



# 2018 Minerals Yearbook

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**PERLITE [ADVANCE RELEASE]**

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# PERLITE

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In 2018, the quantity of domestic processed crude perlite sold and used by producers decreased by 7% to 444,000 metric tons (t) from 479,000 t in 2017 (table 1). The average unit value of processed crude perlite sold and used decreased slightly compared with that in 2017. Production of expanded perlite decreased by 13% to 476,000 t from 545,000 t in 2017 and the quantity of expanded perlite sold and used decreased by 17% to 452,000 t from 545,000 t in 2017 (tables 1, 2). U.S. domestic exports of processed crude perlite were estimated to have decreased by 11% to 16,000 t in 2018 from 18,000 t in 2017 and total U.S. imports for consumption of processed crude perlite were estimated to have increased by 19% to 204,000 t from those in 2017 (table 1). World production from 17 countries decreased by 8% to 3.04 million metric tons (Mt) in 2018, compared with 3.31 Mt (revised) in 2017 (tables 1, 3). Percentages throughout this chapter were calculated using unrounded data.

Perlite is an amorphous siliceous volcanic glass with a relatively high content of contained water. When perlite ore is rapidly heated to approximately 900 degrees Celsius (°C) (expansion temperatures vary depending on the chemical composition and water content of the ore), the contained water converts to steam, and the ore expands up to 20 times its original volume. Expanded perlite appears lighter in color (white) than the crude ore (gray to black) and the resulting ultralightweight material has many properties suited for myriad industrial applications.

## Production

Domestic production data for perlite were compiled by the U.S. Geological Survey (USGS) through two voluntary annual surveys—one for domestic mine operations (mined and processed crude perlite) and one for expansion plants. Processed crude perlite was produced by six companies operating eight mines. Of the eight mines surveyed, seven were active, and five responded, representing 71% of the active mines. Production data for nonrespondents were estimated based on previous years' reported production levels adjusted by mine and mill employment hours published by the Mine Safety and Health Administration (MSHA). According to data collected by the USGS, the 444,000 t of processed crude perlite sold and used in 2018 was valued at \$31.9 million, decreases of 7% in quantity and of 9% in value from those in 2017. The 452,000 t of expanded perlite sold or used by domestic producers was valued at \$157 million, decreases of 17% in quantity and 14% in value compared with those in 2017. However, the average unit value of expanded perlite increased by 4% in 2018, consistent with the 5-year (2014 through 2018) trend of an increase in the average unit value of expanded perlite (tables 1, 2). The 20-year (1998 through 2018) progression of the quantity and average value of processed crude (sold and used) perlite and expanded perlite

sold or used in the United States indicated an overall trend of declining quantities of processed crude perlite sold and used and expanded perlite sold or used associated with an overall trend of increasing average value for expanded perlite sold or used and a slightly increasing trend for average value of processed crude perlite sold or used over the time period (fig. 1).

Domestic perlite was produced from mines in five Western States, each with geologically recent volcanism. Crude perlite was mined and processed in Arizona (Imerys, S.A., France), Idaho (Hess Perlite), Nevada (EP Minerals, LLC and Wilkin Mining and Trucking, Inc.), New Mexico (Dicaperl Minerals Corp. and Imerys, S.A.), and Oregon (Cornerstone Industrial Minerals Corp.). In 2018, perlite producer EP Minerals, LLC was acquired by U.S. Silica Holdings, Inc., and is now one of U.S. Silica's wholly owned subsidiaries (U.S. Silica Holdings, Inc., 2018).

Sunrise Resources plc (United Kingdom) continued to develop its pozzolan-perlite project in Esmeralda County, NV. In 2018, the company completed its drilling program in support of the initial mine plan design, signed memoranda of understanding with two separate perlite buyers, successfully completed commercial trials, and initiated the mine permitting process. The company also identified another nearby perlite prospect for further investigation (Sunrise Resources plc, 2018, p. 1; 2020).

Processed crude perlite was shipped to expansion plants which were closer to the point of use; there were 61 expansion plants in 28 States. Of the 61 plants surveyed, 3 were inactive, and 29 plant operators responded, representing 50% of the active plants and 49% of the production. Production information for nonresponding companies was estimated using previously reported data, with adjustments based on currently reported production trends. The expansion plants used domestic and (or) imported processed crude perlite.

## Consumption

The properties of expanded perlite, including its lightweight nature, durability, fire resistance, inertness, low acoustical and thermal conductivity, and water retention capacity make it useful for a wide range of applications. Expanded perlite consumed for construction-related uses, such as concrete aggregate, formed products, masonry- and cavity-fill insulation, and plaster aggregate accounted for more than 50% of the total production. Horticultural uses for perlite decreased to 66,700 t, accounting for 15% of the total production. In 2018, expanded perlite consumption increased for unspecified and other uses (including plaster aggregate) compared with that in 2017, but decreased for the remaining uses (concrete aggregate, fillers, filter aid, formed products, horticultural aggregate, low temperature insulation, and masonry- and cavity-fill insulation) (table 2).

## Prices

The average unit value of processed crude perlite sold to expanders in 2018 was \$71 per metric ton, a 3% decrease compared with that in 2017. In 2018, the average unit value of perlite used by perlite expansion plants was \$94 per metric ton, a slight decrease from that of the prior year. The average unit value of expanded perlite in 2018 increased by 4% to \$346 per metric ton (table 1).

Expanded perlite unit values ranged from \$241 per metric ton for formed products to \$601 per metric ton for low-temperature insulation (table 2). The wide range in values is a function of the end use and quality of the perlite required for various products.

## Foreign Trade

Trade data for perlite are not collected as a separate category by the U.S. Census Bureau but are included within the group “vermiculite, perlite, and chlorites, unexpanded” under the Harmonized Tariff Schedule of the United States code 2530.10.0000. Domestic exports and imports for consumption of perlite were estimated based on information published by the U.S. Census Bureau (table 1). In 2018, exports of processed crude perlite by the United States were estimated to be 16,000 t, a decrease of 11% from 18,000 t in 2017; most exports went to Canada (89%). These exports to Canada were likely horticultural-grade perlite, to be mixed with peat and other ingredients to produce potting soils. The unit value of exported perlite was estimated to be \$128 per metric ton, a 6% increase from \$121 per metric ton in 2017.

Total United States imports for consumption of processed crude perlite were estimated to be 204,000 t, an increase of 19% from 171,000 t in 2017; most imports in 2018 were from Greece (89%). In 2018, the unit value of imported perlite was estimated to be \$118 per metric ton, a 9% decrease from \$129 per metric ton in 2017. After arriving at U.S. ports, perlite was shipped to expansion plants throughout the country. Imerys was thought to be a major importer of the perlite from Greece because it owned S&B Industrial Minerals S.A. (Greece), a global leader in perlite production.

## World Review

In 2018, the total world production of crude perlite was 3.04 Mt, an 8% decrease from the revised world total of 3.31 Mt in 2017 (table 3). The leading producing countries were, in decreasing order of production, China, Greece, Turkey, and the United States. Most of China’s production was thought to be consumed internally. Greece and Turkey were the leading exporters of perlite.

## Outlook

The total consumption of perlite in the United States is expected to increase in 2019, if privately owned housing and commercial construction increase. Perlite expansion plants, particularly in the eastern United States, are expected to continue to purchase imported perlite because it has become economically competitive with domestically produced perlite. In 2018, about one-third of the perlite consumed in the United States was imported.

## References Cited

- Sunrise Resources plc, 2018, Audited results for the year to 30 September 2018: Macclesfield, United Kingdom, Sunrise Resources plc news announcement, December 11, 42 p. (Accessed February 4, 2021, at <https://www.sunriseresourcesplc.com/downloads/sunrise-resources-plc-rms-final-results-11-december-2018.pdf>.)
- Sunrise Resources plc, 2020, The CS project: Macclesfield, United Kingdom, Sunrise Resources plc. (Accessed May 19, 2020, at <https://www.sunriseresourcesplc.com/cs-project>.)
- U.S. Silica Holdings, Inc., 2018, U.S. Silica acquires performance materials leader EP Minerals for \$750 million: Katy, TX, U.S. Silica Holdings, Inc. press release, March 23. (Accessed June 12, 2020, at <https://www.ussilica.com/news/us-silica-acquires-performance-materials-leader-ep-minerals-750-million>.)

## GENERAL SOURCES OF INFORMATION

### U.S. Geological Survey Publications

- Historical Statistics for Mineral and Material Commodities in the United States. Data Series 140.
- Lightweight Aggregates. Ch. in United States Mineral Resources, Professional Paper 820, 1973.
- Perlite. Ch. in Mineral Commodity Summaries, annual.

### Other

- Geology of the Industrial Rocks and Minerals. Dover Publications Inc., 1969.
- Industrial Minerals—Geology and World Deposits. Metal Bulletin plc, 1990.
- Industrial Minerals, monthly.
- Perlite. Ch. in Industrial Minerals and Rocks (6th ed.), Society for Mining, Metallurgy, and Exploration, Inc., 2006.
- Perlite. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.

TABLE 1  
SALIENT PERLITE STATISTICS<sup>1</sup>

(Thousand metric tons and thousand dollars unless otherwise specified)

	2014	2015	2016	2017	2018	
United States:						
Mine production <sup>2</sup>	462	501	521	570	494	
Processed crude:						
Sold:						
Quantity	388	380	424	468	434	
Value	21,500	22,700	27,300	34,100	30,900	
Average value	dollars per metric ton	55	60	64	73	71
Used:						
Quantity	75	65	13	11	10	
Value	3,960	4,230	1,140	1,040	943	
Average value	dollars per metric ton	53	65	88	95	94
Total, sold and used:						
Quantity	462	444	437	479	444	
Value	25,500	26,900	28,400	35,100	31,900	
Average value	dollars per metric ton	55	61	65	73	72
Imports for consumption: <sup>3</sup>						
Quantity	160	154	199	171	204	
Value <sup>4</sup>	19,200	18,100	21,500	22,100	24,200	
Average value	dollars per metric ton	120	117	108	129	118
Exports: <sup>3</sup>						
Quantity	20	18	16	18	16	
Value <sup>5</sup>	3,920	2,480	2,010	2,180	2,050	
Average value	dollars per metric ton	196	138	125	121	128
Expanded:						
Production, quantity	481	503	537	545	476	
Sold or used:						
Quantity	475	503	528	545	452	
Value	153,000	168,000	173,000	182,000	157,000	
Average value	dollars per metric ton	323	333	327	334	346
World production	4,710 <sup>r</sup>	3,260 <sup>r</sup>	4,670 <sup>r</sup>	3,310 <sup>r</sup>	3,040 <sup>e</sup>	

<sup>e</sup>Estimated. <sup>r</sup>Revised.

<sup>1</sup>Table includes data available through March 4, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Crude ore mined and stockpiled for processing.

<sup>3</sup>Source: U.S. Census Bureau; data adjusted by U.S. Geological Survey. Data are for "vermiculite, perlite and chlorites, unexpanded," Harmonized Tariff Schedule of the United States code 2530.10.0000.

<sup>4</sup>Customs value.

<sup>5</sup>Free alongside ship value.

TABLE 2  
EXPANDED PERLITE SOLD OR USED BY PRODUCERS IN THE UNITED STATES, BY USE<sup>1</sup>

Use	2017			2018		
	Quantity (metric tons)	Value (thousands)	Average value <sup>2</sup> (dollars per metric ton)	Quantity (metric tons)	Value (thousands)	Average value <sup>2</sup> (dollars per metric ton)
Concrete aggregate	1,930	\$711	369	1,590	\$415	260
Fillers	77,200	34,200	443 <sup>r</sup>	71,600	32,100	449
Filter aid	63,800	25,000	392	57,000	22,400	393
Formed products <sup>3</sup>	245,000	50,700	207	212,000	51,100	241
High-temperature insulation	W	W	W	W	W	W
Horticultural aggregate	106,000	47,400	448	66,700	35,000	525
Low-temperature insulation	2,320	2,040	882	2,060	1,240	601
Masonry- and cavity-fill insulation	2,210	1,340	606	1,110	565	508
Plaster aggregate	23,800	11,300	474	W	W	W
Unspecified and other <sup>4</sup>	22,400	9,290	405	39,400	13,700	348
Total or average	545,000	182,000	334	452,000	157,000	346

<sup>r</sup>Revised. W Withheld to avoid disclosing company proprietary data.

<sup>1</sup>Table includes data available through March 4, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Average value is based on unrounded data and is rounded to the nearest dollar.

<sup>3</sup>Includes acoustic ceiling panels, pipe insulation, roof insulation board, and unspecified formed products.

<sup>4</sup>“Unspecified” includes estimated and reported data with specific use unknown. “Other” includes absorbents, laundries, paint texturizers, plaster aggregate, and other miscellaneous uses. Unspecified and other uses have been combined to avoid disclosing company proprietary data.

TABLE 3  
PERLITE: WORLD PRODUCTION, BY COUNTRY OR LOCALITY<sup>1</sup>

(Metric tons)

Country or locality <sup>2</sup>	2014	2015	2016	2017	2018
Argentina	22,680	23,282	17,905	19,924 <sup>r</sup>	20,000 <sup>e</sup>
Armenia	84,904	57,657	44,820	45,000 <sup>e</sup>	45,000 <sup>e</sup>
Australia <sup>e</sup>	1,000 <sup>r</sup>	1,000 <sup>r</sup>	800 <sup>r</sup>	500 <sup>r</sup>	500
Bulgaria <sup>e</sup>	5,000	5,000	5,000	5,000	5,000
China	2,037,000 <sup>r</sup>	723,800 <sup>r</sup>	1,930,000	1,219,000 <sup>r</sup>	935,600
Greece, crude	985,328	890,670	921,410	700,000	750,000 <sup>e</sup>
Hungary <sup>3,4</sup>	37,957 <sup>r</sup>	36,248 <sup>r</sup>	42,219 <sup>r</sup>	39,538 <sup>r</sup>	39,000 <sup>e</sup>
Iran	42,646	63,030	17,083	20,000 <sup>e</sup>	20,000 <sup>e</sup>
Mexico <sup>3</sup>	26,000	26,000 <sup>e</sup>	19,000	20,000 <sup>e</sup>	20,000 <sup>e</sup>
New Zealand <sup>e</sup>	22,000	25,000	25,000	17,000 <sup>r</sup>	20,000
Philippines	17,194	18,575	21,645	19,000 <sup>e</sup>	18,000 <sup>e</sup>
Slovakia	17,000	25,000	19,000	18,000	19,000 <sup>e</sup>
South Africa	1,100	1,000 <sup>e</sup>	1,000 <sup>e</sup>	1,000 <sup>e</sup>	1,000 <sup>e</sup>
Thailand	54,100	17,200	15,690	5,800 <sup>r</sup>	6,000 <sup>e</sup>
Turkey <sup>3</sup>	897,125	843,242	1,066,251 <sup>r</sup>	606,231 <sup>r</sup>	650,000 <sup>e</sup>
United States <sup>5</sup>	462,000	501,000	521,000	570,000	494,000
Zimbabwe <sup>e</sup>	1,000	1,000	1,000	1,000	1,000
Total	4,710,000 <sup>r</sup>	3,260,000 <sup>r</sup>	4,670,000 <sup>r</sup>	3,310,000 <sup>r</sup>	3,040,000 <sup>e</sup>

<sup>e</sup>Estimated. <sup>r</sup>Revised.

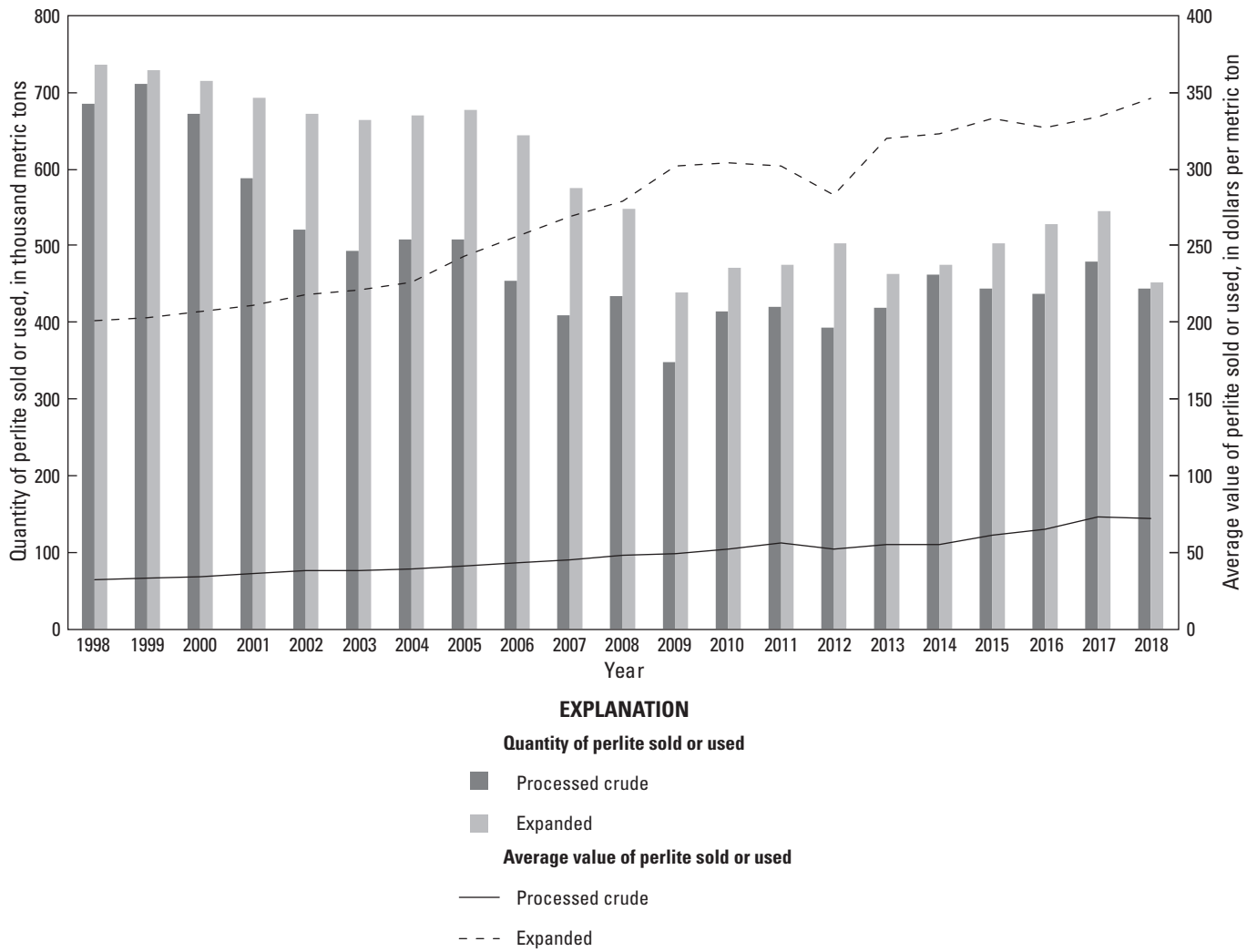
<sup>1</sup>Table includes data available through August 22, 2019. All data are reported unless otherwise noted. Totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>In addition to the countries and (or) localities listed, Algeria, Cyprus, Georgia, Morocco, and Russia may have produced perlite, but available information was inadequate to make reliable estimates of output.

<sup>3</sup>Crude ore.

<sup>4</sup>Hungary reports perlite production in cubic meters, as follows: 2014—32,750; 2015—31,275; 2016—36,427; 2017—34,114; and 2018—34,000 (estimated). One cubic meter of perlite equals 1.159 metric tons.

<sup>5</sup>Crude ore mined and stockpiled for processing.



**Figure 1.** Quantity and average value of processed crude (sold and used) perlite and expanded perlite sold or used in the United States from 1998 through 2018.