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 2005, approximately 100 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 2005 were refractory applications, 26%; batteries, foundry operations, and lubricants, 21%; brake linings, 12%; and other uses (including steelmaking), 41%.

Salient Statistics—United States:	2001	2002	2003	2004	2005[e]
Production, mine	—	—	—	—	—
Imports for consumption	52	45	52	64	60
Exports	24	22	22	46	23
Consumption, apparent[1]	28	24	30	18	37
Price, imports (average dollars per ton at foreign ports):					
Flake	520	529	619	485	578
Lump and chip (Sri Lankan)	1,360	1,220	2,270	2,420	2,730
Amorphous	131	137	152	177	197
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 (2001-04): China, 40%; Mexico, 22%; Canada, 19%; Brazil, 6%; and other, 13%.

Tariff: Item	Number	Normal Trade Relations 12-31-05
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—9-30-05[3]

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2005	Disposals FY 2005
Sri Lanka, amorphous lump	—	51	—	—	—
Malagasy, crystalline flake	56	675	56	—	632

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GRAPHITE (NATURAL)

Events, Trends, and Issues: Graphite was near supply-demand balance in 2005. Flake graphite imports were from China and Canada (in descending order of tonnage), imports of graphite lump and chip were from Mexico; and amorphous graphite imports were from Mexico and China (in descending order of tonnage). Use of natural graphite in lubrication applications only increased slightly 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]
	2004	2005[e]		
United States	—	—	—	1,000
Brazil	62	60	360	1,000
Canada	25	25	([5])	([5])
China	700	700	64,000	220,000
Czech Republic	10	10	11,400	13,000
India	120	130	800	3,800
Korea, North	30	12	([5])	([5])
Madagascar	2	15	940	960
Mexico	8	15	3,100	3,100
Norway	2	2	([5])	([5])
Sri Lanka	3	3	([5])	([5])
Turkey	1	1	([5])	([5])
Ukraine	8	8	([5])	([5])
Zimbabwe	10	10	([5])	([5])
Other countries	1	1	5,100	44,000
World total (rounded)	982	992	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."