

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 vermiculite concentrate and reported production of approximately 100,000 tons. Flakes of raw vermiculite concentrate are micaceous in appearance and contain interlayer water in their structure. When the flakes are heated rapidly at a temperature above 870 °C, the water flashes into steam, and the flakes expand into accordionlike particles. This process is called exfoliation, or expansion, and the resulting lightweight material is chemically inert, fire resistant, and odorless. Most of the vermiculite concentrate produced in the United States was shipped to 17 exfoliating plants in 11 States. The end uses for exfoliated vermiculite were estimated to be agriculture and horticulture, 43%; lightweight concrete aggregates (including cement premixes, concrete, and plaster), 19%; insulation, 8%; and other, 30%.

Salient Statistics—United States:	2013	2014	2015	2016	2017^e
Production ^{e,1}	100	100	100	100	100
Imports for consumption ^{e,2}	36	43	21	46	45
Exports ^e	2	3	2	2	2
Consumption, apparent, concentrate ³	130	140	120	140	140
Consumption, reported, exfoliated	64	63	65	68	65
Price, range of value, concentrate, dollars per ton, ex-plant	145–525	145–565	140–575	140–575	140–575
Employment, number ^e	65	68	69	69	70
Net import reliance ⁴ as a percentage of apparent consumption	25	30	20	30	30

Recycling: Insignificant.

Import Sources (2013–16): Brazil, 42%; South Africa, 34%; China, 20%; Zimbabwe, 3%; and other, 1%.

Tariff: Item	Number	Normal Trade Relations 12–31–17
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: U.S. exports and imports of vermiculite are not collected as a separate category by the U.S. Census Bureau. However, according to an independent industry trade information source, United States imports, excluding any material from Canada and Mexico, were estimated to be about 45,000 tons in 2017, slightly lower than those of 2016. Coarse-grade vermiculite remained in short supply; however prices were unchanged in 2017; most imports in 2017 came from China, South Africa, and Zimbabwe.

A company based in Australia produced vermiculite concentrate at the Namekara vermiculite mine in Uganda. The deposit is considered to be one of the world's largest vermiculite deposits that contain significant portions of medium- and coarse-grade material. A drilling program continued to better define the resource. The company confirmed sales of vermiculite concentrate into southern Africa, and its first sale to North America. Its operating subsidiary entered into 12-month contracts to supply vermiculite concentrate to customers in Japan, the United Kingdom, and other countries in Europe. The 30,000-ton-per-year mine capacity may increase to 80,000 tons per year during the next several years. The Namekara deposit has sufficient resources for more than 50 years of production at the higher rate.

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A company in Turkey continued development and began production at the country's first vermiculite mine at the Karakoc deposit in Sivas in central Turkey. A company based in France, which was a partner in the project, was arranging the vermiculite sales. Although production continued to ramp up, first year production was expected to be about 5,000 tons.

Companies in China with significant vermiculite resources also were ramping up production, although processing operations were somewhat constrained by increased enforcement of environmental regulations. A company based in France, in cooperation with the Government of Zimbabwe and local governments, intermittently produced vermiculite concentrate, including a significant portion of coarse-grade vermiculite, at the Shawa deposit in Zimbabwe. The mine had an expected life of more than 30 years. The deposit also is considered to be one of the world's largest vermiculite deposits that contain significant portions of medium- and coarse-grade material. A company in Brazil expanded production capacity at its vermiculite mine in central Brazil and was developing another deposit near Brasilia. The goal was to bring the company's total production capacity to 200,000 tons per year.

World Mine Production and Reserves:

	Mine production		Reserves ⁵
	<u>2016</u>	<u>2017^e</u>	
United States ^e	¹ 100	¹ 100	25,000
Brazil	55	50	6,300
Bulgaria	10	10	NA
China	NA	NA	NA
India	13	10	1,700
Russia	20	20	NA
South Africa	166	170	14,000
Uganda	3	20	NA
Zimbabwe	35	40	NA
Other countries	<u>2</u>	<u>20</u>	<u>NA</u>
World total	404	440	NA

World Resources: Vermiculite occurrences in Colorado, Nevada, North Carolina, Texas, and Wyoming 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 reserves 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 substitutes in these applications are 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.

^eEstimated. NA Not available.

¹Concentrate sold or used by producers. Data are rounded to one significant digit to avoid disclosing company proprietary data.

²Excludes Canada and Mexico.

³Defined as concentrate sold or used by producers + imports – exports.

⁴Defined as imports – exports.

⁵See [Appendix C](#) for resource and reserve definitions and information concerning data sources.