

# VERMICULITE

(Data in thousand metric tons unless otherwise noted)

**Domestic Production and Use:** One company located in 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, whether produced in the United States or imported, 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), 25%; insulation, 13%; and other, 30%.

<b><u>Salient Statistics—United States:</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020</u></b>	<b><u>2021</u></b>	<b><u>2022<sup>e</sup></u></b>
Production <sup>1, 2</sup>	100	100	100	100	100
Imports for consumption <sup>e</sup>	37	39	40	33	30
Exports <sup>e</sup>	13	8	8	10	7
Consumption:					
Apparent, concentrate <sup>e, 3</sup>	120	130	130	120	120
Reported, exfoliated	79	79	81	78	80
Price, range of value, concentrate, ex-plant, dollars per metric ton	140–575	NA	NA	NA	NA
Employment, number <sup>e</sup>	70	70	70	70	50
Net import reliance <sup>4</sup> as a percentage of apparent consumption <sup>e, 5</sup>	20	20	20	20	20

**Recycling:** Insignificant.

**Import Sources (2018–21):** South Africa, 64%; Brazil, 35%; and other, 1%.

<b><u>Tariff:</u></b>	<b><u>Item</u></b>	<b><u>Number</u></b>	<b><u>Normal Trade Relations</u></b> <b><u>12–31–22</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:** In recent years, two companies mined crude vermiculite domestically; however, a company with operations in South Carolina did not expect to produce vermiculite in 2022. Data for U.S. exports and imports of vermiculite were combined with data for other mineral products by the U.S. Census Bureau. U.S. imports were estimated to be about 30,000 tons in 2022, a decrease which could be related to disruptions in the global supply chain. Most imports came from Brazil and South Africa in 2022. Historically, South Africa was the leading principal source of imports; however, in 2022, Brazil supplied more imports than South Africa.

Exploration and development of vermiculite deposits containing medium, large, and premium (coarser) grades (greater than 5-millimeter particle size) are likely to continue because of the higher demand for those grades. Demand for vermiculite remains strong. With less domestic production, as well as global supply issues, vermiculite exfoliation operations are experiencing difficulties obtaining crude vermiculite (especially medium and coarse grade), which is increasing lead times and could result in consumers using substitute materials. 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:** Reserves data for China were revised based on Government reports.

	Mine production		Reserves <sup>6</sup>
	2021	2022 <sup>e</sup>	
United States	1,2100	1,2100	25,000
Brazil	60	60	6,600
Bulgaria	10	10	NA
China	39	39	340
India	1	3	1,600
Mexico	(7)	(7)	NA
Russia	29	29	NA
South Africa	160	160	14,000
Turkey	19	19	NA
Uganda	14	14	NA
Uzbekistan	2	2	NA
Zimbabwe	30	30	NA
World total (rounded)	464	470	NA

**World Resources:**<sup>6</sup> In addition to the producing mine in Virginia, there are vermiculite occurrences in Colorado, Nevada, North Carolina, South Carolina, Texas, and Wyoming that contain estimated resources of 2 million to 3 million tons. Significant deposits have been reported in Australia, 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.