COLUMBIUM (NIOBIUM)

(Data in thousand kilograms of columbium content, unless noted)

Domestic Production and Use: There has been no significant columbium-mining industry since 1959, with the exception of small unreported quantities of columbium-bearing concentrates produced in 1989-92. Most metal, ferrocolumbium, other alloys, and compounds were produced by six companies with seven plants. Feed for these plants included imported concentrates, columbium oxide, and ferrocolumbium. Consumption was mainly as ferrocolumbium by the steel industry and as columbium alloys and metal by the aerospace industry, with plants in the Eastern and Midwestern United States, California, and Washington. The estimated value of reported columbium consumption, in the form of ferrocolumbium and nickel columbium, in 1995 was about $56 million. Major end-use distribution of reported columbium consumption was as follows: high-strength low-alloy steels, 38%; carbon steels, 30%; superalloys, 18%; stainless and heat-resisting steels, 13%; and other, 1%.

Salient Statistics—United States:	1991	1992	1993	1994	1995[e]
Production, mine	(1)	(1)	—	—	—
Imports for consumption:					
Concentrates, tin slags, and other[2]	NA	NA	NA	NA	NA
Ferrocolumbium[e]	2,130	2,450	2,190	2,590	3,000
Exports, concentrate, metal, alloys, waste, and scrap[e]	270	350	300	320	400
Consumption, reported:					
Raw material	NA	NA	NA	NA	NA
Ferrocolumbium[e 3]	2,410	2,470	2,470	2,750	2,830
Consumption, apparent	3,310	3,500	3,500	3,700	3,900
Price: Columbite, dollars per pound[4]	2.83	2.83	2.67	2.60	2.90
Pyrochlore, dollars per pound[5]	2.75	2.75	2.75	NA	NA
Stocks, industry, processor and consumer, yearend	NA	NA	NA	NA	NA
Employment, processor	NA	NA	NA	NA	NA
Net import reliance[6] as a percent of apparent consumption	100	100	100	100	100

Recycling: Insignificant.

Import Sources (1991-94): Brazil, 65%; Canada, 25%; Germany, 4%; and other, 6%.

Tariff: Item	Number	Most favored nation (MFN) 12/31/95	Non-MFN[7] 12/31/95
Columbium ores and concentrates	2615.90.6030	Free	Free.
Columbium oxide	2825.90.1500	3.7% ad val.	25% ad val.
Ferrocolumbium	7202.93.0000	5.0% ad val.	25% ad val.
Columbium, unwrought:			
Waste and scrap	8112.91.0500	Free	Free.
Alloys, metal, and powders	8112.91.4000	4.9% ad val.	25% ad val.
Columbium, wrought	8112.99.0000	5.2% ad val.	45% ad val.

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

Government Stockpile: The uncommitted inventories shown below include 341,000 kilograms in nonstockpile-grade concentrates and 151,000 kilograms in nonstockpile-grade ferrocolumbium; and 50,000 kilograms in concentrates, 113,000 kilograms in ferrocolumbium, and 54,000 kilograms in columbium metal ingots with status (inventory) not yet determined.

Stockpile Status—9-30-95

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposals Jan.-Sept. 95
Columbium:				
Carbide powder	10	—	—	—
Concentrates	831	—	—	—
Ferrocolumbium	535	—	—	—
Metal	54	—	—	—

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COLUMBIUM (NIOBIUM)

Events, Trends, and Issues: For the first one-half-year, overall reported consumption of columbium increased by about 10% compared with that of the previous year. Consumption of columbium by the steelmaking sector rose by about 6%, influenced by a 7% increase in raw steel production. Additionally, demand for columbium in superalloys was up significantly, affected by an improving aerospace market. For the same period, overall columbium imports were down slightly. Brazil was the leading supplier, providing more than 60% of total imports. In mid-October, the published price for columbite ore was quoted at a range of $2.80 to $3.20 per pound of contained columbium and tantalum pentoxides. The published price for steelmaking-grade ferrocolumbium was quoted at $6.58 per pound of contained columbium, and for high-purity ferrocolumbium and nickel columbium at $18.50 and $20.50 per pound of contained columbium, respectively. The published price for columbium oxide was quoted at $8.17 per pound of oxide, and the published price for columbium metal was quoted at a range of $30 to $50 per pound.

It is estimated that in 1996 domestic columbium mine production will be zero and U.S. apparent consumption will be about 4 million kilograms. The majority of total U.S. demand will be mainly supplied by columbium imports in upgraded forms.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[e 8]	Reserve base[e 8]
	1994	1995[e]		
United States	—	—	—	Negligible
Australia	81	90	NA	NA
Brazil	12,700	11,000	3,300,000	3,600,000
Canada	2,320	2,400	140,000	410,000
Nigeria	17	20	64,000	91,000
Rwanda	3	3	NA	NA
Zaire	1	5	32,000	91,000
Zimbabwe	1	1	NA	NA
Other countries[9]	—	1	6,000	9,000
World total (rounded)	15,200	13,500	3,500,000	4,200,000

World Resources: Most of the world's identified resources of columbium are outside the United States and occur mainly as pyrochlore in carbonatite deposits. On a worldwide basis, resources are more than adequate to supply projected needs. The United States has approximately 360 million kilograms of columbium resources in identified deposits, most of which were considered uneconomic at 1995 prices for columbium.

Substitutes: The following materials can be substituted for columbium, but a performance or cost penalty may ensue: vanadium and molybdenum as alloying elements in high-strength low-alloy steels; tantalum and titanium as alloying elements in stainless and high-strength steels and superalloys; and molybdenum, tungsten, tantalum, and ceramics in high-temperature applications.

[e]Estimated. NA Not available.

[1]A small unreported quantity was produced.

[2]Metal, alloys, synthetic concentrates, and columbium oxide.

[3]Includes nickel columbium and a small quantity of other columbium materials.

[4]Average value, contained pentoxides for material having a Cb_2O_5 to Ta_2O_5 ratio of 10 to 1.

[5]Average value, contained pentoxide.

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

[7]See Appendix B.

[8]See Appendix C for definitions.

[9]Excludes any production from Bolivia, China, and countries in the Former Soviet Union.