

KYANITE AND RELATED MINERALS

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: One firm in Virginia with integrated mining and processing operations produced kyanite from hard-rock open pit mines. Another company produced synthetic mullite in Georgia. Of the kyanite-mullite output, 90% was estimated to have been used in refractories and 10% in other uses. Of the refractory usage, an estimated 60% to 65% was used in ironmaking and steelmaking and the remainder in the manufacture of chemicals, glass, nonferrous metals, and other materials.

Salient Statistics—United States:	2004	2005	2006	2007	2008^e
Production:					
Mine ^e	90	90	90	90	90
Synthetic mullite ^e	40	40	40	40	40
Imports for consumption (andalusite)	4	6	4	2	5
Exports ^e	35	35	35	35	35
Shipments from Government stockpile excesses	0.1	—	—	—	—
Consumption, apparent ^e	99	101	99	97	100
Price, average, dollars per metric ton:					
U.S. kyanite, raw ¹	NA	NA	NA	224	229
U.S. kyanite, calcined ¹	272	272	313	333	357
Andalusite, Transvaal, South Africa ¹	238	238	248	235	263
Stocks, producer	NA	NA	NA	NA	NA
Employment, kyanite mine, office, and plant, number ^e	120	130	135	130	125
Net import reliance ² as a percentage of apparent consumption	E	E	E	E	E

Recycling: Insignificant.

Import Sources (2004-07): South Africa, 97%, France, 3%.

Tariff: Item	Number	Normal Trade Relations 12-31-08
Andalusite, kyanite, and sillimanite	2508.50.0000	Free.
Mullite	2508.60.0000	Free.

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

Government Stockpile: None.

KYANITE AND RELATED MINERALS

Events, Trends, and Issues: The steel industry worldwide continued to be the leading consumer of refractories. According to World Steel Association data, world crude steel production for the first 8 months of 2008 was about 6% higher than in the comparable period of 2007. The three leading steel-producing countries were China with about 38%; Japan, 9%; and the United States, 7%.

According to the Freedonia Group, U.S. demand for refractory products is forecast to grow at the modest rate of 1.8% per year to \$2.5 billion in 2011. Shipments of refractories are projected to rise 1.3% per year. Demand for bricks and shapes may increase more rapidly than for monolithics (unshaped refractories) because of certain performance characteristics, such as reduced heat-up time.³

The global refractories market is being especially driven by the rapid industrialization of regions such as Asia-Pacific, Eastern Europe, and Latin America. Russia and Ukraine are major steel producers in Eastern Europe. Ukraine's refractories industry has developed actively and has invested in modernization and worked on reducing energy consumption.⁴

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves and reserve base ⁵
	2007	2008 ^e	
United States ^e	90	90	Large in the United States. South Africa reports a reserve base of about 51 million tons of aluminosilicates ore (andalusite and sillimanite).
France	65	65	
India	22	23	
South Africa	220	220	
Other countries	5	5	
World total (rounded)	400	400	

World Resources: Large resources of kyanite and related minerals are known to exist in the United States. The chief resources are in deposits of micaceous schist and gneiss, mostly in the Appalachian Mountains area and in Idaho. Other resources are in aluminous gneiss in southern California. These resources are not economical to mine at present. The characteristics of kyanite resources in the rest of the world are thought to be similar to those in the United States.

Substitutes: Two types of synthetic mullite (fused and sintered), superduty fire clays, and high-alumina materials are substitutes for kyanite in refractories. Principal raw materials for synthetic mullite are bauxite, kaolin and other clays, and silica sand.

^eEstimated. E Net exporter. NA Not available. — Zero.

¹Prices from trade journal.

²Defined as imports – exports + adjustments for Government and industry stock changes.

³Industrial Minerals, 2008, U.S. refractory demand growth 1.8% to 2011: Industrial Minerals, no. 488, May, p. 31.

⁴Backus, Rachel, 2008, Eastern Europe cashing in: Industrial Minerals, no. 484, January, p. 26-33.

⁵[See Appendix C for definitions.](#)