GRAPHITE (NATURAL)

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: Although natural graphite was not produced in the United States in 2004, approximately 200 U.S. firms, primarily in the Northeastern and Great Lakes regions, used it for a wide variety of applications. The major uses of natural graphite in 2004 were refractory applications, 24%; brake linings, 13%; foundry operations, 9%; lubricants, 8%; and other uses (including steelmaking), 46%.

Salient Statistics—United States:	2000	2001	2002	2003	2004[e]
Production, mine	—	—	—	—	—
Imports for consumption	61	52	45	52	61
Exports	22	24	22	22	30
Consumption, apparent[1]	39	28	24	30	31
Price, imports (average dollars per ton at foreign ports):					
Flake	615	520	529	622	600
Lump and chip (Sri Lankan)	1,250	1,360	1,220	2,260	2,200
Amorphous	130	131	137	152	150
Stocks, yearend	NA	NA	NA	NA	NA
Net import reliance[2] as a percentage 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 led the way in recycling of graphite products. The market for recycled refractory graphite material is growing with material being recycled into products, such as brake linings and thermal insulation.

Recovering high-quality flake graphite from steelmaking kish is technically feasible, but not practiced at the present time. Abundance of graphite in the world market and continuing low prices inhibit increased recycling efforts. Information on the quantity and value of recycled graphite is not available.

Import Sources (2000-03): China, 37%; Mexico, 23%; Canada, 19%; Brazil, 6%; Japan, 6%; and other, 9%.

Tariff: Item	Number	Normal Trade Relations 12-31-04
Crystalline flake (not including flake dust)	2504.10.1000	Free.
Other	2504.90.0000	Free.

Depletion Allowance: 22% (Domestic lump and amorphous), 14% (Domestic flake), and 14% (Foreign).

Government Stockpile:

Stockpile Status—9-30-04[3]

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2004	Disposals FY 2004
Sri Lanka, amorphous lump	—	—	—	1,814	685
Madagascar, crystalline flake	—	813	—	—	311

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GRAPHITE (NATURAL)

Events, Trends, and Issues: Graphite was near supply-demand balance in 2004. Flake graphite imports were from China and Canada (in descending order of tonnage), imports of graphite lump and chip were from Sri Lanka; and amorphous graphite imports were from China and Mexico (in descending order of tonnage). There has been a marked decrease in the consumption of graphite electrodes, owing to development of more efficient iron and steel production techniques. Use of natural graphite in lubrication applications also is decreasing because of changes in requirements for lubricants and in processing technologies. Advances in thermal technology and acid-leaching techniques that enable the production of higher purity graphite powders are likely to lead to development of new applications for graphite in high-technology fields. Such innovative refining techniques have enabled the use of improved graphite in carbon-graphite composites, electronics, foils, friction materials, and special lubricant applications. Flexible graphite product lines, such as graphoil (a thin graphite cloth), probably will be the fastest growing market. Large-scale fuel-cell applications are being developed that could consume as much graphite as all other uses combined.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[4]	Reserve base[4]
	2003	2004[e]		
United States	—	—	—	1,000
Austria	—	12	(5)	(5)
Brazil	61	62	360	1,000
Canada	25	25	(5)	(5)
China	450	450	64,000	220,000
Czech Republic	15	10	11,400	13,000
India	110	120	800	3,800
Korea, North	25	25	(5)	(5)
Madagascar	2	2	940	960
Mexico	15	10	3,100	3,100
Norway	2	2	(5)	(5)
Sri Lanka	4	4	(5)	(5)
Turkey	15	15	(5)	(5)
Ukraine	8	8	(5)	(5)
Zimbabwe	8	8	(5)	(5)
Other countries	2	3	5,100	44,000
World total (rounded)	742	756	86,000	290,000

World Resources: Domestic resources are relatively small, but 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 applications. Molybdenum disulfide competes as a dry lubricant but is more sensitive to oxidizing conditions.

[e]Estimated. NA Not available. — Zero.

[1]Defined as imports – exports.

[2]Defined 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.

[3]See Appendix B for definitions.

[4]See Appendix C for definitions.

[5]Reserves and reserve base for this country are included with "Other countries."