

KYANITE AND RELATED MATERIALS

(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:	2005	2006	2007	2008	2009^e
Production:					
Mine ^e	112	112	118	115	80
Synthetic mullite ^e	40	40	40	40	50
Imports for consumption (andalusite)	6	4	2	6	8
Exports ^e	35	35	35	36	32
Shipments from Government stockpile excesses	—	—	—	—	—
Consumption, apparent ^e	123	121	125	125	106
Price, average, dollars per metric ton: ¹					
U.S. kyanite, raw	NA	NA	224	229	256
U.S. kyanite, calcined	272	313	333	357	383
Andalusite, Transvaal, South Africa	238	248	235	263	352
Stocks, producer	NA	NA	NA	NA	NA
Employment, kyanite mine, office, and plant, number ^e	130	135	130	120	120
Employment, mullite mine, office, and plant, number ^e	190	200	200	190	170
Net import reliance ² as a percentage of apparent consumption	E	E	E	E	E

Recycling: Insignificant.

Import Sources (2005-08): South Africa, 89%; France, 5%; Japan, 4%; and United Kingdom, 2%.

Tariff: Item	Number	Normal Trade Relations 12-31-09
Andalusite, kyanite, and sillimanite	2508.50.0000	Free.
Mullite	2508.60.0000	Free.

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

Government Stockpile: None.

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Events, Trends, and Issues: Because of the recession in 2009, steel production in the United States declined by 51% in the first 7 months of 2009 as compared with that of the same period in 2008. This notable contraction and weak demand from metal manufacturers resulted in the temporary mothballing of a refractory plant in Alabama that produced mullite and andalusite brick.

Of the total world refractories market, estimated to be approximately 20 million tons, crude steel manufacturing consumed around 70% of production. Crude steel production for the first half of 2009 increased in China by 1.2% compared with that of the first half of 2008, despite total world production declining by 21% during the same period. India reported a 1.7% annualized increase in crude steel production in the first 7 months of 2009.

Anticipation of long-term growth in the andalusite market was pushing expansion in South Africa, which was projected to increase production by 40% in order to alleviate tight supply conditions caused by production constraints in France.

World Mine Production and Reserves:

	Mine production		Reserves ³
	2008	2009 ^e	
United States ^e	115	80	Large in the United States.
France	65	65	
India	24	24	
South Africa	260	265	
Other countries	6	6	
World total (rounded)	470	440	

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.

¹Source: Industrial Minerals.

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

³See [Appendix C for definitions](#). Reserve base estimates were discontinued in 2009; see [Introduction](#).