

GRAPHITE (NATURAL)

(Data in thousand metric tons, unless otherwise noted)

Domestic Production and Use: Natural graphite was not produced domestically in 1999. Natural graphite was consumed by approximately 200 firms primarily in the Northeastern and Great Lakes regions. The major uses of natural graphite did not significantly differ from those of 1998. Refractory applications, once again, led the way in use categories with 39%; brake linings was second with 14%; lubricants, 6%; dressings and molds in foundry operations, 5%; and other uses making up the remaining 36%.

Salient Statistics—United States:	1995	1996	1997	1998	1999^e
Production, mine	—	—	—	—	—
Imports for consumption	61	53	58	62	60
Exports	37	26	40	28	32
Consumption, apparent	24	27	18	34	28
Price, imports (average dollars per ton at foreign ports):					
Flake	658	699	622	514	550
Lump and chip (Sri Lankan)	610	675	1,010	1,200	1,100
Amorphous (Mexican)	143	134	153	192	220
Stocks, yearend	NA	NA	NA	NA	NA
Net import reliance ¹ as a percent of apparent consumption	100	100	100	100	100

Recycling: Refractory brick and linings, alumina-graphite refractories for continuous metal castings, magnesia-graphite refractory brick for basic oxygen and electric arc furnaces, and insulation brick in particular led the way in recycling of graphite products. Primary recycling of refractory articles is growing with the recycled market being principally in less demanding service conditions, such as safety linings and thermal insulation.

Recent demonstrations of technical feasibility of recovering high-quality flake graphite from steelmaking kish, by the former U.S. Bureau of Mines research staff, may further boost graphite recycling efforts. The current low prices, however, stand in the way of increased recycling efforts. Information on the quantities and monetary value of recycled graphite is not available.

Import Sources (1995-98): Mexico, 28%; Canada, 27%; China, 27%; Madagascar, 8%; and other, 10%.

Tariff:	Item	Number	Normal Trade Relations 12/31/99
	Crystalline flake (not including flake dust)	2504.10.1000	Free.
	Other	2504.90.0000	Free.

Depletion Allowance: 23% (Domestic lump and amorphous), 15% (Domestic flake), and 15% (Foreign).

Government Stockpile:

Stockpile Status—9-30-99²

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 1999	Disposals FY 1999
Sri Lanka, amorphous lump	5	—	5	3	⁽³⁾
Madagascar, crystalline flake	7	4	7	—	3
Other than Sri Lanka and Madagascar crystalline	—	⁽³⁾	—	—	⁽³⁾

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Events, Trends, and Issues: Graphite was near to supply-demand balance in 1999. Demand was met largely by imports of flake from Canada, China, and Madagascar; lump and chip from Sri Lanka; and amorphous graphite from China and Mexico. Graphite electrode consumption in steelmaking has been decreasing since the late 1980's because of increased efficiency by the iron and steel producers. Use of natural graphite in lubrication applications is also decreasing because of changes in requirements for lubricant compositions and in processing technologies.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ⁴	Reserve base ⁴
	<u>1998</u>	<u>1999^e</u>		
United States	—	—	—	1,000
Brazil	40	44	420	1,000
China	200	200	5,100	310,000
India	120	125	500	620
Madagascar	15	13	950	960
Mexico	40	48	3,100	3,100
Other countries	<u>190</u>	<u>148</u>	<u>5,200</u>	<u>44,400</u>
World total (may be rounded)	605	578	15,000	360,000

World Resources: Domestic resources are relatively small, although the rest of the world's inferred reserve base exceeds 800 million tons of recoverable graphite.

Substitutes: Manufactured graphite powder, scrap from discarded machined shapes, and calcined petroleum coke compete for use in iron and steel production. Finely ground coke with olivine is a potential competitor in foundry facing operations. Molybdenum disulfide competes as a dry lubricant, but is more sensitive to oxidizing conditions.

^eEstimated. NA Not available.

¹Defined as imports - exports + adjustments for Government and industry stock changes. Data on changes in stocks were not available and were assumed to be zero in the calculations.

²See Appendix B for definitions.

³Less than ½ unit.

⁴See Appendix C for definitions.