



2017 Minerals Yearbook

PUMICE AND PUMICITE [ADVANCE RELEASE]

PUMICE AND PUMICITE

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In 2017, U.S. pumice and pumicite production was 383,000 metric tons (t), slightly more than that of 2016 when the United States produced 374,000 t. The overall value of pumice production in 2017 was \$14.8 million, 3% more than that of 2016. The apparent consumption of pumice and pumicite in the United States in 2017 was 538,000 t, slightly more than that of 2016. Imports decreased slightly to 166,000 t. Exports increased by 22% to 11,000 t in 2017. Pumice production, imports, and exports can be highly variable from year to year and are subject to large annual fluctuations in terms of percentage. With the exception of the 2015 average unit value, the apparent consumption, the unit value, and the quantity of pumice that was sold or used have followed an upward trend since 2013 (fig. 1). World production of pumice and related material was estimated to have increased slightly to 17.6 million metric tons (Mt) in 2017 (tables 1, 3).

Pumice is an extrusive igneous volcanic rock formed through the cooling of air-pocketed lava, which results in a highly porous, low-density rock (Presley, 2006). Its low density allows some pumice to float on water. Large pumice rafts that consist of clusters of floating pieces of pumice, a unique geologic phenomenon, have been documented to be as long as 30 kilometers and to drift for several years in oceanic waters (Wood-Jones, 1910, p. 290–291; Bryan and others, 2004, p. 136). Pumicite is defined as grains, flakes, threads, and (or) shards of volcanic glass finer than 4 millimeters in diameter (Harben and Bates, 1984, p. 64). Pumicite and volcanic ash are descriptive terms that are often interchangeably used.

The porous, lightweight properties of pumice are well suited for its main use as an aggregate in lightweight building blocks and assorted building products. In 2017, other major applications included abrasives, horticulture (including landscaping), and roofing. Minor applications used pumice as an absorbent, a concrete aggregate and admixture, a filter aid, and a traction enhancer for tires. A small percentage of pumice was used in abrasive-type products, including pencil erasers, a polishing agent for circuit boards and television monitors, an exfoliant in cosmetics, a henna tattoo removal product, and a variety of heavy-duty hand cleaners. Imports were primarily used as raw material for construction block and as a lightweight aggregate.

Production

Domestic production data for pumice and pumicite were developed by the U.S. Geological Survey from an annual voluntary survey of U.S. pumice- and pumicite-producing sites and company operations. The 2017 canvass included 10 companies with 10 active operations that produced, used, or sold pumice and pumicite in the United States. All 10 companies responded to the canvass. Data were rounded to no more than

three significant digits. All percentages in this report were calculated using unrounded data.

U.S. pumice and pumicite production of 383,000 t was valued at \$14.8 million. States that produced pumice or pumicite were, in order of decreasing production, Oregon, California, Idaho, New Mexico, and Kansas.

Pumice is usually extracted by simple open pit methods using rippers, bulldozers, and front-end loaders. Processing is typically limited to drying, crushing, and screening, although some abrasive grades may require fine grinding and classification. Pumice blocks may be sawn into a variety of shapes and sizes.

Consumption

Owing to the small size of the domestic pumice-mining industry, sales and value data regarding the end-use categories of abrasives, building block, concrete admixture and aggregate, horticulture and landscaping, and “other” (oil absorbent, pet litter, chinchilla chew stones, cosmetics, diluents, engineered fill, filter aids, geotechnical aids, pottery clays, highway snow control, road construction, and other unspecified uses) were withheld to avoid disclosing company proprietary data. Several substitutes exist for pumice in agriculture, in horticulture, as an aggregate, as a concrete additive, and in other end-use products.

Prices

The average prices reported for pumice and pumicite in 2017 varied widely by use. The overall average unit value reported for all pumice and pumicite products increased slightly to \$38.60 per metric ton in 2017 from \$38.20 per metric ton in 2016 (table 1). As with the production data regarding end-use products, value information pertaining to the categories of abrasives, building block, concrete admixture and aggregate, horticulture and landscaping, and other were withheld to avoid disclosing company proprietary data.

Foreign Trade

Export and import data were reported by the U.S. Census Bureau. The trade data were published under subheading 2513.10 of the Harmonized Tariff Schedule of the United States, described as applying to pumice stone. Industry sources, however, indicated that pumice may be included under the general heading 2513, which included corundum garnets and other natural abrasives.

Exports of pumice, mostly specialty products, increased by 22% to 11,000 t, with a value of \$5.44 million in 2017, compared with 9,000 t valued at \$4.54 million in 2016. Canada received 37% of 2017 United States exports, followed by Italy with 9%, Hong Kong with 8%, and Japan and Germany, each

with 6%. Smaller quantities of pumice and pumice products were exported to 38 other countries and (or) localities.

Imports of crude or unmanufactured pumice and pumicite in 2017 decreased slightly to 166,000 t compared with 170,000 t in 2016 (table 1). Most imports of pumice and pumicite were raw materials for blocks and lightweight aggregate in construction-related uses, with smaller quantities used in a range of abrasives and for stonewashing denim. Of these imports, 94% came from Greece (table 2), which supplied 155,000 t of crude pumice to the United States in 2017 and remained the leading source of pumice imports. Fourteen other countries and (or) localities supplied most of the remainder of pumice and pumicite imports in 2017.

World Review

World production of pumice and related material was estimated to be 17.6 Mt in 2017, which represented a slight increase from that of 2016. Pumice is used more extensively as a building material outside the United States, which explained the large global production of pumice relative to that of the United States.

In Europe, basic home construction uses significantly less gypsum wallboard because stone and concrete are the preferred building materials. Prefabricated lightweight concrete walls, which may contain pumice as lightweight aggregate, are often produced and shipped to construction locations. Because of their light weight, strength, and cementitious properties, pumice and pumicite perform well in European-style construction. In 2017, Turkey was the leading exporter of pumice to Asia and Europe.

Outlook

U.S. consumption of pumice and pumicite in 2018 may increase compared with that of 2017 if the U.S. residential housing sector, a major user of pumice- and pumicite-related products, experiences a rise in construction activity.

References Cited

- Bryan, S.E., Cook, Alex, Evans, J.P., Colls, P.W., Wells, M.G., Lawrence, M.G., Jell, J.S., Greig, Alan, and Leslie, Roman, 2004, Pumice rafting and faunal dispersion during 2001–2002 in the southwest Pacific—Record of a dacitic submarine explosive eruption from Tonga: *Earth and Planetary Science Letters*, v. 227, nos. 1–2, October, p. 135–154. (Accessed May 31, 2018, at <https://doi.org/10.1016/j.epsl.2004.08.009>.)
- Harben, P.W., and Bates, R.L., 1984, *Geology of the nonmetallics*: New York, NY, Metal Bulletin Inc., 392 p.
- Presley, G.C., 2006, Pumice, pumicite, and volcanic cinder, in Kogel, J.E., Trivedi, N.C., Barker, J.M., and Krukowski, S.T., eds., *Industrial minerals and rocks* (7th ed.): Littleton, CO, Society for Mining, Metallurgy, and Exploration, Inc., p. 743–754.
- Wood-Jones, Frederick, 1910, *Coral and atolls—A history and description of the Keeling-Cocos Islands, with an account of their fauna and flora, and a discussion of the method of development and transformation of coral structures in general*: London, United Kingdom, Lovell Reeve & Co. Ltd., 392 p.

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.
- Pumice and Pumicite. Ch. in *Mineral Commodity Summaries*, annual.

Other

- Geology of the Industrial Rocks and Minerals*. Dover Publications Inc., 1969.
- Industrial Minerals and Rocks* (7th ed.). Society for Mining, Metallurgy, and Exploration Inc., 2006.
- Pumice. Ch. in *Common Minerals and Their Uses*, Mineral Information Institute, 2006.
- Pumice and Pumicite. Ch. in *Mineral Facts and Problems*, U.S. Bureau of Mines Bulletin 675, 1985.

TABLE 1
SALIENT PUMICE AND PUMICITE STATISTICS¹

(Thousand metric tons and thousand dollars unless otherwise specified)

| | 2013 | 2014 | 2015 | 2016 | 2017 | |
|--|------------------------|---------------------|---------------------|---------------------|--------|-------|
| United States: | | | | | | |
| Sold and used by producers: | | | | | | |
| Quantity | 269 | 269 | 310 | 374 | 383 | |
| Value ² | 9,320 | 10,400 | 10,100 | 14,300 | 14,800 | |
| Average value | dollars per metric ton | 34.65 | 38.51 | 32.66 | 38.23 | 38.57 |
| Exports ³ | 13 | 14 | 11 | 9 | 11 | |
| Imports for consumption ³ | 73 | 60 | 64 | 170 | 166 | |
| Apparent consumption ⁴ | 329 | 315 | 363 | 535 | 538 | |
| World, production, pumice and related volcanic materials | 20,100 ^r | 18,500 ^r | 16,900 ^r | 17,300 ^r | 17,600 | |

^rRevised.

¹Table includes data available through July 3, 2018. Data are rounded to no more than three significant digits, except average value.

²Free on board mine and (or) mill.

³Source: U.S. Census Bureau.

⁴Defined as quantity sold or used plus imports minus exports.

TABLE 2
U.S. IMPORTS FOR CONSUMPTION OF PUMICE,
BY CLASS AND COUNTRY OR LOCALITY¹

| Country or locality | Crude or unmanufactured | | Wholly or partly manufactured | |
|---------------------|-------------------------|-------------------|-------------------------------|--------------------|
| | Quantity (metric tons) | Value (thousands) | Quantity (metric tons) | Value (thousands) |
| 2016: | | | | |
| China | 32 | \$36 | 31 ^r | \$219 ^r |
| Germany | -- | -- | 19 | 10 |
| Greece | 159,000 | 2,780 | -- | -- |
| Hong Kong | -- | -- | 1 | 9 |
| Iceland | 7,780 | 737 | -- | -- |
| Italy | 12 | 9 | 3 | 3 |
| Japan | 58 | 47 | 42 | 22 |
| Mexico | 2,490 | 646 | 57 | 11 |
| Poland | -- | -- | 15 | 158 |
| Turkey | -- | -- | 18 | 12 |
| Other | -- | -- | 4 | 69 |
| Total | 170,000 | 4,260 | 189 ^r | 513 ^r |
| 2017: | | | | |
| China | 3 | 12 | 61 | 365 |
| Greece | 155,000 | 2,980 | -- | -- |
| Hong Kong | -- | -- | 7 | 98 |
| Iceland | 7,400 | 737 | -- | -- |
| Indonesia | -- | -- | 20 | 24 |
| Japan | 21 | 21 | 30 | 14 |
| Mexico | 3,290 | 959 | -- | -- |
| Poland | -- | -- | 2 | 32 |
| Spain | -- | -- | 11 | 172 |
| Switzerland | 2 | 5 | -- | -- |
| Other | (2) | 2 | 1 | 9 |
| Total | 166,000 | 4,710 | 130 | 715 |

^rRevised. -- Zero.

¹Table includes data available through July 3, 2018. Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 3
PUMICE AND RELATED MATERIALS: WORLD PRODUCTION, BY COUNTRY OR LOCALITY¹

(Metric tons)

| Country or locality ² | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|
| Algeria, pozzolan | 388,242 ^r | 314,637 ^r | 350,000 ^e | 350,000 ^e | 350,000 ^e |
| Argentina, pumice | 7,320 | 7,320 ^r | 7,000 | 7,000 ^e | 7,000 ^e |
| Cameroon, pozzolan | 363,655 | 297,592 ^r | 300,000 ^{r,e} | 360,000 ^e | 360,000 ^e |
| Chile, pumice and pozzolan | 800,031 | 808,879 | 804,121 ^r | 840,976 ^r | 840,000 ^e |
| Croatia, volcanic tuff ^e | 14,000 | 20,000 | 20,000 | 20,000 | 20,000 |
| Ecuador, pumice ^e | 1,740,000 ^r | 1,730,000 ^r | 1,000,000 ^r | 1,000,000 ^r | 830,000 |
| Eritrea, pumice | 5,100 ^r | 5,100 ^r | 5,100 ^{r,e} | 78 ^e | 80 |
| Ethiopia ^{e,3} | 510,000 ^r | 640,895 ^r | 720,000 ^r | 800,000 ^r | 800,000 |
| France, pozzolan, including lapilli | 276,000 | 276,000 | 276,000 | 280,000 ^e | 280,000 ^e |
| Greece: | | | | | |
| Pozzolan, Santorin earth | 266,000 | 270,000 | 153,070 ^r | 290,000 ^e | 290,000 ^e |
| Pumice | 420,000 | 429,870 ^r | 580,960 ^r | 580,000 ^e | 660,000 ^e |
| Guadeloupe, pumice ^e | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 |
| Guatemala, pumice | 90,701 | 79,969 | 160,986 ^r | 160,000 ^{r,e} | 570,000 ^e |
| Iceland, pumice ^e | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 |
| Italy: ^e | | | | | |
| Pozzolan | 4,000,000 | 4,000,000 | 4,000,000 | 4,000,000 | 4,000,000 |
| Pumice and pumiceous lapilli | 28,000 | 28,000 | 43,000 | 43,000 | 43,000 |
| Jamaica, pozzolan | 112,000 | 129,171 | 129,000 | 130,000 ^{r,e} | 130,000 ^e |
| Macedonia, volcanic tuff | 67,663 | 65,504 | 70,148 ^r | 76,796 ^r | 77,000 ^e |
| New Zealand | 93,865 | 68,835 | 42,037 ^r | 68,000 ^e | 68,000 ^e |
| Philippines: | | | | | |
| Pumice | 5,566 | 6,018 | 6,261 ^r | 6,300 ^{r,e} | 8,300 ^e |
| Volcanic tuff | 26,930 | 28,884 | 40,775 ^r | 41,000 ^{r,e} | 40,000 ^e |
| Saudi Arabia, pozzolan | 460,000 | 480,000 | 480,000 ^e | 480,000 ^e | 480,000 ^e |
| Slovenia, volcanic tuff | 19,171 ^r | 8,872 ^r | 9,116 ^r | 8,840 ^{r,e} | 8,800 ^e |
| Spain, including Canary Islands ^e | 195,000 | 195,000 | 195,000 | 200,000 | 200,000 |
| Syria, volcanic tuff | 300,000 ^e | 250,444 ^r | 200,000 ^{r,e} | 200,000 ^{r,e} | 200,000 ^e |
| Tanzania, pozzolan materials | 79,452 ^r | 68,925 | 342,628 ^r | 350,000 ^{r,e} | 350,000 ^e |
| Turkey | 8,644,716 ^r | 6,966,987 ^r | 5,660,190 ^r | 5,637,494 ^r | 5,600,000 ^e |
| Uganda, pozzolan materials | 623,471 | 742,425 | 686,564 ^r | 740,000 ^e | 720,000 ^e |
| United States, pumice, sold and used by producers | 269,000 | 269,000 | 310,000 | 374,000 | 383,000 |
| Total | 20,100,000 ^r | 18,500,000 ^r | 16,900,000 ^r | 17,300,000 ^r | 17,600,000 |
| Of which: | | | | | |
| Pozzolan | 5,870,000 ^r | 5,770,000 ^r | 5,690,000 ^r | 5,890,000 ^r | 5,890,000 |
| Pumice | 2,830,000 ^r | 2,830,000 ^r | 2,370,000 ^r | 2,430,000 ^r | 2,750,000 |
| Volcanic tuff | 428,000 ^r | 374,000 ^r | 340,000 ^r | 347,000 ^r | 374,000 |
| Undifferentiated | 11,000,000 ^r | 9,520,000 ^r | 8,490,000 ^r | 8,680,000 ^r | 8,620,000 |

^eEstimated. ^rRevised.

¹Table includes data available through May 31, 2018. All data are reported unless otherwise noted. Totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

²In addition to those listed, other countries and (or) localities, including Iran, Martinique, and Mexico, may have produced limited quantities of pumice and related materials, but available information was inadequate to make reliable estimates of output.

³Production is based on fiscal year, with a starting date of July 8 of the year shown.

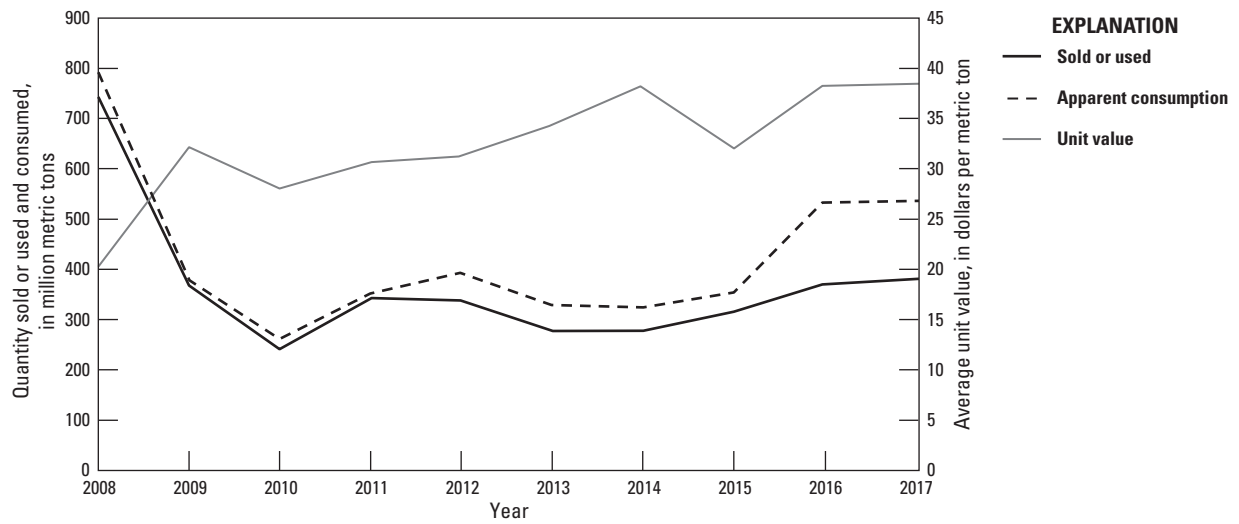


Figure 1. Pumice and pumicite sold or used, apparent consumption, and average unit value for 2008 through 2017 in the United States.