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.

Production:
- Mine W W *90 *90 90
- Synthetic mullite W W *39 *39 39
- Imports for consumption (andalusite) 11 8 10 6 5
- Exports<sup>a</sup> 35 35 35 35 35
- Shipments from Government stockpile excesses — 1 — — —
- Consumption, apparent W W *104 *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% Al₂O₃ 190 190 190 200 180<sup>b</sup>
- Andalusite, Transvaal, South Africa, 59.5% Al₂O₃ 230 230 230 225 210

Stocks, producer NA NA NA NA NA
Employment, kyanite mine and plant, number<sup>a</sup> 150 150 150 150 150
Net import reliance<sup>c</sup> 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:

Stockpile Status—9-30-00<sup>2</sup>

<table>
<thead>
<tr>
<th>Material</th>
<th>Uncommitted inventory</th>
<th>Committed inventory</th>
<th>Authorized for disposal</th>
<th>Disposal plan FY 2000</th>
<th>Disposals FY 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kyanite, lump</td>
<td>0.1</td>
<td>—</td>
<td>0.1</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

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KYANITE AND RELATED MINERALS

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. 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:

<table>
<thead>
<tr>
<th></th>
<th>Mine production</th>
<th>Reserves and reserve base</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1999</td>
<td>2000</td>
</tr>
<tr>
<td>United States</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>France</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>India</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>South Africa</td>
<td>130</td>
<td>150</td>
</tr>
<tr>
<td>Other countries</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>World total</td>
<td>313</td>
<td>330</td>
</tr>
</tbody>
</table>

Large in the United States and South Africa; may be large in other countries.

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.

*Estimated. 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.
4See Appendix C for definitions.