

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. One 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, 50% to 60% was estimated to have been used in iron and steel making and the remainder in the manufacture of chemicals, glass, nonferrous metals, and other materials.

Salient Statistics—United States:	1996	1997	1998	1999	2000^e
Production:					
Mine	W	W	^e 90	^e 90	90
Synthetic mullite	W	W	^e 39	^e 39	39
Imports for consumption (andalusite)	11	8	10	6	5
Exports ^e	35	35	35	35	35
Shipments from Government stockpile excesses	—	1	—	—	—
Consumption, apparent	W	W	^e 104	^e 100	99
Price, average, dollars per metric ton:					
U.S. kyanite, raw	154	154	157	158	165
U.S. kyanite, calcined	262	262	267	268	279
Andalusite, Transvaal, South Africa, 57.5% Al ₂ O ₃	190	190	190	200	180
Andalusite, Transvaal, South Africa, 59.5% Al ₂ O ₃	230	230	230	225	210
Stocks, producer	NA	NA	NA	NA	NA
Employment, kyanite mine and plant, number ^e	150	150	150	150	150
Net import reliance ¹ as a percent of apparent consumption	E	E	E	E	E

Recycling: Insignificant.

Import Sources (1996-99): South Africa, 100%.

Tariff:	Item	Number	Normal Trade Relations 12/31/00
	Andalusite, kyanite, and sillimanite	2508.50.0000	Free.
	Mullite	2508.60.0000	Free.

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

Government Stockpile:

Material	Stockpile Status—9-30-00²				
	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2000	Disposals FY 2000
Kyanite, lump	0.1	—	0.1	—	—

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Events, Trends, and Issues: Refractories are used in the manufacture of many materials, including aluminum and other nonferrous metals, cement, chemicals, glass, iron and steel, petrochemicals, and others. Manufacturing process technology has advanced in most of these industries; refractory suppliers have been developing products that offer superior performance and increased longevity and that require less frequent replacement and maintenance.

The iron and steel industry has been the largest user of refractories. In Japan, for example, some 70% of refractory demand comes from the steel industry. Japan is considered to be the world's leader in refractories technology.³ According to the International Iron and Steel Institute, most of its 63 member countries, including China, the European Union, Japan, Republic of Korea, North America, Russia, and South America, were projected to show growth in steel consumption in 2000 compared with that of 1999. The Institute estimated that world steel consumption will be 5.8% higher in 2000 than in 1999.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves and reserve base⁴
	1999	2000^e	
United States	^e 90	90	Large in the United States and South Africa; may be large in other countries.
France	65	65	
India	17	15	
South Africa	130	150	
Other countries	<u>11</u>	<u>10</u>	
World total	313	330	

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 Mountain area and in Idaho. Other resources are in aluminous gneiss in southern California. These resources are not economical to mine at present, but some may be eventually. 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. W Withheld to avoid disclosing company proprietary data.

¹Defined as imports - exports + adjustments for Government and industry stock changes.

²See Appendix B for definitions.

³Pearson, Karine, 2000, The Chinese invasion: Industrial Minerals, no. 389, February, p. 28-29.

⁴See Appendix C for definitions.