

## 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.

<b>Salient Statistics—United States:</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005<sup>e</sup></b>
Production:					
Mine <sup>e</sup>	90	90	90	90	90
Synthetic mullite <sup>e</sup>	40	40	40	40	40
Imports for consumption (andalusite)	3	5	4	4	10
Exports <sup>e</sup>	35	35	35	35	35
Shipments from Government stockpile excesses	—	—	—	0.1	—
Consumption, apparent <sup>e</sup>	98	100	99	99	105
Price, average, dollars per metric ton:					
U.S. kyanite, raw	165	165	NA	NA	NA
U.S. kyanite, calcined	279	279	279	272	272
Andalusite, Transvaal, South Africa	186	191	220	238	238
Stocks, producer	NA	NA	NA	NA	NA
Employment, kyanite mine and plant, number <sup>e</sup>	150	150	150	150	150
Net import reliance <sup>1</sup> as a percentage of apparent consumption	E	E	E	E	E

**Recycling:** Insignificant.

**Import Sources (2001-04):** South Africa, 100%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations 12-31-05</b>
	Andalusite, kyanite, and sillimanite	2508.50.0000	Free.
	Mullite	2508.60.0000	Free.

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

**Government Stockpile:**

<b>Material</b>	<b>Stockpile Status—9-30-05<sup>2</sup> (Metric tons)</b>				
	<b>Uncommitted inventory</b>	<b>Committed inventory</b>	<b>Authorized for disposal</b>	<b>Disposal plan FY 2005</b>	<b>Disposals FY 2005</b>
Kyanite, lump	—	—	—	50	—

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**Events, Trends, and Issues:** The steel industry worldwide continued to be the leading consumer of refractories. According to the International Iron and Steel Institute, world crude steel production for the first 8 months was about 7% higher than in the comparable period of 2004. The three leading producing countries were China with about 31%; Japan, 10%; and the United States, 8%.

Refractory consumers in such countries as China and India were more open to accepting higher performance, higher priced refractory products to obtain improved performance and extended life span of refractories. In India, core refractory consumers were producers of iron and steel and cement. The country was relying to a considerable extent on imported refractories and refractory raw materials. Countries in Asia were facing increases for the price of refractory raw materials from China.<sup>3</sup>

The use of monolithic (unshaped) refractories was becoming more dominant in India and some other Asian nations. In Japan, monolithics were making up about 65% of refractory production.<sup>3</sup>

### **World Mine Production, Reserves, and Reserve Base:**

	Mine production		Reserves and reserve base <sup>4</sup>
	2004	2005 <sup>e</sup>	
United States <sup>e</sup>	90	90	Large in the United States. South Africa reports reserve base of about 51 million tons of aluminosilicates ore (andalusite and sillimanite).
France	65	65	
India	21	22	
South Africa	165	165	
Other countries	8	8	
World total (rounded)	350	350	

**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.

<sup>e</sup>Estimated. E Net exporter. NA Not available. — Zero.

<sup>1</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>2</sup>[See Appendix B for definitions.](#)

<sup>3</sup>Taylor, Lindsey, 2005, Asian refractories steeled for change: Industrial Minerals, no. 456, September, p. 40-45.

<sup>4</sup>[See Appendix C for definitions.](#)