CHROMIUM

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

Domestic Production and Use: In 2000, the United States consumed about 13% of world chromite ore production in various forms of imported materials, such as chromite ore, chromium chemicals, chromium ferroalloys, and chromium metals. Imported chromite was consumed by two chemical firms and two refractory firms to produce chromium chemicals and chromite-containing refractories, respectively. Consumption of chromium ferroalloys and metal was predominantly for the production of stainless and heat-resisting steel and superalloys, respectively. The value of chromium material consumption was about $327 million.

Salient Statistics—United States:[1]	1996	1997	1998	1999	2000[e]
Production: Mine	—	—	—	—	—
Secondary	98	120	104	118	110
Imports for consumption	362	350	385	476	398
Exports	51	30	62	60	46
Government stockpile releases	52	47	93	19	51
Consumption: Reported[2] (excludes secondary)	275	333	277	298	280
Apparent[3] (includes secondary)	467	490	531	558	499
Price, chromite, yearend:					
South African, dollars per metric ton, South Africa	75	73	68	63	63
Turkish, dollars per metric ton, Turkey	225	180	145	145	145
Stocks, industry, yearend	74	71	56	54	68
Net import reliance[4] as a percent of apparent consumption	79	75	80	79	78

Recycling: In 2000, chromium contained in purchased stainless steel scrap accounted for 21% of apparent consumption.

Import Sources (1996-99): Chromium contained in chromite ore and chromium ferroalloys and metal: South Africa, 46%; Kazakhstan, 14%; Russia, 10%; Zimbabwe, 10%; Turkey, 9%; and other, 11%.

Tariff:[5] Item	Number	Normal Trade Relations 12/31/00
Ore and concentrate	2610.00.0000	Free.
Ferrochromium, high-carbon	7202.41.0000	1.9% ad valorem.
New chromium metal	8112.20.6000	3.0% ad valorem.

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

Government Stockpile: The Defense Logistics Agency, U.S. Department of Defense, submitted the Annual Materials Plan for 2001 in February 2000. In addition to the stockpile-grade uncommitted inventory listed below, the stockpile contained the following nonstockpile-grade uncommitted inventory, in thousand metric tons: metallurgical chromite ore, 33; high-carbon ferrochromium, 0.4.

Stockpile Status—9-30-00[6]

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2000	Disposals FY 2000	Average chromium content
Chromite ore:						
Chemical-grade	153	49.8	153	90.7	9.07	28.6%
Metallurgical-grade	90.6	110	90.6	227	52.8	28.6%
Refractory-grade	216	25.0	216	90.7	18.3	[e]23.9%
Chromium ferroalloys:						
Ferrochromium:						
High-carbon	561	27.1	561	136	43.2	71.4%
Low-carbon	270	0.015	270	—	3.14	71.4%
Ferrochromium-silicon	12.1	22.2	12.1	—	37.4	42.9%
Chromium metal	7.34	0.209	4.16	0.454	0.377	[e]100%

Events, Trends, and Issues: In the Western Hemisphere, chromite ore is produced only in Brazil and Cuba. Most of Brazilian production is consumed in Brazil; some is exported to Norway. Cuban production is small. The largest chromite-ore-producing countries (India, Kazakhstan, South Africa, and Turkey) accounted for about 80% of world production. South Africa alone accounts for more than 40% of world production and has been the major supplier of

Prepared by **John F. Papp [(703) 648-4963, jpapp@usgs.gov, fax: (703) 648-7757]**

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chromium in the form of chromite ore and ferrochromium to Western industrialized countries. Stainless steel, the major end use market for chromium, has shown long-term growth equivalent to about one or two new ferrochromium furnaces per year. To meet this demand, South African plants were built or expanded. Production capacity was then expanded through the addition of furnaces and plant enhancements that improved recovery and reduced cost, such as agglomeration and preheating of furnace feed and recovery from slag. South African chromite ore and ferrochromium producers financed these process changes through joint ventures with stainless steel producers in Asia. By financing capacity growth and production efficiency, consumers have lowered their cost and secured their supply, and producers have secured market share and stabilized production rates. With existing South African plants efficiently meeting current (2000) demand, a new round of plant development and furnace additions is expected in Kazakhstan and South Africa to meet anticipated demand growth.

Economic and political reorganization in the countries of the Commonwealth of Independent States resulted in reduced demand in those countries. This reduction may eventually be followed by strong growth-driven demand resulting from the institution of reforms in those countries. The economic slowdown that started with the Asian financial crisis in 1997 resulted in reduced demand for stainless steel in Asia and forced Asian produced stainless steel prices down. This resulted in pressure to lower the price of stainless steel produced in Europe and North America. Oversupply of stainless steel in the world market kept ferrochromium in excess supply until late in 1999 when the price of ferrochromium rose, indicating a return to supply balance. Stainless steel production in the first half of 2000 exceeded that of the same time period in 1999 by about 12%.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[7]	Reserve base[7]
	1999	2000[e]	(shipping grade)[8]	
United States	—	—	—	10,000
Albania	86	90	6,100	6,100
Brazil	360	350	14,000	17,000
Finland	611	610	41,000	120,000
India	1,310	1,400	27,000	67,000
Iran	212	200	2,400	2,400
Kazakhstan	1,600	1,600	320,000	320,000
Russia	130	130	4,000	460,000
South Africa	6,480	6,500	3,000,000	5,500,000
Turkey	1,400	1,500	8,000	20,000
Zimbabwe	660	650	140,000	930,000
Other countries	701	700	40,000	99,000
World total (rounded)	13,500	13,700	3,600,000	7,600,000

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

Substitutes: Chromite ore has no substitute in the production of ferrochromium, chromium chemicals, or chromite refractories. Chromium has no substitute 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. In 1978, the National Academy of Sciences found that 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]The years 1996 through 1998 include chromite ore; 1999 through 2000 exclude chromite ore.

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

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

[5]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.

[6]See Appendix B for definitions.

[7]See Appendix C for definitions.

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