

## 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. Two companies produced synthetic mullite at one operation each; one was in Georgia and the other in Kentucky. It was estimated that 90% of the kyanite/mullite output was used in refractories: 55% for smelting and processing ferrous metals, 20% for nonferrous metals, and 15% for glassmaking and ceramics. Nonrefractory uses accounted for the remainder.

<b>Salient Statistics—United States:</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996<sup>e</sup></b>
Production: Mine	W	W	W	W	W
Synthetic mullite	W	W	W	W	W
Imports for consumption (andalusite)	6	12	8	3	10
Exports <sup>e</sup>	35	33	35	35	35
Shipments from Government stockpile excesses	—	—	—	—	—
Consumption, apparent	W	W	W	W	W
Stocks, producer	NA	NA	NA	NA	NA
Employment, kyanite mine and plant <sup>e</sup> , number	150	150	150	150	150
Net import reliance <sup>1</sup> as a percent of apparent consumption	W	W	W	W	W

Price: U.S. kyanite, 54% to 60% Al<sub>2</sub>O<sub>3</sub>, 35-325 Tyler mesh, 18-ton lots, explant, raw, \$140 to \$168 per ton; calcined, \$248 to \$276 per ton. Andalusite, Transvaal, South Africa, 57.5% Al<sub>2</sub>O<sub>3</sub>, 2,000 ton bulk, f.o.b., \$180 to \$200; 59.5% Al<sub>2</sub>O<sub>3</sub>, 2,000 ton bulk, f.o.b., \$220 to \$240.

**Recycling:** Insignificant.

**Import Sources (1992-95):** South Africa, 96%; and other, 4%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Most favored nation (MFN) 12/31/96</b>	<b>Non-MFN<sup>2</sup> 12/31/96</b>
Andalusite, kyanite, and sillimanite	2508.50.0000	Free	Free.
Mullite	2508.60.0000	2.9% ad val.	30% ad val.

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

### **Government Stockpile:**

#### Stockpile Status—9-30-96

<b>Material</b>	<b>Uncommitted inventory</b>	<b>Committed inventory</b>	<b>Authorized for disposal</b>	<b>Disposals Jan.-Sept. 96</b>
Kyanite, lump	1.1	—	1.1	—

## KYANITE AND RELATED MATERIALS

**Events, Trends, and Issues:** Developments in the refractories industry in general included new products on the market. Monolithic refractories, or those that are made or formed in one piece, were being used in a growing number of ways. This was especially because of the availability of advanced castables (refractories), self-flow castables, improved gunning mixes, etc., according to a non-Government source. Several U.S. companies have responded to the global marketplace by opening refractory plants in other countries.

U.S. imports of andalusite from South Africa have averaged about 8,000 tons per year since 1992. Traditional markets for andalusite have been Western Europe and the Far East, especially Japan. There has been growth in demand for andalusite in emerging economies in Eastern Europe, especially Poland and the Czech Republic.

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

	<b>Mine production<sup>e</sup></b>		<b>Reserves and reserve base<sup>3</sup></b>
	<b>1995</b>	<b>1996</b>	
United States	W	W	Large in the United States and South Africa; may be large in other countries.
France	50	50	
India	27	28	
South Africa	191	190	
Other countries	<u>8</u>	<u>7</u>	
World total <sup>4</sup> (may be rounded)	276	275	

**World Resources:** Immense 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 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.

<sup>e</sup>Estimated. NA Not available. W Withheld to avoid disclosing company proprietary data.

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

<sup>2</sup>See Appendix B.

<sup>3</sup>See Appendix C for definitions.

<sup>4</sup>Excludes the United States and countries for which information is not available.