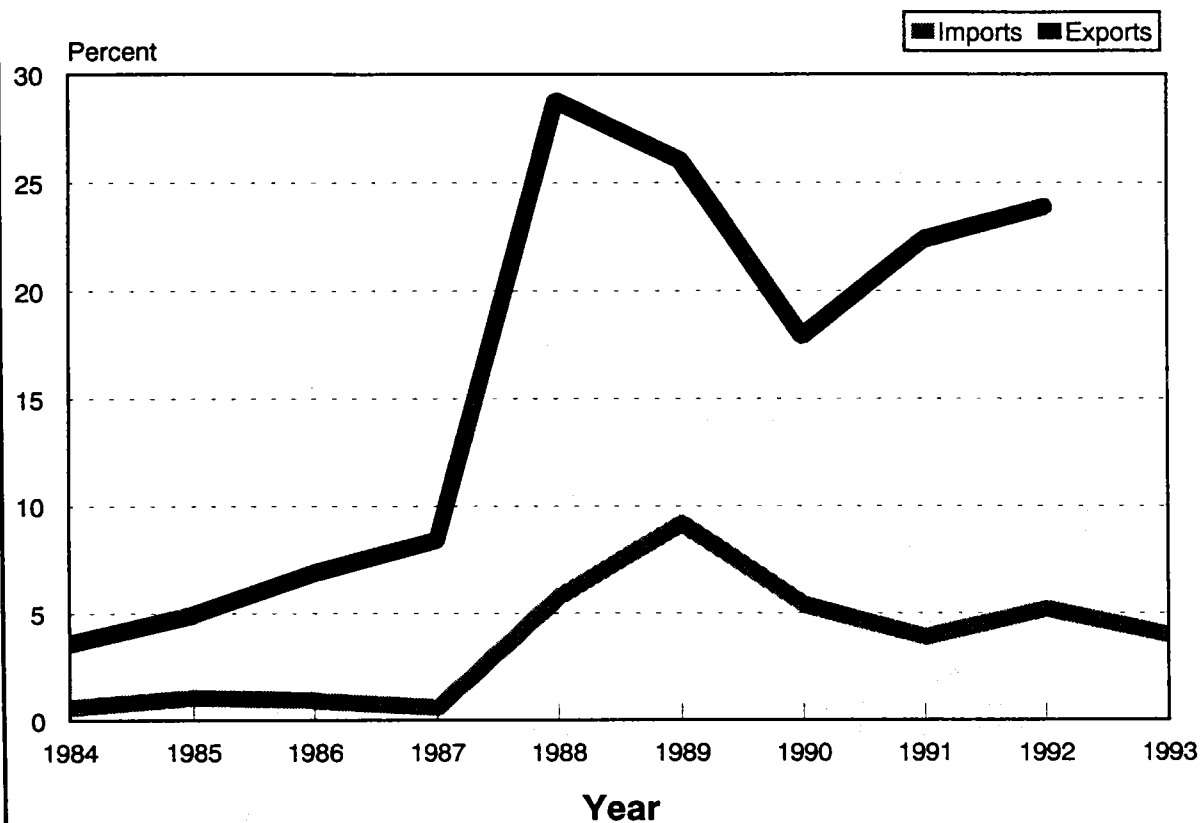


Figure A-7
United Kingdom's Chromium Metal Trade, 1984-1993. Imports Reported as Percent of World Imports; Exports, as Percent of World Exports

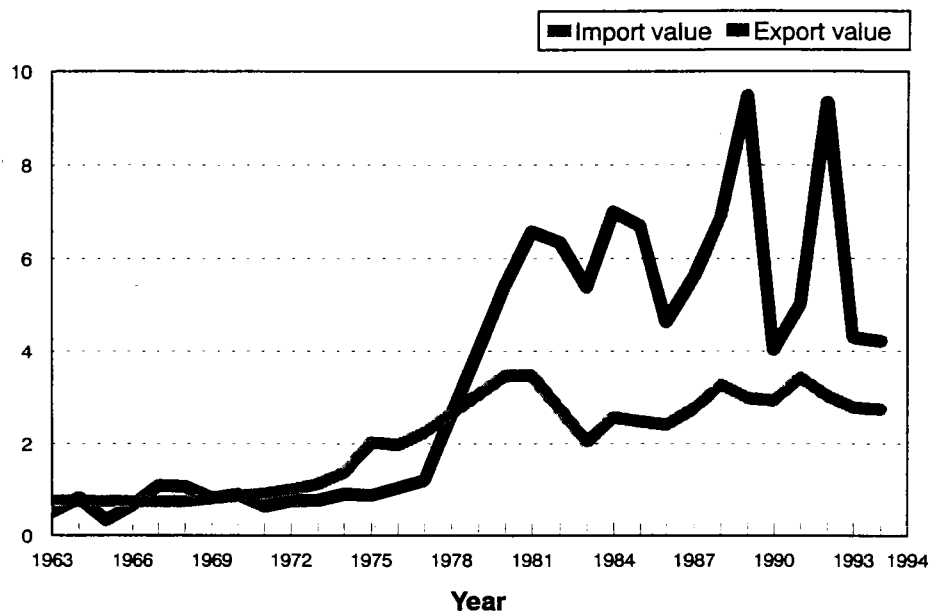


APPENDIX B.--PRICES

Figure B-1 shows average annual prices over the time period reported. Tables B-1 through B-26 detail the annual

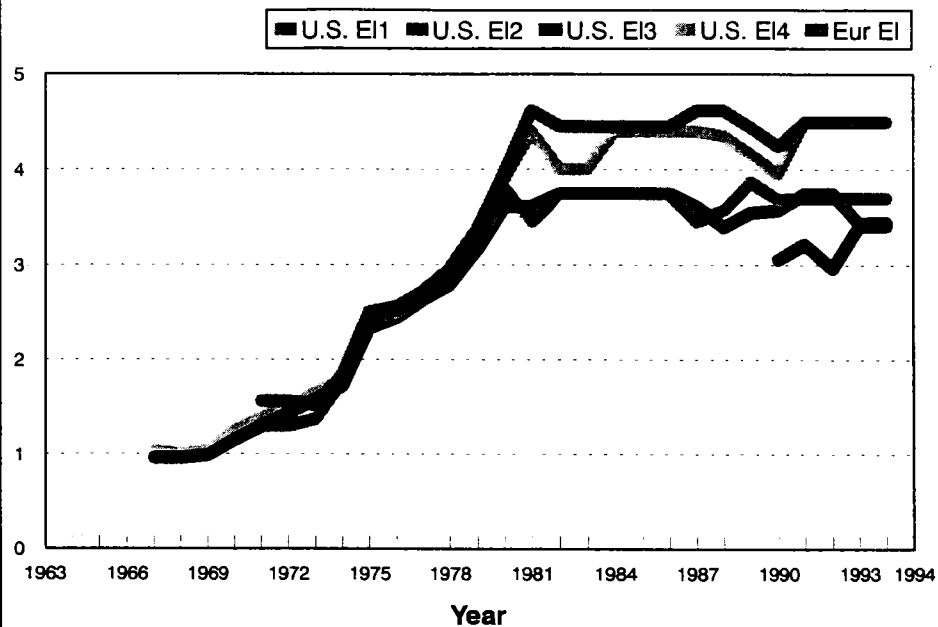
price history of chromium metal.

Figure B-1
Chromium Metal Average Annual Value and Price from 1963 through 1994
 (Dollars per pound, gross weight unless otherwise noted.)



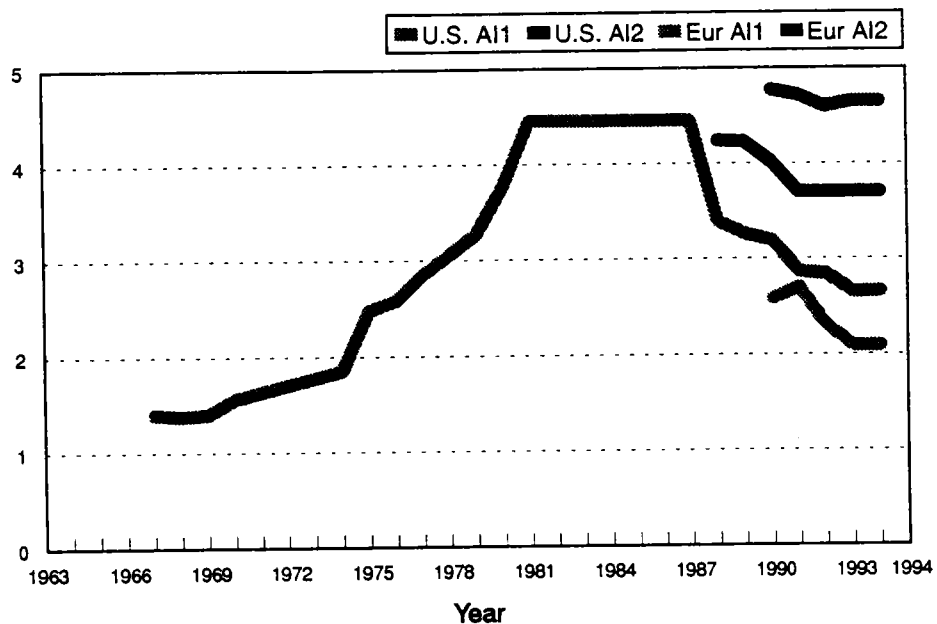
NOTE.--U.S. United States. Eur Europe. El Electrolytic. Al Aluminothermic.
 See table 6 or Appendix B tables for definitions.

Figure B-1
Chromium Metal Average Annual Value and Price from 1963 through 1994--Continued
 (Dollars per pound, gross weight unless otherwise noted.)



NOTE.--U.S. United States. Eur Europe. El Electrolytic. Al Aluminothermic.
 See table 6 or Appendix B tables for definitions.

Figure B-1
Chromium Metal Average Annual Value and Price from 1963 through 1994--Continued
 (Dollars per pound, gross weight unless otherwise noted.)



NOTE.--U.S. United States. Eur Europe. EI Electrolytic. Al Aluminothermic.
 See table 6 or Appendix B tables for definitions.

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
1/10	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
1/17	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
1/24	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
1/31	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
2/7	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
2/14	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
2/21	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
2/28	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
3/7	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
3/14	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
3/21	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
3/28	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
4/4	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
4/11	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
4/18	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
4/25	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
5/2	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
5/9	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
5/16	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
5/23	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
5/30	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
6/6	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
6/13	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
6/20	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
6/27	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
7/4	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
7/11	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
7/18	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
7/25	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
8/1	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
8/8	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
8/15	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
8/22	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
8/29	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
9/5	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
9/12	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
9/19	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
9/26	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
10/3	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
10/10	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
10/17	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
10/24	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
10/31	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
11/7	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
11/14	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
11/21	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
11/28	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
12/5	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
12/12	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
Average	3.70	4.50	3.45	4.50	2.66	3.70	3.41	2.09	4.65

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-2.—1993 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
1/10	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
1/17	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
1/24	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
1/31	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
2/7	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
2/14	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
2/21	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
2/28	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
3/7	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
3/14	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.70	2.10 - 2.20	4.60 - 4.70
3/21	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
3/28	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
4/4	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
4/11	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
4/18	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
4/25	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
5/2	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
5/9	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
5/16	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
5/23	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
5/30	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
6/6	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
6/13	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
6/20	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
6/27	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
7/4	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
7/11	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
7/18	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
7/25	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
8/1	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
8/8	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
8/15	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
8/22	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
8/29	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
9/5	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
9/12	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
9/19	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
9/26	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
10/3	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
10/10	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
10/17	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
10/24	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
10/31	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
11/7	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
11/14	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
11/21	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
11/28	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
12/5	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
12/12	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
12/19	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
12/26	3.70	4.50	3.15 - 3.25	4.50	2.45 - 2.55	3.70	3.20 - 3.60	2.00 - 2.15	4.60 - 4.70
Average	3.70	4.50	3.44	4.50	2.65	3.70	3.41	2.09	4.65

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-3.—1992 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.30-2.45	4.50-4.70
1/10	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.25-2.35	4.50-4.70
1/17	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.25-2.35	4.50-4.70
1/24	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.25-2.35	4.50-4.70
1/31	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.25-2.35	4.50-4.70
2/7	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.25-2.35	4.50-4.70
2/14	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.25-2.35	4.50-4.70
2/21	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.25-2.35	4.50-4.70
2/28	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.25-2.35	4.50-4.70
3/7	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
3/14	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
3/21	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
3/28	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
4/4	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
4/11	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
4/18	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
4/25	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
5/2	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
5/9	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
5/16	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
5/23	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
5/30	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
6/6	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
6/13	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
6/20	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
6/27	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
7/4	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
7/11	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
7/18	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
7/25	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
8/1	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
8/8	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
8/15	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
8/22	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
8/29	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
9/5	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
9/12	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
9/19	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
9/26	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
10/3	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
10/10	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
10/17	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
10/24	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
10/31	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
11/7	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
11/14	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
11/21	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
11/28	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
12/5	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
12/12	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.25-2.35	4.50-4.70
12/19	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.20-2.30	4.50-4.70
12/26	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.80-3.10	2.20-2.30	4.50-4.70
Average	3.70	4.50	3.75	4.50	2.84	3.70	2.96	2.30	4.60

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-4.—1991 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.30-3.50	2.60-3.00	4.65-4.90
1/10	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.30-3.50	2.60-3.00	4.65-4.90
1/17	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.30-3.50	2.60-3.00	4.65-4.90
1/24	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.30-3.50	2.60-3.00	4.65-4.90
1/31	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.30-3.50	2.60-3.00	4.65-4.90
2/7	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.30-3.50	2.60-3.00	4.65-4.90
2/14	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.35-3.55	2.85-3.00	4.70-4.90
2/21	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.35-3.55	2.85-3.00	4.70-4.90
2/28	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.35-3.55	2.85-3.00	4.70-4.90
3/7	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.35-3.55	2.85-3.00	4.70-4.90
3/14	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.35-3.55	2.85-3.00	4.70-4.90
3/21	3.70	4.225	3.50-3.70	3.95	2.69 - 3.10	3.70	3.35-3.55	2.85-3.00	4.70-4.90
3/28	3.70	4.50	3.50-3.70	3.95	2.69 - 3.10	3.70	3.25-3.45	2.85-3.00	4.70-4.90
4/4	3.70	4.50	3.50-3.70	3.95	2.69 - 3.10	3.70	3.25-3.45	2.85-3.00	4.70-4.90
4/11	3.70	4.50	3.50-3.70	3.95	2.69 - 3.10	3.70	3.25-3.45	2.85-3.00	4.70-4.90
4/18	3.70	4.50	3.50-3.70	3.95	2.69 - 3.10	3.70	3.25-3.45	2.75-2.95	4.70-4.90
4/25	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.25-3.45	2.75-2.95	4.70-4.90
5/2	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.25-3.45	2.75-2.95	4.70-4.90
5/9	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.25-3.45	2.75-2.95	4.70-4.90
5/16	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.10-3.35	2.70-2.90	4.70-4.90
5/23	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.10-3.35	2.70-2.90	4.70-4.90
5/30	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.10-3.35	2.70-2.90	4.70-4.90
6/6	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.10-3.35	2.70-2.90	4.70-4.90
6/13	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.10-3.35	2.70-2.90	4.70-4.90
6/20	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.10-3.35	2.70-2.90	4.70-4.90
6/27	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.10-3.35	2.70-2.90	4.70-4.90
7/4	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.70-2.90	4.60-4.80
7/11	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.70-2.90	4.60-4.80
7/18	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.70-2.90	4.60-4.80
7/25	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.70-2.90	4.60-4.80
8/1	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.70-2.90	4.60-4.80
8/8	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.70-2.90	4.60-4.80
8/15	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.70-2.90	4.60-4.80
8/22	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.35-2.65	4.60-4.80
8/29	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.35-2.65	4.60-4.80
9/5	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.35-2.65	4.60-4.80
9/12	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.35-2.65	4.60-4.80
9/19	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.35-2.65	4.60-4.80
9/26	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	3.00-3.30	2.35-2.65	4.60-4.80
10/3	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.35-2.65	4.50-4.70
10/10	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.35-2.65	4.50-4.70
10/17	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.35-2.65	4.50-4.70
10/24	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.35-2.65	4.50-4.70
10/31	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.35-2.65	4.50-4.70
11/7	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.35-2.65	4.50-4.70
11/14	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.30-2.45	4.50-4.70
11/21	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.30-2.45	4.50-4.70
11/28	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.30-2.45	4.50-4.70
12/5	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.30-2.45	4.50-4.70
12/12	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.30-2.45	4.50-4.70
12/19	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.30-2.45	4.50-4.70
12/26	3.70	4.50	3.75	4.50	2.69 - 3.00	3.70	2.90-3.15	2.30-2.45	4.50-4.70
Average	3.70	4.50	3.75	4.50	2.86	3.70	3.22	2.70	4.72

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.95	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.60-2.80	2.10-2.40	4.50-4.60
1/10	3.95	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.60-2.80	2.10-2.40	4.50-4.60
1/17	3.95	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.60-2.80	2.10-2.40	4.50-4.60
1/24	3.95	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.60-2.80	2.10-2.40	4.50-4.60
1/31	3.50	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.60-2.80	2.10-2.40	4.50-4.60
2/7	3.50	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.60-2.80	2.10-2.40	4.50-4.60
2/14	3.50	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.60-2.80	2.10-2.40	4.50-4.60
2/21	3.50	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.10-2.30	4.60-4.75
2/28	3.50	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.10-2.30	4.60-4.75
3/7	3.50	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.10-2.30	4.60-4.75
3/14	3.50	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.10-2.30	4.60-4.75
3/21	3.50	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.10-2.30	4.60-4.75
3/28	3.50	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.10-2.30	4.60-4.75
4/4	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.30-2.50	4.75-5.00
4/11	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.30-2.50	4.75-5.00
4/18	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.30-2.50	4.75-5.00
4/25	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.30-2.50	4.75-5.00
5/2	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.60-2.80	4.75-5.00
5/9	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.60-2.80	4.75-5.00
5/16	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.60-2.80	4.75-5.00
5/23	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.60-2.80	4.75-5.00
5/30	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.60-2.80	4.75-5.00
6/6	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.60-2.80	4.75-5.00
6/13	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.60-2.80	4.75-5.00
6/20	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.60-2.80	4.75-5.00
6/27	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.60-2.80	4.75-5.00
7/4	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.60-2.80	4.75-5.00
7/11	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.55-2.85	4.75-5.00
7/18	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.55-2.85	4.75-5.00
7/25	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	2.85-3.00	2.55-2.85	4.75-5.00
8/1	3.70	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	3.10-3.40	2.55-2.85	4.75-5.00
8/8	3.70	4.25	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.55-2.85	4.75-5.00
8/15	3.70	4.25	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.55-2.85	4.75-5.00
8/22	3.70	4.25	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.55-2.85	4.75-5.00
8/29	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.55-2.85	4.65-4.90
9/5	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.65-2.85	4.65-4.90
9/12	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.65-2.85	4.65-4.90
9/19	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.65-2.85	4.65-4.90
9/26	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.65-2.85	4.65-4.90
10/3	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.65-2.85	4.65-4.90
10/10	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
10/17	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
10/24	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
10/31	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
11/7	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
11/14	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
11/21	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
11/28	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
12/5	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
12/12	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
12/19	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
12/26	3.70	4.225	3.50-3.70	3.95	2.69-3.00	3.70	3.20-3.40	2.60-2.90	4.65-4.90
Average	3.68	4.24	3.57	3.95	3.19	4.01	3.05	2.58	4.77

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-6.—1989 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
1/10	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
1/17	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
1/24	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
1/31	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
2/7	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
2/14	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
2/21	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
2/28	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
3/7	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
3/14	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
3/21	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
3/28	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
4/4	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
4/11	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
4/18	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
4/25	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
5/2	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
5/9	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
5/16	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
5/23	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
5/30	3.75	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
6/6	3.95	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
6/13	3.95	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
6/20	3.95	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
6/27	3.95	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
7/4	3.95	4.62	3.50-3.60	4.10-4.62	3.50-3.60	4.20-4.25	NA	NA	NA
7/11	3.95	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	NA	NA	NA
7/18	3.95	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	NA	NA	NA
7/25	3.95	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	NA	NA	NA
8/1	3.95	4.25	3.50-3.60	3.95	3.40-3.45	4.20-4.25	NA	NA	NA
8/8	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
8/15	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
8/22	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
8/29	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
9/5	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
9/12	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
9/19	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
9/26	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
10/3	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
10/10	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
10/17	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
10/24	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
10/31	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
11/7	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
11/14	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
11/21	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
11/28	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
12/5	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
12/12	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
12/19	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
12/26	3.95	4.25	3.50-3.60	3.95	2.69-3.00	4.20-4.25	NA	NA	NA
Average	3.87	4.44	3.55	4.16	3.26	4.23	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-7.—1988 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
1/10	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
1/17	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
1/24	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
1/31	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
2/7	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
2/14	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
2/21	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
2/28	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
3/7	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
3/14	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
3/21	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
3/28	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
4/4	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
4/11	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
4/18	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
4/25	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
5/2	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
5/9	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
5/16	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
5/23	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
5/30	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
6/6	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
6/13	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
6/20	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
6/27	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
7/4	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
7/11	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
7/18	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
7/25	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
8/1	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
8/8	3.15-3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
8/15	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
8/22	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
8/29	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
9/5	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
9/12	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
9/19	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
9/26	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
10/3	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
10/10	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
10/17	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
10/24	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
10/31	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
11/7	3.75	4.62	3.35-3.40	4.10-4.62	3.35-3.40	4.20-4.25	NA	NA	NA
11/14	3.75	4.62	3.35-3.40	4.10-4.62	3.45-3.50	4.20-4.25	NA	NA	NA
11/21	3.75	4.62	3.35-3.40	4.10-4.62	3.45-3.50	4.20-4.25	NA	NA	NA
11/28	3.75	4.62	3.35-3.40	4.10-4.62	3.45-3.50	4.20-4.25	NA	NA	NA
12/5	3.75	4.62	3.50-3.60	4.20-4.25	3.45-3.50	4.10-4.62	NA	NA	NA
12/12	3.75	4.62	3.50-3.60	4.20-4.25	3.45-3.50	4.10-4.62	NA	NA	NA
12/19	3.75	4.62	3.50-3.60	4.20-4.25	3.45-3.50	4.10-4.62	NA	NA	NA
12/26	3.75	4.62	3.50-3.60	4.20-4.25	3.45-3.50	4.10-4.62	NA	NA	NA
Average	3.57	4.62	3.39	4.35	3.39	4.24	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-8.—1987 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
1/10	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
1/17	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
1/24	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
1/31	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
2/7	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
2/14	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
2/21	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
2/28	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
3/7	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
3/14	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
3/21	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
3/28	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
4/4	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
4/11	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
4/18	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
4/25	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
5/2	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
5/9	3.15-3.75	4.62	3.75	4.40	4.45	NA	NA	NA	NA
5/16	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
5/23	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
5/30	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
6/6	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
6/13	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
6/20	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
6/27	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
7/4	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
7/11	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
7/18	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
7/25	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
8/1	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
8/8	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
8/15	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
8/22	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
8/29	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
9/5	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
9/12	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
9/19	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
9/26	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
10/3	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
10/10	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
10/17	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
10/24	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
10/31	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
11/7	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
11/14	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
11/21	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
11/28	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
12/5	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
12/12	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
12/19	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
12/26	3.15-3.75	4.62	3.50-3.55	4.40	4.45	NA	NA	NA	NA
Average	3.45	4.62	3.61	4.40	4.45	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E). 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-9.—1986 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1/10	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1/17	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1/24	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1/31	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
2/7	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
2/14	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
2/21	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
2/28	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
3/7	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
3/14	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
3/21	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
3/28	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
4/4	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
4/11	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
4/18	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
4/25	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
5/2	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
5/9	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
5/16	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
5/23	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
5/30	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
6/6	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
6/13	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
6/20	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
6/27	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
7/4	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
7/11	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
7/18	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
7/25	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
8/1	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
8/8	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
8/15	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
8/22	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
8/29	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
9/5	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
9/12	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
9/19	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
9/26	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
10/3	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
10/10	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
10/17	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
10/24	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
10/31	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
11/7	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
11/14	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
11/21	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
11/28	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
12/5	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
12/12	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
12/19	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
12/26	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
Average	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-10.—1985 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1/10	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1/17	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1/24	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1/31	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
2/7	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
2/14	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
2/21	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
2/28	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
3/7	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
3/14	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
3/21	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
3/28	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
4/4	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
4/11	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
4/18	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
4/25	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
5/2	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
5/9	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
5/16	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
5/23	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
5/30	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
6/6	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
6/13	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
6/20	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
6/27	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
7/4	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
7/11	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
7/18	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
7/25	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
8/1	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
8/8	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
8/15	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
8/22	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
8/29	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
9/5	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
9/12	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
9/19	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
9/26	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
10/3	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
10/10	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
10/17	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
10/24	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
10/31	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
11/7	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
11/14	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
11/21	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
11/28	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
12/5	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
12/12	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
12/19	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
12/26	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
Average	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe			
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic		
	1	2	3	4	1	2		1	2	
1/3	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
1/10	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA	
1/17	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
1/24	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
1/31	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
2/7	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
2/14	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
2/21	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
2/28	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
3/7	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
3/14	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
3/21	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
3/28	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
4/4	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
4/11	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
4/18	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
4/25	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
5/2	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
5/9	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
5/16	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
5/23	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
5/30	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
6/6	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
6/13	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
6/20	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
6/27	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
7/4	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
7/11	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
7/18	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
7/25	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
8/1	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
8/8	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
8/15	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
8/22	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
8/29	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
9/5	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
9/12	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
9/19	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
9/26	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
10/3	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
10/10	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
10/17	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
10/24	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
10/31	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
11/7	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
11/14	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
11/21	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
11/28	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
12/5	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
12/12	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
12/19	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
12/26	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	
Average	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA	

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-12.—1983 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
1/10	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1/17	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
1/24	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
1/31	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
2/7	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
2/14	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
2/21	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
2/28	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
3/7	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
3/14	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
3/21	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
3/28	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
4/4	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
4/11	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
4/18	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
4/25	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
5/2	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
5/9	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
5/16	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
5/23	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
5/30	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
6/6	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
6/13	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
6/20	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
6/27	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
7/4	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
7/11	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
7/18	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
7/25	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
8/1	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
8/8	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
8/15	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
8/22	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
8/29	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
9/5	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
9/12	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
9/19	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
9/26	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
10/3	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
10/10	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
10/17	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
10/24	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
10/31	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
11/7	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
11/14	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
11/21	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
11/28	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
12/5	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
12/12	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
12/19	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
12/26	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
Average	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- tolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
1/10	3.75	4.45	3.75	4.40	4.45	NA	NA	NA	NA
1/17	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
1/24	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
1/31	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
2/7	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
2/14	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
2/21	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
2/28	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
3/7	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
3/14	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
3/21	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
3/28	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
4/4	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
4/11	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
4/18	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
4/25	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
5/2	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
5/9	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
5/16	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
5/23	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
5/30	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
6/6	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
6/13	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
6/20	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
6/27	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
7/4	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
7/11	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
7/18	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
7/25	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
8/1	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
8/8	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
8/15	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
8/22	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
8/29	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
9/5	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
9/12	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
9/19	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
9/26	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
10/3	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
10/10	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
10/17	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
10/24	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
10/31	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
11/7	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
11/14	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
11/21	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
11/28	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
12/5	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
12/12	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
12/19	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
12/26	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA
Average	3.75	4.45	3.75	4.00	4.45	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-14.—1981 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
1/10	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
1/17	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
1/24	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
1/31	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
2/7	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
2/14	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
2/21	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
2/28	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
3/7	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
3/14	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
3/21	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
3/28	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
4/4	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
4/11	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
4/18	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
4/25	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
5/2	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
5/9	3.15-3.75	4.62	3.75	4.40	4.45	4.23	NA	NA	NA
5/16	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
5/23	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
5/30	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
6/6	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
6/13	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
6/20	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
6/27	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
7/4	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
7/11	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
7/18	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
7/25	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
8/1	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
8/8	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
8/15	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
8/22	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
8/29	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
9/5	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
9/12	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
9/19	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
9/26	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
10/3	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
10/10	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
10/17	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
10/24	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
10/31	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
11/7	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
11/14	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
11/21	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
11/28	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.23	NA	NA	NA
12/5	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.36	NA	NA	NA
12/12	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.36	NA	NA	NA
12/19	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.36	NA	NA	NA
12/26	3.15-3.75	4.62	3.50-3.55	4.40	4.45	4.36	NA	NA	NA
Average	3.45	4.62	3.61	4.40	4.45	4.24	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-15.—1980 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
1/10	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
1/17	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
1/24	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
1/31	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
2/7	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
2/14	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
2/21	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
2/28	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
3/7	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
3/14	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
3/21	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
3/28	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
4/4	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
4/11	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
4/18	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
4/25	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
5/2	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
5/9	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
5/16	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
5/23	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
5/30	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
6/6	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
6/13	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
6/20	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
6/27	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
7/4	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
7/11	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
7/18	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
7/25	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
8/1	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
8/8	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
8/15	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
8/22	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
8/29	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
9/5	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
9/12	3.90	4.10	3.50	3.82	3.65	NA	NA	NA	NA
9/19	3.90	4.10	3.50	4.10	4.10	NA	NA	NA	NA
9/26	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
10/3	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
10/10	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
10/17	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
10/24	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
10/31	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
11/7	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
11/14	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
11/21	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
11/28	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
12/5	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
12/12	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
12/19	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
12/26	3.90	4.10	3.90	4.10	4.10	NA	NA	NA	NA
Average	3.80	3.99	3.61	3.90	3.78	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-16.—1979 chromium metal prices

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(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
1/10	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
1/17	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
1/24	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
1/31	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
2/7	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
2/14	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
2/21	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
2/28	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
3/7	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
3/14	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
3/21	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
3/28	2.99	3.15	2.99	3.10	3.05	NA	NA	NA	NA
4/4	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
4/11	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
4/18	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
4/25	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
5/2	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
5/9	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
5/16	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
5/23	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
5/30	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
6/6	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
6/13	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
6/20	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
6/27	3.20	3.35	2.99	3.10	3.05	NA	NA	NA	NA
7/4	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
7/11	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
7/18	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
7/25	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
8/1	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
8/8	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
8/15	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
8/22	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
8/29	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
9/5	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
9/12	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
9/19	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
9/26	3.20	3.35	3.20	3.35	3.35	NA	NA	NA	NA
10/3	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
10/10	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
10/17	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
10/24	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
10/31	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
11/7	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
11/14	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
11/21	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
11/28	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
12/5	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
12/12	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
12/19	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
12/26	3.50	3.65	3.50	3.82	3.65	NA	NA	NA	NA
Average	3.22	3.38	3.17	3.34	3.27	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-17.—1978 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
1/10	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
1/17	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
1/24	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
1/31	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
2/7	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
2/14	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
2/21	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
2/28	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
3/7	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
3/14	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
3/21	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
3/28	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
4/4	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
4/11	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
4/18	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
4/25	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
5/2	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
5/9	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
5/16	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
5/23	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
5/30	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
6/6	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
6/13	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
6/20	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
6/27	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
7/4	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
7/11	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
7/18	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
7/25	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
8/1	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
8/8	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
8/15	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
8/22	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
8/29	2.79	2.89	2.79	2.89	3.05	NA	NA	NA	NA
9/5	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
9/12	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
9/19	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
9/26	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
10/3	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
10/10	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
10/17	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
10/24	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
10/31	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
11/7	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
11/14	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
11/21	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
11/28	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
12/5	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
12/12	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
12/19	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
12/26	2.99	3.15	2.79	2.89	3.05	NA	NA	NA	NA
Average	2.84	2.96	2.79	2.89	3.05	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-18.—1977 chromium metal prices

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(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
1/10	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
1/17	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
1/24	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
1/31	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
2/7	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
2/14	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
2/21	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
2/28	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
3/7	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
3/14	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
3/21	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
3/28	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
4/4	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
4/11	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
4/18	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
4/25	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
5/2	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
5/9	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
5/16	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
5/23	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
5/30	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
6/6	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
6/13	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
6/20	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
6/27	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
7/4	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
7/11	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
7/18	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
7/25	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
8/1	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
8/8	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
8/15	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
8/22	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
8/29	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
9/5	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
9/12	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
9/19	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
9/26	2.63	2.70	2.63	2.70	2.85	NA	NA	NA	NA
10/3	2.71	2.80	2.63	2.70	2.85	NA	NA	NA	NA
10/10	2.71	2.80	2.63	2.70	2.85	NA	NA	NA	NA
10/17	2.71	2.80	2.63	2.70	2.85	NA	NA	NA	NA
10/24	2.71	2.80	2.63	2.70	2.85	NA	NA	NA	NA
10/31	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
11/7	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
11/14	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
11/21	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
11/28	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
12/5	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
12/12	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
12/19	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
12/26	2.71	2.80	2.79	2.89	3.05	NA	NA	NA	NA
Average	2.65	2.72	2.63	2.71	2.85	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
1/10	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
1/17	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
1/24	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
1/31	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
2/7	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
2/14	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
2/21	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
2/28	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
3/7	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
3/14	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
3/21	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
3/28	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
4/4	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
4/11	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
4/18	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
4/25	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
5/2	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
5/9	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
5/16	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
5/23	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
5/30	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
6/6	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
6/13	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
6/20	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
6/27	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
7/4	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
7/11	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
7/18	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
7/25	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
8/1	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
8/8	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
8/15	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
8/22	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
8/29	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
9/5	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
9/12	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
9/19	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
9/26	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
10/3	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
10/10	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
10/17	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
10/24	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
10/31	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
11/7	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
11/14	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
11/21	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
11/28	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
12/5	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
12/12	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
12/19	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
12/26	2.63	2.70	2.44	2.51	2.58	NA	NA	NA	NA
Average	2.49	2.56	2.44	2.51	2.58	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets. U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-20.—1975 chromium metal prices

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(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	2.30	2.37	2.08	2.15	2.25	NA	NA	NA	NA
1/10	2.30	2.37	2.08	2.15	2.25	NA	NA	NA	NA
1/17	2.30	2.37	2.08	2.15	2.25	NA	NA	NA	NA
1/24	2.30	2.37	2.08	2.15	2.25	NA	NA	NA	NA
1/31	2.30	2.37	2.08	2.15	2.25	NA	NA	NA	NA
2/7	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
2/14	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
2/21	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
2/28	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
3/7	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
3/14	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
3/21	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
3/28	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
4/4	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
4/11	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
4/18	2.44	2.51	2.08	2.15	2.25	NA	NA	NA	NA
4/25	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
5/2	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
5/9	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
5/16	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
5/23	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
5/30	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
6/6	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
6/13	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
6/20	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
6/27	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
7/4	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
7/11	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
7/18	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
7/25	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
8/1	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
8/8	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
8/15	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
8/22	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
8/29	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
9/5	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
9/12	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
9/19	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
9/26	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
10/3	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
10/10	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
10/17	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
10/24	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
10/31	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
11/7	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
11/14	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
11/21	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
11/28	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
12/5	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
12/12	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
12/19	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
12/26	2.44	2.51	2.44	2.51	2.58	NA	NA	NA	NA
Average	2.43	2.50	2.33	2.40	2.48	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-21.—1974 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
1/10	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
1/17	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
1/24	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
1/31	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
2/7	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
2/14	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
2/21	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
2/28	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
3/7	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
3/14	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
3/21	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
3/28	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
4/4	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
4/11	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
4/18	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
4/25	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
5/2	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
5/9	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
5/16	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
5/23	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
5/30	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
6/6	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
6/13	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
6/20	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
6/27	1.53	1.60	1.53	1.60	1.65	NA	NA	NA	NA
7/4	1.78	1.85	1.53	1.60	1.65	NA	NA	NA	NA
7/11	1.78	1.85	1.53	1.60	1.65	NA	NA	NA	NA
7/18	1.78	1.85	1.53	1.60	1.65	NA	NA	NA	NA
7/25	1.78	1.85	1.53	1.60	1.65	NA	NA	NA	NA
8/1	1.78	1.85	1.78	1.85	1.90	NA	NA	NA	NA
8/8	1.78	1.85	1.78	1.85	1.90	NA	NA	NA	NA
8/15	1.78	1.85	1.78	1.85	1.90	NA	NA	NA	NA
8/22	1.78	1.85	1.78	1.85	1.90	NA	NA	NA	NA
8/29	1.78	1.85	1.78	1.85	1.90	NA	NA	NA	NA
9/5	2.08	2.15	1.78	1.85	1.90	NA	NA	NA	NA
9/12	2.08	2.15	1.78	1.85	1.90	NA	NA	NA	NA
9/19	2.08	2.15	1.78	1.85	1.90	NA	NA	NA	NA
9/26	2.08	2.15	2.08	2.15	2.25	NA	NA	NA	NA
10/3	2.08	2.15	2.08	2.15	2.25	NA	NA	NA	NA
10/10	2.08	2.15	2.08	2.15	2.25	NA	NA	NA	NA
10/17	2.08	2.15	2.08	2.15	2.25	NA	NA	NA	NA
10/24	2.08	2.15	2.08	2.15	2.25	NA	NA	NA	NA
10/31	2.08	2.15	2.08	2.15	2.25	NA	NA	NA	NA
11/7	2.08	2.15	2.08	2.15	2.25	NA	NA	NA	NA
11/14	2.08	2.15	2.08	2.15	2.25	NA	NA	NA	NA
11/21	2.08	2.15	2.08	2.15	2.25	NA	NA	NA	NA
11/28	2.08	2.15	2.08	2.15	2.25	NA	NA	NA	NA
12/5	2.30	2.37	2.08	2.15	2.25	NA	NA	NA	NA
12/12	2.30	2.37	2.08	2.15	2.25	NA	NA	NA	NA
12/19	2.30	2.37	2.08	2.15	2.25	NA	NA	NA	NA
12/26	2.30	2.37	2.08	2.15	2.25	NA	NA	NA	NA
Average	1.77	1.84	1.72	1.79	1.85	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-22.—1971 through 1973 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe	
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic
	1	2	3	4	1	2		

Data for 1971 through 1973 not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-23.—1970 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe			
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic		
	1	2	3	4	1	2		1	2	
1/3	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
1/10	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
1/17	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
1/24	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
1/31	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
2/7	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
2/14	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
2/21	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
2/28	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
3/7	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
3/14	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
3/21	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
3/28	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
4/4	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
4/11	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
4/18	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
4/25	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
5/2	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
5/9	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
5/16	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
5/23	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
5/30	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
6/6	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
6/13	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
6/20	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
6/27	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
7/4	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
7/11	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
7/18	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
7/25	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
8/1	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
8/8	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
8/15	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
8/22	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
8/29	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
9/5	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
9/12	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
9/19	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
9/26	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
10/3	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
10/10	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
10/17	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
10/24	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
10/31	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
11/7	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
11/14	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
11/21	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
11/28	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
12/5	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
12/12	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
12/19	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
12/26	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA
Average	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-24.—1969 chromium metal prices

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(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
1/10	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
1/17	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
1/24	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
1/31	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
2/7	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
2/14	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
2/21	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
2/28	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
3/7	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
3/14	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
3/21	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
3/28	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
4/4	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
4/11	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
4/18	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
4/25	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
5/2	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
5/9	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
5/16	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
5/23	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
5/30	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
6/6	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
6/13	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
6/20	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
6/27	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
7/4	NA	NA	0.96	1.03	1.41	NA	NA	NA	NA
7/11	NA	NA	0.96	1.03	1.41	NA	NA	NA	NA
7/18	NA	NA	0.96	1.03	1.41	NA	NA	NA	NA
7/25	NA	NA	0.96	1.03	1.41	NA	NA	NA	NA
8/1	NA	NA	0.96	1.03	1.41	NA	NA	NA	NA
8/8	NA	NA	0.96	1.03	1.41	NA	NA	NA	NA
8/15	NA	NA	0.96	1.03	1.41	NA	NA	NA	NA
8/22	NA	NA	0.96	1.03	1.41	NA	NA	NA	NA
8/29	NA	NA	0.96	1.03	1.41	NA	NA	NA	NA
9/5	NA	NA	0.96	1.03	1.41	NA	NA	NA	NA
9/12	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
9/19	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
9/26	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
10/3	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
10/10	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
10/17	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
10/24	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
10/31	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
11/7	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
11/14	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
11/21	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
11/28	NA	NA	1.01	1.04	1.42	NA	NA	NA	NA
12/5	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA
12/12	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA
12/19	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA
12/26	NA	NA	1.15	1.25	1.56	NA	NA	NA	NA
Average	NA	NA	0.99	1.03	1.40	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-25.—1968 chromium metal prices

(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Electrolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
1/10	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
1/17	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
1/24	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
1/31	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
2/7	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
2/14	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
2/21	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
2/28	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
3/7	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
3/14	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
3/21	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
3/28	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
4/4	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
4/11	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
4/18	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
4/25	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
5/2	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
5/9	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
5/16	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
5/23	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
5/30	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
6/6	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
6/13	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
6/20	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
6/27	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
7/4	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
7/11	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
7/18	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
7/25	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
8/1	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
8/8	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
8/15	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
8/22	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
8/29	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
9/5	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
9/12	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
9/19	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
9/26	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
10/3	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
10/10	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
10/17	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
10/24	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
10/31	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
11/7	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
11/14	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
11/21	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
11/28	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
12/5	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
12/12	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
12/19	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
12/26	NA	NA	0.96	0.99	1.37	NA	NA	NA	NA
Average	NA	NA	0.96	1.00	1.38	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets. U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.

Table B-26.—1967 chromium metal prices

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(Dollars per pound, gross weight unless noted otherwise)

Week	United States						Europe		
	Electrolytic				Aluminothermic		Elec- trolytic	Aluminothermic	
	1	2	3	4	1	2		1	2
1/3	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
1/10	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
1/17	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
1/24	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
1/31	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
2/7	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
2/14	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
2/21	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
2/28	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
3/7	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
3/14	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
3/21	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
3/28	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
4/4	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
4/11	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
4/18	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
4/25	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
5/2	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
5/9	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
5/16	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
5/23	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
5/30	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
6/6	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
6/13	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
6/20	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
6/27	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
7/4	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
7/11	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
7/18	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
7/25	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
8/1	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
8/8	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
8/15	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
8/22	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
8/29	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
9/5	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
9/12	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
9/19	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
9/26	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
10/3	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
10/10	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
10/17	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
10/24	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
10/31	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
11/7	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
11/14	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
11/21	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
11/28	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
12/5	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
12/12	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
12/19	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
12/26	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA
Average	NA	NA	0.96	1.03	1.40	NA	NA	NA	NA

NA Not available.

NOTE.—Value is weighted average value. Average annual price is time averaged reported price.

Sources: Value: United States trade statistics as reported in Chromium Annual Reports, various years.

United States (U.S.), electrolytic (E), 1 (U.S.E1) is chromium metal price as reported by Platt's Metals Week (PMW). U.S.E2 is elchrome metal as reported by PMW. U.S.E3 is standard grade as reported by American Metal Market (AMM). U.S.E4 is vacuum grade as reported by AMM. U.S.E4 called electrolytic in and before 1987. United States, Aluminothermic (A), 1 (U.S.A1) is standard grade as reported by AMM. U.S.A2 is vacuum grade as reported by AMM. In and before 1987; U.S.A1 called vacuum grade pellets, U.S.A2 called 9 percent carbon metal.

Europe, electrolytic, is reported by Metals Bulletin (MB). Europe, aluminothermic, 1 (EA1) is reported by MB. EA2 is western grade reported by MB in pounds per kilogram.