

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 2006, 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 2006 were refractory applications, 27%; brake linings, 15%; and batteries, foundry operations, and lubricants, 8%.

Salient Statistics—United States:	2002	2003	2004	2005	2006^e
Production, mine	—	—	—	—	—
Imports for consumption	45	52	64	65	55
Exports	22	22	46	22	22
Consumption, apparent ¹	24	30	18	43	33
Price, imports (average dollars per ton at foreign ports):					
Flake	529	619	485	578	528
Lump and chip (Sri Lankan)	1,220	2,270	2,420	2,730	2,459
Amorphous	137	152	177	197	194
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 (2002-05): China, 42%; Mexico, 30%; Canada, 18%; Brazil, 6%; and other, 4%.

Tariff:	Item	Number	Normal Trade Relations 12-31-06
	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—9-30-06³**

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2006	Disposals FY 2006
Sri Lanka, amorphous lump	—	51	—	—	—
Malagasy, crystalline flake	56	134	56	—	—

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Events, Trends, and Issues: Graphite was near supply-demand balance in 2006. Leading sources for graphite imports were: flake graphite from China, Canada, Brazil, and Madagascar (in descending order of tonnage), graphite lump and chip from Sri Lanka; and amorphous graphite from Mexico and China (in descending order of tonnage). 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: Reserves and reserve base estimates for the Czech Republic were revised downward from those previously published based on information reported by the Government of the Czech Republic.

	Mine production		Reserves ⁴	Reserve base ⁴
	2005	2006 ^e		
United States	—	—	—	1,000
Brazil	77	76	360	1,000
Canada	30	30	(⁵)	(⁵)
China	720	720	64,000	220,000
Czech Republic	10	5	1,300	14,000
Germany	3	3	(⁵)	(⁵)
India	130	120	800	3,800
Korea, North	32	32	(⁵)	(⁵)
Madagascar	15	15	940	960
Mexico	11	13	3,100	3,100
Norway	2	2	(⁵)	(⁵)
Sri Lanka	3	3	(⁵)	(⁵)
Turkey	6	30	(⁵)	(⁵)
Ukraine	8	8	(⁵)	(⁵)
Zimbabwe	6	6	(⁵)	(⁵)
Other countries	2	2	5,100	44,000
World total (rounded)	1,060	1,070	76,000	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.

^eEstimated. NA Not available. — Zero.

¹Defined as imports – exports.

²Defined 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.

³See Appendix B for definitions.

⁴See Appendix C for definitions.

⁵Included with "Other countries."