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.

Salient Statistics—United States:

Production: Mine W W W W W
Synthetic mullite W W W W W
Imports for consumption (andalusite) 8 3 11 8 11
Exports\(^a\) 35 35 35 35 35
Shipments from Government stockpile excesses — — — 1 —
Consumption, apparent W W W W W
Price, average, dollars per metric ton:
U.S. kyanite, raw 138 144 154 154 157
U.S. kyanite, calcined 239 248 262 262 267
Andalusite, Transvaal, South Africa, 57.5% Al\(_2\)O\(_3\) 170 190 190 190 190
Andalusite, Transvaal, South Africa, 59.5% Al\(_2\)O\(_3\) 190 210 230 230 230
Stocks, producer NA NA NA NA NA
Employment, kyanite mine and plant, number\(^c\) 150 150 150 150 150
Net import reliance\(^1\) as a percent of apparent consumption E E E E E

Recycling: Insignificant.

Import Sources (1994-97): South Africa, 100%.

Tariff: Item Number Normal Trade Relations (NTR) Non-NTR\(^2\) 12/31/98 12/31/98
Andalusite, kyanite, and sillimanite 2508.50.0000 Free Free
Mullite 2508.60.0000 1% ad val. 30% ad val.

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

Government Stockpile:

<table>
<thead>
<tr>
<th>Material</th>
<th>Uncommitted inventory</th>
<th>Committed inventory</th>
<th>Authorized for disposal</th>
<th>Disposal plan FY 1998</th>
<th>Disposals FY 1998</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 continue to be the largest end use of kyanite and mullite. Based on recent years’ data, overall refractory market value has increased at a higher rate than refractory tonnage, according to a non-Government source. Refractories are being developed that are higher quality and longer lasting.

A major growth area of refractories in general is projected to be monolithic refractories (those that are made or formed in one piece) and preformed shapes. The technology of refractories has continued to advance in response to the increasingly stringent requirements of the customers.

Over-capacity in refractories is said to still exist in the industrialized countries of Europe, Japan, and North America, according to another non-Government source. Corporate mergers and buyouts in the refractories industry have occurred and may continue. Major refractory companies are producing and selling more overseas and are establishing joint ventures in developing countries.

World Mine Production, Reserves, and Reserve Base:

<table>
<thead>
<tr>
<th></th>
<th>Mine production</th>
<th>Reserves and reserve base④</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1997</td>
<td>1998*</td>
</tr>
<tr>
<td>United States</td>
<td>W</td>
<td>W</td>
</tr>
<tr>
<td>France</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>India</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>South Africa⑤</td>
<td>220</td>
<td>220</td>
</tr>
<tr>
<td>Other countries</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>World total⑥</td>
<td>287</td>
<td>290</td>
</tr>
</tbody>
</table>

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

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.

①Estimated. ②Net exporter. ③Not available. ④Withheld to avoid disclosing company proprietary data.
⑤Defined as imports - exports + adjustments for Government and industry stock changes.
⑥See Appendix B.
⑦See Appendix C for definitions.
⑧See Appendix D for definitions.
⑨Production is mostly andalusite.
⑩Excludes the United States and countries for which information is not available.