CHROMIUM

(Data in thousand metric tons, gross weight, unless otherwise noted)

Domestic Production and Use: The United States consumes about 12% of world chromite ore production in various forms of imported materials (chromite ore, chromium ferroalloys, chromium metal, and chromium chemicals). Imported chromite was consumed by two chemical firms, one metallurgical firm, and four refractory firms to produce chromium chemicals, chromium ferroalloys, and chromite-containing refractories, respectively. Consumption of chromium ferroalloys and metal by end use was: stainless and heat-resisting steel, 68%; full-alloy steel, 8%; superalloys, 3%; and others, 21%. The value of chromium materials consumption was about $460 million. Secondary chromium is recovered from stainless steel scrap.

Salient Statistics—United States:[1]	1993	1994	1995	1996	1997[e]
Production: Mine	—	—	—	—	—
Secondary	92	99	112	98	124
Imports for consumption	330	273	416	362	373
Exports	21	33	27	51	33
Government stockpile releases	68	49	44	52	39
Consumption: Reported (excludes secondary)	327	310	298	277	315
Apparent[2] (includes secondary)	484	390	565	467	513
Price, chromite, yearend:					
Turkish, dollars per metric ton, Turkey	110	110	230	230	150
South African, dollars per metric ton, South Africa	60	60	80	80	75
Stocks, industry, yearend	103	101	80	74	64
Net import reliance[3] as a percent of apparent consumption	81	75	80	79	76

Recycling: In 1997, chromium contained in purchased stainless steel scrap accounted for 24% of demand.

Import Sources (1993-96): Chromium contained in chromite ore and chromium ferroalloys and metal: South Africa, 37%; Turkey, 13%; Russia, 13%; Kazakstan, 8%; Zimbabwe, 7%; and other, 22%.

Tariff:[4] Item	Number	Most favored nation (MFN) 12/31/97	Non-MFN[5] 12/31/97
Ore and concentrate	2610.00.0000	Free	Free.
Ferrochromium, high-carbon	7202.41.0000	1.9% ad val.	7.5% ad val.

Depletion Allowance: 22% (Domestic), 14% (Foreign).

Government Stockpile: The National Defense Stockpile Agency submitted the Annual Materials Plan for 1998 in February 1997. In addition to the stockpile grade uncommitted inventory listed below, the stockpile contains the following nonstockpile grade uncommitted inventory, in thousand metric tons: 36.6, metallurgical chromite ore; 0.6, high-carbon ferrochromium; 10.4, low-carbon ferrochromium; and 1.24, ferrochromiumsilicon.

Stockpile Status—9-30-97[6]

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 1997	Disposals FY 1997	Average chromium content
Chromite ore:						
Chemical-grade	162	55.6	112	90.7	10.0	28.6%
Metallurgical-grade	319	237	349	—	72.8	28.6%
Refractory-grade	208	101	77.0	90.7	8.66	[e]23.9%
Chromium ferroalloys:						
Ferrochromium:						
High-carbon	680	9.13	462	31.8	15.3	71.4%
Low-carbon	272	—	—	—	—	71.4%
Ferrochromium-silicon	51.4	0.002	—	—	—	42.9%
Chromium metal	7.72	—	—	—	—	[e]100%

Events, Trends, and Issues: Chromite ore is not produced in the United States, Canada, or Mexico. Chromite ore is produced in the Western Hemisphere only in Brazil and Cuba. Virtually all of Brazilian production is consumed in Brazil. Cuban production is relatively small. The three largest chromite ore producers, accounting for about two-thirds

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of world production, are India, Kazakstan, and South Africa. These countries are currently in the process of major political change. Economic and political reorganization in the Former Soviet Union has resulted in reduced demand. This lull in demand may be followed by strong growth-driven demand resulting from the institution of reforms in those countries. South Africa has been the major supplier of chromite ore to Western industrialized countries. In 1995, prices recovered from having been suppressed by excess production capacity resulting from the dissolution of the U.S.S.R.[7] in 1991 and excess ferrochromium capacity resulting from expansion worldwide during 1990-92. Western economy demand remains firm while industry restructures. Chromium markets strengthened in 1997 after having weakened in 1996 following 2 consecutive years of stainless steel growth in excess of 10%. It was estimated that stainless steel production in 1997 would increase about 5% resulting in similar growth in ferrochromium demand. This was reflected in increased ferrochromium prices.

Chromium releases into the environment are regulated by the U.S. Environmental Protection Agency. Workplace exposure is regulated by the U.S. Occupational Safety and Health Administration.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[8]	Reserve base[8]
	1996	1997[e]	(shipping grade)[9]	
United States	—	—	—	10,000
Albania	235	250	6,100	6,100
Brazil	450	400	14,000	23,000
Finland	582	600	41,000	120,000
India	1,363	1,400	27,000	67,000
Iran	129	100	2,400	2,400
Kazakstan	1,190	1,200	320,000	320,000
Russia	97	100	4,000	460,000
South Africa	5,018	5,000	3,000,000	5,500,000
Turkey	2,000	2,000	8,000	20,000
Zimbabwe	428	500	140,000	930,000
Other countries	428	400	29,000	37,000
World total (may be rounded)	12,190	12,000	3,600,000	7,500,000

World Resources: World resources exceed 11 billion tons of shipping-grade chromite, sufficient to meet conceivable demand for centuries. About 95% of chromium resources are geographically concentrated in southern Africa. Reserves and reserve base are geographically concentrated in southern Africa and Kazakstan. The largest U.S. chromium resource is in the Stillwater Complex in Montana.

Substitutes: There is no substitute for chromite ore in the production of ferrochromium, chromium chemicals, or chromite refractories. There is no substitute for chromium in stainless steel, the largest end use, or for chromium in superalloys, the major strategic end use. Chromium-containing scrap can substitute for ferrochromium in metallurgical uses. Substitutes for chromium-containing alloys, chromium chemicals, and chromite refractories generally increase cost or limit performance. According to the National Academy of Sciences, substituting chromium-free materials for chromium-containing products could save about 60% of chromium used in alloying metals, about 15% of chromium used in chemicals, and 90% of chromite used in refractories, given 5 to 10 years to develop technically acceptable substitutes and to accept increased cost.

[e]Estimated.

[1]Data in thousand metric tons of contained chromium, unless noted otherwise.

[2]Calculated demand for chromium is production + imports - exports + stock adjustment.

[3]Defined as imports - exports + adjustments for Government and industry stock changes.

[4]In addition to the tariff items listed, certain imported chromium materials (see U.S. Code, chapter 26, sections 4661 and 4672) are subject to excise tax.

[5]See Appendix B.

[6]See Appendix C for definitions.

[7]As constituted before Dec. 1991.

[8]See Appendix D for definitions. Reserves and reserve base data are rounded to no more than two significant figures.

[9]Shipping-grade chromite ore is deposit quantity and grade normalized to 45% Cr_2O_3.