



2016 Minerals Yearbook

PUMICE AND PUMICITE [ADVANCE RELEASE]

PUMICE AND PUMICITE

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In 2016, U.S. pumice and pumicite production was 374,000 metric tons (t), 21% more than that of 2015 when the United States produced 310,000 t. The overall value of pumice production in 2016 was \$14.3 million, 41% more than that of 2015. The apparent consumption of pumice and pumicite in the United States in 2016 was 535,000 t, an increase of 47% compared with that of 2015. Imports increased by 166% to 170,000 t. Exports decreased by 18% to 9,000 t in 2016. 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 essentially unchanged at 17.1 million metric tons (Mt) in 2016 (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 2016, 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 2016 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 374,000 t was valued at \$14.3 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

In 2016, 171,000 t, or 46% of the pumice and pumicite produced in the United States, was used for building and decorative blocks, a 16% increase from that of 2015. As a result of relatively small production totals, variations in pumice-use categories are subject to large annual fluctuations in terms of percentage. Owing to the limited size of the domestic pumice-mining industry, production and value data regarding the end-use categories of concrete admixture and aggregate, abrasives, 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 2016 varied widely by use. The overall average unit value reported for all pumice and pumicite products increased by 17% to \$38.20 per metric ton in 2016 from \$32.70 per ton in 2015 (table 1). The unit value for building and decorative blocks decreased by 5% in 2016 to \$17.60 per ton from the 2015 value of \$18.50 per ton. The price for horticulture and landscaping pumice was reported to be \$24.60 per ton in 2016, a 4% decrease from \$25.70 per ton reported in 2015. As with the production data regarding end-use products, value information pertaining to the categories of abrasives, 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, 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, decreased by 18% to 9,000 t, with a value of \$4.54 million in 2016, compared with 11,000 t valued at \$6.21 million in 2015. Canada received 24% of 2016 United States exports, followed by Hong Kong with 12%, Italy with 11%, and the United Kingdom and Japan, each with 8%. Smaller quantities of pumice and pumice products were exported to 39 other countries.

Imports of crude or unmanufactured pumice and pumicite in 2016 increased by 166% to 170,000 t compared with 64,000 t in 2015 (table 1). Imported pumice levels are relatively small and therefore subject to large percentage changes, as was the case in 2016. 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 159,000 t of crude pumice to the United States in 2016 and remained the leading source of pumice imports. Ten other countries supplied most of the remainder of pumice and pumicite imports in 2016.

World Review

World production of pumice and related material was 17.1 Mt in 2016, which was essentially unchanged from that of 2015. 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 2016, Turkey was the leading exporter of pumice to Asia and Europe.

Outlook

U.S. consumption of pumice and pumicite in 2017 may increase compared with that of 2016 if the U.S. residential housing sector, a major user of pumice- and pumicite-related products, experiences a rise in construction activity.

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- 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)

	2012	2013	2014	2015	2016	
United States:						
Sold and used by producers:						
Quantity	338	269	269	310	374	
Value ²	10,800	9,320	10,400	10,100	14,300	
Average value	dollars per metric ton	31.85	34.65	38.51 ^r	32.66 ^r	38.23
Exports ³	13	13	14	11	9	
Imports for consumption ³	75 ^r	73 ^r	60	64	170	
Apparent consumption ⁴	400 ^r	329	315	363 ^r	535	
World, production, pumice and related volcanic materials						
	15,500 ^r	15,100 ^r	16,900 ^r	17,100 ^r	17,100 ^e	

^eEstimated. ^rRevised.

¹Table includes data available through June 8, 2017. 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.

⁴Production plus imports minus exports plus adjustments for Government and industry stock changes.

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)
2015:				
China	8	\$17	87	\$403
Germany	--	--	11	27
Greece	55,200	768	--	--
Hong Kong	--	--	12	47
Iceland	7,520	721	--	--
Indonesia	--	--	14	14
Italy	11	24	(2)	10
Japan	42	29	28	15
Mexico	1,240	301	61	12
New Zealand	--	--	2	24
Other	--	--	1	48 ^r
Total	64,000	1,860	216	600
2016:				
China	32	36	32	222
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	190	516

^rRevised. -- Zero.

¹Table includes data available through June 8, 2017. 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	2012	2013	2014	2015	2016 ^P
Algeria, pozzolan	325,000	388,000	315,000	350,000 ^e	350,000 ^e
Argentina, pumice	6,252	7,320 ^{r,e}	6,500 ^{r,e}	7,000 ^e	7,000 ^e
Cameroon, pozzolan	400,205	363,655	360,000 ^e	360,000 ^e	360,000 ^e
Chile, pumice and pozzolan	826,779	800,031	808,879	804,000 ^{r,e}	800,000 ^e
Croatia, volcanic tuff ^e	8,000 ^r	14,000 ^r	20,000	20,000	20,000
Djibouti, pumice and volcanic tuff ^e	100,000	100,000	100,000	100,000	100,000
Ecuador, pumice ^e	175,000	175,000	175,000	175,000	180,000
Eritrea, pumice	75	76	78 ^r	78 ^{r,e}	78 ^e
Ethiopia ^{e,3}	330,000	460,000	630,000	600,000	600,000
France, pozzolan and lapilli	276,000	276,000	276,000	276,000 ^e	280,000 ^e
Greece:					
Pozzolan, Santorin earth	285,000	266,000	270,000	290,000 ^e	290,000 ^e
Pumice	386,000 ^r	420,000	430,000 ^r	581,000 ^{r,e}	580,000 ^e
Guadeloupe, pumice	285,000 ^r	200,000	200,000	200,000 ^e	200,000 ^e
Guatemala, pumice	460,817 ^r	90,701	79,969	80,000 ^e	80,000 ^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	30,000	28,000	28,000	43,000	43,000
Jamaica, pozzolan	107,000	112,000	129,171	129,000 ^e	130,000 ^e
Macedonia, volcanic tuff	52,911	67,663	65,504	68,000 ^e	68,000 ^e
New Zealand	72,414 ^r	93,865	68,835	68,000 ^{r,e}	68,000 ^e
Nicaragua, stone	70	10	10 ^e	10 ^e	10 ^e
Philippines:					
Pumice	2,895	5,566	6,018	6,000 ^e	6,000 ^e
Volcanic tuff	22,295	26,930	28,884	28,900 ^e	29,000 ^e
Saudi Arabia, pozzolan	941,000	460,000	480,000	480,000 ^e	480,000 ^e
Slovenia, volcanic tuff	35,000 ^e	35,000 ^e	35,000 ^e	35,000 ^e	35,000 ^e
Spain, including Canary Islands	194,655	195,000 ^e	195,000 ^e	195,000 ^e	200,000 ^e
Syria, volcanic tuff	485,000	300,000	257,000	257,000 ^e	260,000 ^e
Tanzania, pozzolanic materials	75,193	52,349	68,925	69,000 ^e	69,000 ^e
Turkey	4,556,632	5,159,047	6,710,170	6,700,000 ^e	6,700,000 ^e
Uganda, pozzolanic materials	650,324	623,471	742,425	742,000 ^e	740,000 ^e
United States, pumice, sold and used by producers	338,000	269,000	269,000	310,000	374,000
Total	15,500,000 ^r	15,100,000	16,900,000	17,100,000 ^r	17,100,000 ^e

^eEstimated. ^PPreliminary. ^rRevised.

¹Table includes data available through May 2, 2017. 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.

²In addition to the countries listed, Iran, Martinique, and Mexico may have produced pumice and related materials, but available information was inadequate to make reliable estimates of output.

³Data are for year starting July 8 of that stated.

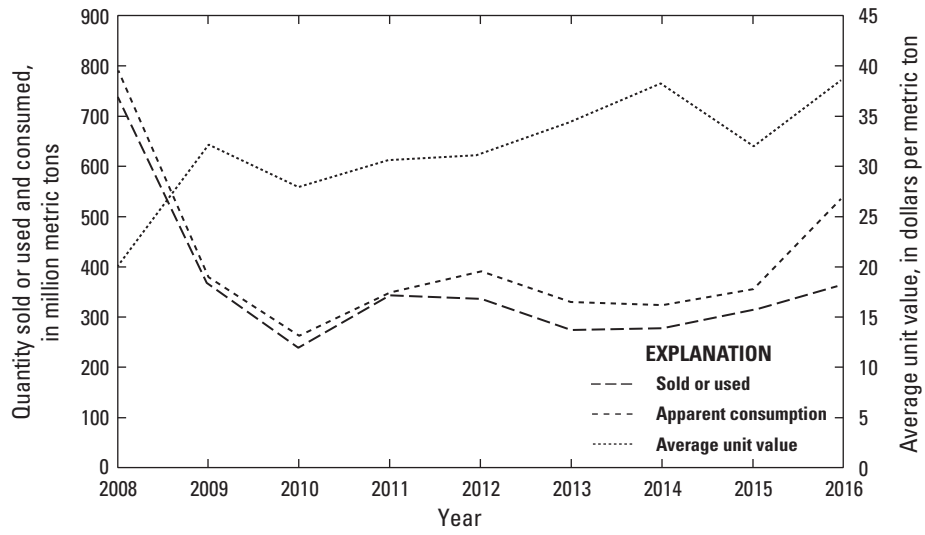


Figure 1. U.S. domestic pumice and pumicite sold or used, apparent consumption, and average unit value for 2008 through 2016.