

## VERMICULITE

(Data in thousand metric tons unless otherwise specified)

**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, 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, 30%; lightweight concrete aggregates (including cement premixes, concrete, and plaster), 21%; insulation, 14%; and other, 35%.

<b>Salient Statistics—United States:</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023<sup>e</sup></b>
Production <sup>1, 2</sup>	100	100	100	100	100
Imports for consumption <sup>e</sup>	39	40	33	24	40
Exports <sup>e</sup>	8	8	10	8	9
Consumption:					
Apparent, concentrate <sup>e, 3</sup>	130	130	120	120	130
Reported, exfoliated	76	74	68	67	74
Price, range of value, concentrate, ex-plant, dollars per metric ton	NA	NA	NA	NA	NA
Employment, number <sup>e</sup>	70	70	70	70	70
Net import reliance <sup>4</sup> as a percentage of apparent consumption <sup>e, 5</sup>	20	20	20	10	20

**Recycling:** Insignificant.

**Import Sources (2019–22):** South Africa, 60%; Brazil, 37%; Zimbabwe, 2%; and other, 1%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations 12–31–23</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.

**Events, Trends, and Issues:** 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 an estimated 40,000 tons in 2023, compared with 24,000 tons in 2022. In 2023, most imports came from Brazil and South Africa.

A company in Brazil continued to develop an additional mine and production facility. The project, which is in Catalao, Goias State, is expected to begin production in 2024 with an initial production capacity of 20,000 tons per year of ore and with production capacity eventually reaching 60,000 tons per year, equaling that of their other operation. The majority of vermiculite from this new location is expected to be super fine grade.

Demand for all grades of vermiculite remained strong. 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. Producers are expected to continue investigating ways to increase the use of the finer grades in existing products and as a substitute for coarser grade vermiculite while continuing to develop new and innovative applications.

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**World Mine Production and Reserves:** Reserves data for China and Turkey were revised based on Government reports.

	Mine production <sup>e</sup>		Reserves <sup>6</sup>
	2022	2023 <sup>e</sup>	
United States	1,2100	1,2100	25,000
Brazil	70	70	6,600
Bulgaria	10	10	NA
China	39	39	2,900
India	4	4	1,600
Mexico	(7)	(7)	NA
Russia	29	29	NA
South Africa	<sup>8</sup> 183	160	14,000
Turkey	3	10	11,000
Uganda	30	30	NA
Uzbekistan	3	3	NA
Zimbabwe	45	45	NA
World total (rounded)	516	500	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, 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>Reported.