

CHROMIUM

(Data in thousand metric tons, gross weight, unless 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 chromite ore by end use was: metallurgical and chemical industry, 94%; refractory industry, 6%. Consumption of chromium ferroalloys and metal by end use was: stainless and heat-resisting steel, 79%; full-alloy steel, 8%; superalloys, 3%; and other end uses, 10%. The value of chromium materials consumption was about \$385 million. Secondary chromium is recovered from stainless steel scrap.

Salient Statistics—United States:¹	1991	1992	1993	1994	1995^e
Production: Mine	—	—	—	—	—
Secondary	96	102	92	99	117
Imports for consumption	310	324	330	273	379
Exports	18	18	21	33	13
Government stockpile releases	17	(30)	68	49	30
Consumption: Reported (excludes secondary)	323	334	327	307	270
Apparent ² (includes secondary)	413	378	484	390	537
Price, chromite, yearend:					
Turkish, dollars per metric ton, Turkey	130	110	110	110	230
South African, dollars per metric ton, South Africa	50	60	60	60	80
Stocks, industry, yearend	118	118	103	101	76
Net import reliance ³ as a percent of apparent consumption	73	73	75	75	78

Recycling: In 1995, chromium contained in purchased stainless steel scrap accounted for 22% of demand.

Import Sources (1991-94): Chromium contained in chromite ore and chromium ferroalloys and metal: South Africa, 40%; Turkey, 16%; Zimbabwe, 7%; Russia, 6%; and other, 31%.

Tariff:⁴ Item	Number	Most favored nation (MFN) 12/31/95	Non-MFN⁵ 12/31/95
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 stockpile conversion programs by which stockpiled chromite ore is upgraded to ferrochromium and nonstockpile grade ferrochromium is upgraded to chromium metal were completed in 1994.

Stockpile Status—9-30-95

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposals Jan.-Sept. 95	Average chromium content
Chromite ore:					
Chemical-grade	175	44.7	144	45.4	28.6%
Metallurgical-grade	509	308	509	127	28.6%
Refractory-grade	255	78.4	110	72.6	^e 23.9%
Chromium ferroalloys:					
High-carbon ferrochromium	738	—	427	0.528	71.4%
Low-carbon ferrochromium	283	—	—	—	71.4%
Ferrochromium-silicon	52.9	—	—	—	42.9%
Chromium metal	7.69	—	—	—	^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 small. The two largest chromite ore producers, accounting for two-thirds of world production, are Kazakstan and South Africa. Both are currently in the process of major political change. Economic and political

CHROMIUM

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 1989-90, world demand for ferrochromium by the metallurgical industry exceeded supply, resulting in increased prices followed by production capacity expansion. Chromite ore prices also increased slightly. The end of the cold war in 1991 coincided with generally weak economic conditions that reduced chromium demand. In 1995, prices recovered from having been suppressed by excess production capacity resulting from the dissolution of the U.S.S.R.⁶ in 1991 and excess ferrochromium capacity resulting from expansion worldwide during 1990-92. Western economy demand remains firm while industry restructures.

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 ⁷ (shipping grade) ⁸	Reserve base ⁷ (shipping grade) ⁸
	1994	1995 ^e		
United States	—	—	—	10,000
Albania	223	250	6,100	6,100
Brazil	360	400	10,000	18,000
Finland	573	600	38,000	46,000
India	909	1,000	27,000	59,000
Iran	129	130	2,400	2,400
Kazakstan	2,020	2,500	320,000	320,000
Russia	143	150	4,000	460,000
South Africa	3,590	3,800	3,100,000	5,500,000
Turkey	790	800	8,000	20,000
Zimbabwe	517	550	140,000	930,000
Other countries	319	400	29,000	38,000
World total (rounded)	9,570	10,600	3,700,000	7,400,000

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 major end use of chromium, nor for chromium in superalloys, the major strategic end use of chromium. 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 result in savings of 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 accept increased cost.

^eEstimated.

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

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

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

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

⁵See Appendix B.

⁶As constituted before Dec. 1991.

⁷See Appendix C for definitions. Reserves and reserve base data rounded to no more than 2 significant figures.

⁸Shipping-grade chromite ore is deposit quantity and grade normalized to 45% Cr₂O₃.