

# VERMICULITE

(Data in thousand metric tons unless otherwise noted)

**Domestic Production and Use:** Two companies with mining and processing facilities in South Carolina and Virginia produced approximately 100,000 tons of vermiculite concentrate; data have been rounded to the nearest hundred thousand tons to avoid disclosing company proprietary data. Flakes of raw vermiculite concentrate are micaceous in appearance and contain interlayer water in their structure. When the flakes are heated rapidly to a temperature above 870 degrees Celsius, the water flashes into steam, and the flakes expand into accordionlike particles. This process is called exfoliation or expansion, and the resulting ultralightweight material is chemically inert, fire resistant, and odorless. Most vermiculite concentrate produced in the United States was shipped to 15 exfoliating plants in nine States. The end uses for exfoliated vermiculite were estimated to be agriculture and horticulture, 32%; lightweight concrete aggregates (including cement premixes, concrete, and plaster), 24%; insulation, 9%; and other, 35%.

<b><u>Salient Statistics—United States:</u></b>	<b><u>2017</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020</u></b>	<b><u>2021<sup>e</sup></u></b>
Production <sup>1, 2</sup>	100	100	100	100	100
Imports for consumption <sup>e</sup>	28	37	39	40	38
Exports <sup>e</sup>	15	13	8	8	12
Consumption:					
Apparent, concentrate <sup>e, 3</sup>	110	120	130	130	130
Reported, exfoliated	77	79	79	81	78
Price, range of value, concentrate, ex-plant, dollars per ton	140–575	140–575	NA	NA	NA
Employment, number <sup>e</sup>	63	66	73	73	68
Net import reliance <sup>4</sup> as a percentage of apparent consumption <sup>e, 5</sup>	10	20	20	20	20

**Recycling:** Insignificant.

**Import Sources (2017–20):** South Africa, 70%; Brazil, 28%; and other, 2%.

<b><u>Tariff:</u></b>	<b><u>Item</u></b>	<b><u>Number</u></b>	<b><u>Normal Trade Relations</u></b> <b><u>12–31–21</u></b>
	Vermiculite, perlite, and chlorites, unexpanded	2530.10.0000	Free.
	Exfoliated vermiculite, expanded clays, foamed slag, and similar expanded materials	6806.20.0000	Free.

**Depletion Allowance:** 14% (domestic and foreign).

**Government Stockpile:** None.

## VERMICULITE

**Events, Trends, and Issues:** U.S. exports and imports of vermiculite are not collected as a separate category by the U.S. Census Bureau. U.S. imports were estimated to be about 38,000 tons in 2021, a decrease which could be related to disruptions in the global supply chain. Most imports came from South Africa and Brazil in 2021. One U.S. company announced a packaging surcharge in 2021 owing to the rising costs it was incurring from its suppliers. In 2020, a U.S. exfoliating plant in Florida closed, while another in New Mexico ceased producing exfoliated vermiculite.

Exploration and development of vermiculite deposits containing medium, large, and premium (coarser) grades (greater than 5-millimeter particle size) are likely to continue (mostly in China and South Africa) because of the higher demand for those grades. Finer grade production has exceeded consumption for several years, with Brazil and the United States continuing to be the leading producers. Producers will continue to investigate ways to increase the use of the finer grades in existing products and as a substitute for coarser vermiculite while continuing to develop new and innovative applications.

### World Mine Production and Reserves:

	Mine production		Reserves <sup>6</sup>
	2020	2021 <sup>e</sup>	
United States	1,2100	1,2100	25,000
Brazil	50	60	6,600
Bulgaria	10	10	NA
China	NA	NA	NA
India	2	2	1,600
Mexico	(7)	(7)	NA
Russia	29	30	NA
South Africa	150	140	14,000
Turkey	1	1	NA
Uganda	9	10	NA
Uzbekistan	2	2	NA
Zimbabwe	29	30	NA
World total (rounded) <sup>8</sup>	380	390	NA

**World Resources:**<sup>6</sup> In addition to the producing mines in South Carolina and Virginia, there are vermiculite occurrences in Colorado, Nevada, North Carolina, Texas, and Wyoming that contain estimated resources of 2 million to 3 million tons. Significant deposits have been reported in Australia, China, Russia, Uganda, and some other countries, but reserve and resource information comes from many sources and, in most cases, it is not clear whether the numbers refer to vermiculite alone or vermiculite plus other minerals and host rock and overburden.

**Substitutes:** Expanded perlite is a substitute for exfoliated vermiculite in lightweight concrete and plaster. Other denser but less costly alternatives in these applications include expanded clay, shale, slag, and slate. Alternate materials for loose-fill fireproofing insulation include fiberglass, perlite, and slag wool. In agriculture, substitutes include bark and other plant materials, peat, perlite, sawdust, and synthetic soil conditioners.

<sup>e</sup>Estimated. NA Not available.

<sup>1</sup>Concentrate sold or used by producers.

<sup>2</sup>Data are rounded to the nearest hundred thousand tons to avoid disclosing company proprietary data.

<sup>3</sup>Defined as concentrate sold or used by producers + imports – exports.

<sup>4</sup>Defined as imports – exports.

<sup>5</sup>Data are rounded to one significant digit to avoid disclosing company proprietary data.

<sup>6</sup>See Appendix C for resource and reserve definitions and information concerning data sources.

<sup>7</sup>Less than ½ unit.

<sup>8</sup>Does not include China's production.