

VERMICULITE

By Michael J. Potter

U.S. output of vermiculite concentrate and exfoliated (expanded) vermiculite has remained stable for the past few years. Most vermiculite is consumed in thermally exfoliated form. In 1995, the largest end use for exfoliated vermiculite was again horticultural products, comprising 55% of the output. These included potting soils and as a carrier in fertilizers, herbicides, and insecticides. Other uses for vermiculite included insulation; in building boards such as fire resistant plaster board and some lightweight wall board; as a filler in friction materials, such as a replacement for asbestos in brake linings; etc.¹

Production

U.S. vermiculite concentrate sold and used was 170,000 metric tons, down about 6% from that of the 1994, according to the U.S. Geological Survey (USGS). The tonnage of exfoliated vermiculite sold and used was 130,000 tons, or the same as in 1994.

Domestic production data for vermiculite for 1995 were developed by the USGS from two separate voluntary surveys—one for domestic mine-mill operations and the other for exfoliating plants. Of the four known mine-mill operations, data were obtained for three operations, representing a response rate of 75%. Production for the one nonrespondent was estimated by the USGS. Of the 22 known active exfoliating plants, data were obtained from 17, or a response rate of 77%. Output for the five nonrespondents was estimated by the USGS using previous years' production levels.

Domestic producers of vermiculite concentrate were W. R. Grace & Co., from its operation at Enoree, SC; Virginia Vermiculite Ltd., with an operation near Woodruff, SC, and another in Louisa County, VA; and Patterson Vermiculite Co., near Enoree, SC.

U.S. output of exfoliated vermiculite from 16 known producers shown in *table 3* came from 22 plants in 15 States. Of these plants, six in six States were operated by W. R. Grace. In descending order of output sold and used, the largest producing States of exfoliated vermiculite were estimated to be Ohio, South Carolina, Pennsylvania, Arizona, Illinois, Florida, Arkansas, and New Jersey.

Prices for U.S. vermiculite concentrate at midyear 1995, ranged from approximately \$116 per ton to \$292 per ton for bulk material, ex-works. The lower end of the price range corresponded to grade 4 (superfine) material and the higher end to grade 1 (coarse).²

Prices for South African concentrate at the end of 1995, were approximately \$127 per ton to \$209 per ton for crude, bulk material, f.o.b. barge, Gulf Coast.³

World Review

Capacity.—*Table 4* gives approximations of rated annual capacity for vermiculite concentrate plants as of December 31, 1995. Rated capacity is defined as the maximum quantity of product that can be produced on a normally sustainable long-term operating rate, based on the physical equipment of the plant, and given acceptable routine operating procedures involving labor, energy, materials, and maintenance. Capacity includes both operating plants and plants temporarily closed that in the judgement of the author can be brought into production within a short period of time with minimum capital expenditure. Because actual capacity data were generally not available, capacities for most countries in *table 4* were considered to be equal to the countries' highest production during the past 5 years.

Australia.—Australian Vermiculite Industries Pty. Ltd., a joint venture between Tennant Ltd. (75%) and Inmet Ltd. (25%), planned to develop the Mud Tank deposit near Alice Springs in the Northern Territory. Initial plant capacity would allow production of about 15,000 tons per year. A mine life of over 20 years was projected, along with additional indicated resources. The company would aim for domestic sales and possibly the international market.⁴

Outlook

Vermiculite faces competition from other materials in specific applications, especially if price is a major factor. Perlite, for example, for the past few years has been about \$30 per ton for crushed and graded material in the United States. Expanded perlite can substitute in lightweight concrete and plaster. Expanded clay, shale, or slate are other substitutes. In insulation products, glass fiber, foam, and slag wool are alternatives. Synthetic polymers, such as polystyrene, can replace vermiculite in sprayed passive fire protection to structures.⁵

According to Roskill Information Services, Ltd. (London), the need to remain cost effective against alternative materials is likely to be the main factor determining the future pricing of vermiculite, and prices are likely to remain steady.⁶

¹Hindman, J. R. Vermiculite. *Metals & Minerals Annual Review* (pub. by Mining Journal Ltd., London), 1995, pp. 84-85.

²Mineral Price Watch (pub. by Industrial Minerals Information Ltd., London). Vermiculite-Expanding its Horizons? Issue 6, June 1995, p. 13.

³Industrial Minerals (London). Prices. No. 339, Dec. 1995, p. 65.

⁴———. World of Minerals. No. 336, Sept. 1995, p. 9.

⁵Work cited in footnote 2.

⁶Chemical Week. Markets. V. 156, No. 7, Feb. 22, 1995, p. 43.

OTHER SOURCES OF INFORMATION

U.S. Geological Survey Publications

Vermiculite. Ch. in Mineral Commodity Summaries, annual.

Bush, A. L., 1973, Lightweight Aggregates, *in* Brobst, D. A.,
and Pratt, W. P., eds., United States Mineral Resources: U.S.

Geological Survey Professional Paper 820, p. 333-355.

Other Sources

The Economics of Vermiculite 1991/1995 update (pub. by
Roskill Information Services Ltd. (London)).

Vermiculite. Ch. in Industrial Minerals and Rocks, SME, 1994.
The Vermiculite Association, Chicago, IL.

Vermiculite Technology Newsletter (pub. by J. R. Hindman,
Salt Lake City, UT).

TABLE 1
SALIENT VERMICULITE STATISTICS 1/

(Thousand metric tons and thousand dollars)

	1991	1992	1993	1994	1995
United States:					
Sold and used by producers:					
Concentrate 2/	180	190	190	180	170
Exfoliated	136	140	140	130	130
Value	\$38,600	\$45,900	\$46,700	\$43,600	\$39,400
Average value 3/	\$284	\$328	\$338	\$335	\$306
Exports to Canada	10 e/	8 e/	7 e/	7 e/	6 e/
Imports for consumption	38 e/	40 e/	30 e/	30 e/	30 e/
World: Production 4/	513 r/	456 r/	490 r/	484 r/	478 e/

e/ Estimated. r/ Revised.

1/ Data are rounded to three significant digits.

2/ Values are withheld to avoid disclosing company proprietary data.

3/ Based on unrounded data.

4/ Excludes production by countries for which data were not available.

TABLE 2
EXFOLIATED VERMICULITE
SOLD AND USED IN THE UNITED STATES, BY END USE 1/

(Metric tons unless otherwise specified)

	1994	1995
Aggregates:		
Concrete	16,300	11,700
Plaster	600	1,400
Premixes 2/	4,500	W
Total	21,400	W
Insulation:		
Loose-fill	W	W
Block	W	14,200
Other 3/	1,400	W
Total	30,500	33,600
Agricultural:		
Horticultural	26,300	26,800
Soil conditioning	15,300	14,500
Fertilizer carrier e/	30,500	30,400
Total e/	72,000	71,700
Other 4/	5,400	W
Grand total	130,000	130,000

e/ Estimated. W Withheld to avoid disclosing company proprietary data; included in "Total and/or Grand total."

1/ Data rounded to three significant digits; may not add to totals shown.

2/ Includes acoustic, fireproofing, and texturizing uses.

3/ Includes high-temperature and packing insulation and sealants.

4/ Includes various industrial, etc., uses not specified.

TABLE 3
ACTIVE VERMICULITE EXFOLIATION
PLANTS IN THE UNITED STATES IN 1995

Company	County	State
A-Tops Corp.	Beaver	Pennsylvania.
W. R. Grace & Co., Construction Products Div.	Jefferson	Alabama.
Do.	Maricopa	Arizona.
Do.	Broward	Florida.
Do.	Du Page	Illinois.
Do.	Multnomah	Oregon.
Do.	Greenville	South Carolina.
Koos Inc.	Kenosha	Wisconsin.
Palmetto Vermiculite Co., Inc.	Spartanburg	South Carolina.
Patterson Vermiculite Co.	Laurens	Do.
P.V.P. Industries	Trumbull	Ohio.
The Schundler Co.	Middlesex	New Jersey.
O.M. Scott & Sons.	Union	Ohio.
Southwest Vermiculite Co., Inc.	Bernalillo	New Mexico.
Strong-Lite Products Corp.	Jefferson	Arkansas.
Strong Products Corporation	La Salle	Illinois.
Thermic Refractories, Inc.	Macoupin	Do.
Thermo-O-Rock, Inc.	Maricopa	Arizona.
Do.	Washington	Pennsylvania.
Verlite Co.	Hillsborough	Florida.
Vermiculite Industrial Corp.	Allegheny	Pennsylvania.
Vermiculite Products, Inc.	Harris	Texas.

TABLE 4
WORLD VERMICULITE ANNUAL
PRODUCTION CAPACITY
DECEMBER 31, 1995

(Thousand metric tons)

Country	Rated capacity 1/ 2/
North America:	
Mexico	(3/)
United States	190
Total	190
South America: e/	
Argentina	(3/)
Brazil	16
Total	16
Europe:	
Russia e/	60
Africa:	
Egypt	1
Kenya	3
South Africa	223
Total	227
Asia:	
India	2
Japan e/	15
Total	17
World total	510

e/ Estimated.

1/ Includes capacity at operating plants as well as at plants on standby basis.

2/ Excludes countries for which data were not available.

3/ Less than 1/2 unit.

TABLE 5
VERMICULITE: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Metric tons)

Country 3/	1991	1992	1993	1994	1995 e/
Argentina	190 r/	-- r/	38 r/	50 r/ e/	50
Brazil	11,031	11,615 r/	14,541 r/	16,000 r/	16,000
Egypt e/	519 4/	500	500	500	500
India	1,768	1,609	1,485 r/	1,789 r/	1,800
Japan e/	15,000	15,000	15,000	15,000	15,000
Kenya	2,600 e/	2,291 r/	1,961 r/	1,960 r/ e/	1,960
Mexico	117	125	134	300	300 4/
Russia e/ 5/	XX	60,000	50,000	40,000	40,000
South Africa	214,656	170,399	211,143	223,478	221,748 4/
U.S.S.R. 5/ 6/	85,000 e/	XX	XX	XX	XX
United States (sold and used by producers)	180,000	190,000	190,000	177,000	171,000 4/
Zimbabwe	2,319	4,300	5,032	8,184	9,000
Total	513,000 r/	456,000 r/	490,000 r/	484,000 r/	478,000

e/ Estimated. r/ Revised. XX Not applicable.

1/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Excludes production by countries for which data are not available and for which general information is inadequate for formulation or reliable estimates. Table includes data available through Aug. 22, 1996.

3/ In addition to the countries listed, Tanzania may produce vermiculite, but available information is inadequate to make reliable estimates of output levels.

4/ Reported figure.

5/ All production in the former U.S.S.R. for 1991 came from Russia.

6/ Dissolved in Dec. 1991.