



# 2015 Minerals Yearbook

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## PUMICE AND PUMICITE [ADVANCE RELEASE]

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# PUMICE AND PUMICITE

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In 2015, U.S. pumice and pumicite production was 310,000 metric tons (t), 15% more than that of 2014 when the United States produced a revised 269,000 t. The overall value of pumice production in 2015 was \$10.1 million, slightly lower than that in 2014. The apparent consumption of pumice and pumicite in the United States in 2015 was 362,000 t, an increase of 15% compared with that of 2014. Imports increased by 7% to 64,000 t. Exports decreased by 21% to 11,000 t in 2015. Pumice imports and exports are relatively small compared with U.S. apparent consumption and are subject to large annual fluctuations in terms of percentage. Since 2011, the apparent consumption, the unit value, and the quantity of pumice that was sold or used have remained relatively constant (fig. 1). World production of pumice and related material increased to 16.9 million metric tons (Mt) in 2015 (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 (km) 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 2015, 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 (USGS) from an annual voluntary survey of U.S. pumice- and pumicite-producing sites and company operations. The 2015 canvass included 9 companies with 10 active operations that produced, used, or sold pumice and pumicite in the United States. All nine companies responded to the canvass. Data were rounded to no

more than three significant digits. All percentages in this report were computed based on unrounded data.

U.S. pumice and pumicite production of 310,000 t was valued at \$10.1 million. States that produced pumice or pumicite were, in order of decreasing production, Oregon, Idaho, California, New Mexico, and Kansas. Kansas Minerals, Inc., a former pumice producer in Mankato, KS, auctioned several pieces of mining and calcining equipment following several years of inactivity (Jewell County Record, 2015).

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 2015, 150,000 t, or 48% of the pumice and pumicite produced in the United States, was used for building and decorative blocks, a 17% increase from that of 2014. 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 2015 varied widely by use. The overall average unit value reported for all pumice and pumicite products decreased by 15% to \$32.68 per metric ton in 2015 from \$38.52 per ton in 2014 (table 1). The unit value for building and decorative blocks decreased slightly in 2015 to \$18.50 per ton from the 2014 value of \$18.70 per ton. The price for horticulture and landscaping pumice was reported to be \$26.22 per ton in 2014. 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 the 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 (HTS), 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 21% to 11,000 t, with a value of \$6.21 million in 2015, compared with 14,000 t valued at 7.4 million in 2014. Canada received 25% of 2015 U.S. exports, followed by Hong Kong with 11%, Italy with 9%, the United Kingdom with 8%, and Trinidad and Tobago with 7%. Smaller quantities of pumice and pumice products were exported to 45 other countries.

Imports of crude or unmanufactured pumice and pumicite in 2015 increased by 7% to 64,000 t compared with 60,000 t in 2014 (table 2). By weight, 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, 86% came from Greece (table 2), which supplied 55,200 t of crude pumice to the United States in 2015 and remained the leading source of pumice imports. Ten other countries supplied most of the remainder of pumice and pumicite imports in 2015.

## World Review

World production of pumice and related material was 16.9 Mt in 2015, unchanged from that in 2014. 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.

Data on production in Ecuador, which is based on small-scale open pit extraction methods, were revised downward following a review of historic and other available data (Sandoval, 2001).

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 2015, Turkey was the leading exporter of pumice to Asia and Europe.

## Outlook

U.S. consumption of pumice and pumicite in 2016 may increase compared with that of 2015 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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## 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 STATISTICS<sup>1</sup>

(Thousand metric tons and thousand dollars unless otherwise specified)

	2011	2012	2013	2014	2015	
United States:						
Sold and used by producers:						
Quantity	343	338	269	269 <sup>r</sup>	310	
Value <sup>2</sup>	10,500	10,800	9,320	10,400 <sup>r</sup>	10,100	
Average value	dollars per metric ton	30.63	31.85 <sup>r</sup>	34.65 <sup>r</sup>	38.52 <sup>r</sup>	32.68
Exports <sup>3</sup>	15 <sup>r</sup>	13 <sup>r</sup>	13	14	11	
Imports for consumption <sup>3</sup>	23	67	72	60	64	
Apparent consumption <sup>4</sup>	351 <sup>r</sup>	392 <sup>r</sup>	329 <sup>r</sup>	315 <sup>r</sup>	362	
World, production, pumice and related volcanic materials	18,400 <sup>r</sup>	15,300 <sup>r</sup>	15,100 <sup>r</sup>	16,900 <sup>r</sup>	16,900 <sup>e</sup>	

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

<sup>1</sup>Data are rounded to no more than three significant digits, except average value.

<sup>2</sup>Free on board mine and (or) mill.

<sup>3</sup>Source: U.S. Census Bureau.

<sup>4</sup>Production 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<sup>1</sup>

Country	Crude or unmanufactured		Wholly or partly manufactured	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2014:				
Australia	--	--	7	\$79
China	18	\$154	22	163
Denmark	--	--	(2)	8
Germany	1	4	54	58
Greece	58,900	942	--	--
Italy	2	8	--	--
Japan	33	29	25	12
Mexico	1,060	243	37	8
Poland	--	--	7	92
Turkey	--	--	10	10
Other	--	--	(2)	2
Total	60,000	1,380	161 <sup>r</sup>	432 <sup>r</sup>
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	47
Total	64,000	1,860	216	600

<sup>r</sup>Revised. -- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 3  
PUMICE AND RELATED MATERIALS: WORLD PRODUCTION, BY COUNTRY<sup>1,2</sup>

(Metric tons)

Country <sup>3</sup>	2011	2012	2013	2014	2015 <sup>c</sup>
Algeria, pozzolan	141,000	325,000	388,000	315,000	350,000
Argentina, pumice <sup>c</sup>	6,445 <sup>4</sup>	6,252 <sup>4</sup>	7,000	7,000	7,000
Cameroon, pozzolan	424,202 <sup>r</sup>	400,205 <sup>r</sup>	363,655 <sup>r</sup>	360,000 <sup>c</sup>	360,000
Chile, pumice and pozzolan	816,565	826,779	800,031 <sup>r</sup>	808,879 <sup>r</sup>	830,000
Croatia, volcanic tuff <sup>c</sup>	15,000	20,000	20,000	20,000	20,000
Dominica, pumice and volcanic tuff <sup>c</sup>	100,000	100,000	100,000	100,000	100,000
Ecuador, pumice <sup>c</sup>	175,000 <sup>r</sup>	175,000 <sup>r</sup>	175,000 <sup>r</sup>	175,000 <sup>r</sup>	175,000
Eritrea, pumice	73 <sup>r</sup>	75	76 <sup>r</sup>	76 <sup>r</sup>	75
Ethiopia <sup>e, 5</sup>	254,152 <sup>4</sup>	330,000 <sup>r</sup>	460,000 <sup>r</sup>	630,000 <sup>r</sup>	600,000
France, pozzolan and lapilli	276,000	276,000	276,000	276,000	276,000
Greece:					
Pozzolan, Santorin earth	350,000 <sup>r</sup>	285,000 <sup>r</sup>	266,000 <sup>r</sup>	270,000 <sup>r</sup>	290,000
Pumice	468,960 <sup>r</sup>	281,000 <sup>r</sup>	420,000	429,872 <sup>r</sup>	430,000
Guadeloupe, pumice	210,000	200,000	200,000	200,000	200,000
Guatemala, pumice	1,447,528 <sup>r</sup>	406,817 <sup>r</sup>	90,701 <sup>r</sup>	79,969	80,000
Iceland, pumice <sup>c</sup>	100,000	100,000	100,000	100,000	100,000
Italy: <sup>c</sup>					
Pozzolan	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000
Pumice and pumiceous lapilli	30,000	30,000	28,000	28,000	43,000
Jamaica, pozzolan	130,000	107,000	112,000	129,171 <sup>4</sup>	129,000
Kosovo, volcanic tuff <sup>6</sup>	59,300 <sup>r</sup>	--	--	--	--
Macedonia, volcanic tuff	57,356	52,911	67,663 <sup>r</sup>	65,504 <sup>r</sup>	68,000
New Zealand	229,268	77,414	93,865 <sup>r</sup>	68,835 <sup>r</sup>	68,800
Philippines:					
Pumice	2,797	2,895 <sup>r</sup>	5,566 <sup>r</sup>	6,018 <sup>r</sup>	6,000
Volcanic tuff	22,106	22,295 <sup>r</sup>	26,930 <sup>r</sup>	28,884 <sup>r</sup>	28,900
Saudi Arabia, pozzolan	961,000 <sup>r</sup>	941,000 <sup>r</sup>	460,000 <sup>r</sup>	480,000 <sup>r</sup>	480,000
Slovenia, volcanic tuff <sup>c</sup>	40,000	35,000	35,000	35,000	35,000
Spain, including Canary Islands <sup>c</sup>	303,462 <sup>4</sup>	194,655 <sup>4</sup>	195,000	195,000	195,000
Syria, volcanic tuff	809,000	485,000	300,000 <sup>r</sup>	257,000 <sup>r</sup>	257,000
Tanzania, pozzolan materials	113,489	75,193	52,349 <sup>r</sup>	68,925	69,000
Turkey	5,822,501	4,556,632 <sup>r</sup>	5,159,047 <sup>r</sup>	6,710,170 <sup>r</sup>	6,700,000
Uganda, pozzolan materials	690,911 <sup>r</sup>	650,324 <sup>r</sup>	623,471 <sup>r</sup>	742,425 <sup>r</sup>	742,000
United States, pumice, sold and used by producers <sup>5</sup>	343,000	338,000	269,000	269,000 <sup>r</sup>	310,000
Total	18,400,000 <sup>r</sup>	15,300,000 <sup>r</sup>	15,100,000 <sup>r</sup>	16,900,000 <sup>r</sup>	16,900,000
Of which:					
Pozzolan	6,810,000 <sup>r</sup>	6,780,000 <sup>r</sup>	6,270,000 <sup>r</sup>	6,370,000 <sup>r</sup>	6,420,000
Pumice	2,780,000 <sup>r</sup>	1,540,000 <sup>r</sup>	1,300,000 <sup>r</sup>	1,290,000 <sup>r</sup>	1,350,000
Volcanic tuff	1,010,000 <sup>r</sup>	615,000	450,000 <sup>r</sup>	406,000 <sup>r</sup>	409,000
Unspecified	7,800,000	6,360,000 <sup>r</sup>	7,080,000 <sup>r</sup>	8,790,000 <sup>r</sup>	8,770,000

<sup>c</sup>Estimated. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>World 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>Includes data available through September 1, 2016.

<sup>3</sup>Pumice and related materials also are produced in a number of other countries, including Iran, Martinique, and Mexico, but available information is inadequate for the formulation of reliable estimates of output levels.

<sup>4</sup>Reported figure.

<sup>5</sup>Data are for year ending July 7 of that stated.

<sup>6</sup>Converted from reported data, in cubic meters, as follows: 2011—65,930 (revised); 2012—zero; 2013—zero; 2014—zero; and 2015—zero.

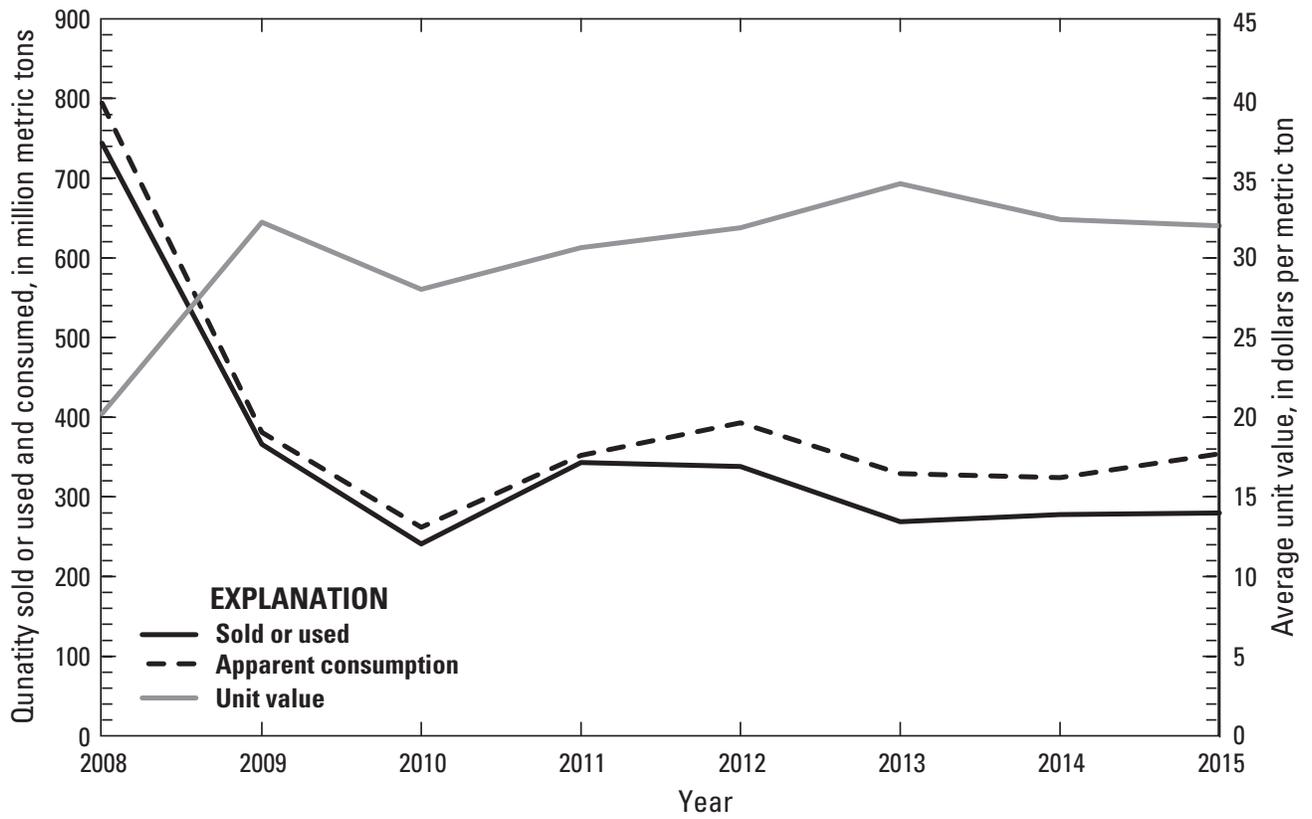


Figure 1. Pumice and pumicite sold or used, apparent consumption, and average unit value for 2008 through 2015.