



# 2014 Minerals Yearbook

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**PUMICE [ADVANCE RELEASE]**

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# PUMICE AND PUMICITE

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In 2014, U.S. pumice and pumicite production was 278,000 metric tons (t). This was 3% more than that of 2013, when the United States produced 269,000 t. The overall value of pumice production in 2014 was \$9.0 million, a decrease of 3% from that in 2013. The apparent consumption of pumice and pumicite in the United States in 2014 was 324,000 t, a slight decrease compared with that of 2013. Imports decreased by 16% to 60,000 t. Exports increased to 14,000 t in 2014, an increase of 8% from that of 2013. Pumice imports and exports are relatively small compared to U.S. apparent consumption and are subject to large annual fluctuations in terms of percentage. World production of pumice and related material, the bulk of which was pozzolan, was 16.8 million metric tons (Mt) in 2014 (tables 1, 4).

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 2014, 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 canvass for 2014 included 11 companies with 11 active operations that produced, used, or sold pumice and pumicite in the United States. Ten of the 11 companies responded to the canvass. Kansas Minerals, Inc., formerly operated in Mankato, KS, was sold to the local governing agency, Jewell County (Jewell County Record, 2014).

Production data for the single nonrespondent were estimated from reported prior-year information adjusted to current employment and production trends, coupled with Mine Safety and Health Administration employment records. 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 278,000 t was valued at \$9.0 million. States that produced pumice or pumicite were, in order of decreasing production, Oregon, Idaho, California, New Mexico, Kansas, and Oklahoma.

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 2014, 132,000 t, or 47% of the pumice and pumicite produced in the United States, was used for building and decorative blocks (table 2). This was a 13% decrease from that of 2013. Pumice used for horticultural and landscaping purposes was 23% of the total 2014 pumice production. 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, 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 2014 varied greatly by use compared with the average price for all uses in 2013. The overall average value reported for all pumice and pumicite products decreased by 6% to \$32.41 per metric ton in 2014 from \$34.64 per ton in 2013 (table 1). The unit value for building and decorative blocks increased by 24% in 2014 to \$16.53 from the 2013 value of \$13.36 per ton (table 2). The price for horticulture and landscaping pumice was reported to be \$26.22 in 2014. As with the production data regarding end-use products, value information pertaining to the categories of abrasives, concrete admixture and aggregate, and other per metric ton are withheld in order to avoid disclosing company proprietary data.

## Foreign Trade

Export and import data are from the U.S. Census Bureau. The trade data were published under subheading 2513.10 of the Harmonized Tariff Schedule of the United States (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, remained virtually unchanged at approximately 14,000 t, with a value of \$7.4 million in 2014, or about \$520 per ton. Canada received 39% of 2014 exports, followed by Hong Kong with 12%, Italy with 7%, and the United Kingdom and Japan with 5% each. Smaller quantities of pumice and pumice products were exported to 44 other countries.

Imports of crude or unmanufactured pumice and pumicite in 2014 decreased by 16% to 60,000 t compared with 71,800 t reported in 2013. 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, 98% came from Greece (table 3), which supplied 58,900 t of crude pumice to the United States in 2014 and remained the leading source of pumice imports. Eight other countries supplied most of the remainder of pumice and pumicite imports in 2014.

## World Review

World production of pumice and related material was 16.8 Mt in 2014, which represented a 10% decrease from 18.6 Mt in 2013. Pumice is used more extensively as a building material outside the United States, which explains 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 2014, Turkey was the leading exporter of pumice to Asia and Europe.

## Outlook

U.S. consumption of pumice and pumicite in 2015 may increase compared with that of 2014 if the U.S. residential housing sector, a major user of pumice- and pumicite-related products, experiences a rise in construction activity.

## References Cited

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- Jewell County Record, 2014, Rural resident concerned road being used as detour: *Jewell County Record* [Mankato, KS], August 7, p. 1.
- 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.

TABLE 1  
SALIENT PUMICE AND PUMICITE STATISTICS<sup>1</sup>

(Thousand metric tons and thousand dollars unless otherwise specified)

	2010	2011	2012	2013	2014	
United States:						
Sold and used by producers:						
Quantity	241	343	338	269	278	
Value <sup>2</sup>	6,760	10,500	10,800	9,320	9,020	
Average value	dollars per metric ton	28.03	30.63	31.88	34.64	32.41
Exports <sup>3</sup>	13	14	12	13	14	
Imports for consumption <sup>3</sup>	34	23	67	72	60	
Apparent consumption <sup>4</sup>	262	352	393	328 <sup>r</sup>	324	
World, production, pumice and related volcanic materials						
	16,600	19,200	18,400	18,600 <sup>e</sup>	16,800 <sup>e</sup>	

<sup>e</sup>Estimated.

<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  
PUMICE AND PUMICITE SOLD AND USED BY PRODUCERS IN THE UNITED STATES, BY USE<sup>1</sup>

Use	2013			2014		
	Quantity (thousand metric tons)	Value (thousands)	Average unit value	Quantity (thousand metric tons)	Value (thousands)	Average unit value
Abrasives <sup>2</sup>	W	W	W	W	W	W
Building block, includes decorative block	152	\$2,470	\$13.36	132	\$2,180	\$16.53
Concrete admixture and aggregate	W	W	W	W	W	W
Horticulture and landscaping	W	1,380	W	W	1,680	W
Other <sup>3</sup>	W	W	W	W	W	W
Total or average	269	9,320	34.64	278	9,020	32.41

W Withheld to avoid disclosing company proprietary data.

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

<sup>2</sup>Includes cleaning and scouring compounds.

<sup>3</sup>Includes absorbent, diluents, fill, filter aids, laundries, pottery, road use, roofing, and other unspecified uses.

TABLE 3  
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)
2013:				
China	141	\$44	78	\$184
Germany	--	--	55	75
Greece	70,600	1,140	--	--
Iceland	--	--	351	351
Italy	8	8	--	--
Japan	44	26	54	25
Mexico	994	188	268	64
Other	--	--	(2)	14
Total	71,800	1,410	806	713
2014:				
Australia	--	--	7	79
China	18	154	22	163
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)	10
Total	60,000	1,380	162	433

-- 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 4  
PUMICE AND RELATED MATERIALS: WORLD PRODUCTION, BY COUNTRY<sup>1,2</sup>

(Metric tons)

Country <sup>3</sup>	2010	2011	2012	2013 <sup>c</sup>	2014 <sup>c</sup>
Algeria, pozzolan	236,961	141,000	325,000	388,000 <sup>4</sup>	315,000
Argentina, pumice	7,582	6,445	6,252	7,000	7,000
Cameroon, pozzolan <sup>c</sup>	600,000	600,000	500,000	500,000	600,000
Chile, pumice and pozzolan	824,049	816,565	826,779	830,000	830,000
Croatia, volcanic tuff <sup>c</sup>	15,000	15,000	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: <sup>c</sup>					
Pumice	718,908 <sup>4</sup>	791,581 <sup>4</sup>	500,000	500,000	500,000
Pozzolan	640,620 <sup>4</sup>	600,000	550,000	550,000	550,000
Eritrea, pumice <sup>c</sup>	65	70	75	75	75
Ethiopia <sup>5</sup>	128,106	254,152	320,000 <sup>c</sup>	420,000	420,000
France, pozzolan and lapilli <sup>c</sup>	276,000	276,000	276,000	276,000	276,000
Greece: <sup>c</sup>					
Pumice	380,000	375,000	375,000	420,000	430,000
Pozzolan, Santorin earth	900,000	850,000	800,000	800,000	800,000
Guadeloupe, pumice <sup>c</sup>	200,000	210,000	200,000	200,000	200,000
Guatemala, pumice	25,568	945,618	1,416,236	1,416,000	79,969 <sup>4</sup>
Iceland, pumice <sup>c</sup>	100,000	100,000	100,000	100,000	100,000
Italy: <sup>c</sup>					
Pumice and pumiceous lapilli	30,000	30,000	30,000	28,000	28,000
Pozzolan	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000
Jamaica, pozzolan	140,000	130,000	107,000	112,000 <sup>4</sup>	129,171 <sup>4</sup>
Kosovo, volcanic tuff <sup>c,6</sup>	60,000	60,000	--	--	--
Macedonia, volcanic tuff	113,323	57,356	52,911	53,000	67,663 <sup>4</sup>
New Zealand	118,249	229,268	77,414	100,000	100,000
Philippines:					
Pumice	2,274	2,797	2,800	2,800	2,800
Volcanic tuff	19,166	22,106	22,200	22,200	22,200
Saudi Arabia, pozzolan	915,000	1,010,000 <sup>c</sup>	1,061,000	1,000,000	1,000,000
Slovenia, volcanic tuff	40,000	40,000	35,000	35,000	35,000
Spain, including Canary Islands	432,364	303,462	194,655	195,000	195,000
Syria, volcanic tuff	910,000	809,000	485,000	324,000 <sup>4</sup>	324,000
Tanzania, pozzolanic materials	60,230	113,489	75,193	75,000	68,925 <sup>4</sup>
Turkey	4,198,751	5,822,501	5,500,000 <sup>c</sup>	5,700,000	5,200,000
Uganda, pozzolanic materials <sup>c</sup>	140,000	140,000	125,000	125,000	125,000
United States, pumice, sold and used by producers <sup>4</sup>	241,000	343,000	338,000	269,000	278,000
Grand total	16,600,000	19,200,000	18,400,000	18,600,000	16,800,000
Of which:					
Pumice	1,710,000	2,800,000	2,970,000	2,940,000	1,630,000
Pozzolan	7,630,000 <sup>r</sup>	7,580,000 <sup>r</sup>	7,540,000 <sup>r</sup>	7,550,000 <sup>r</sup>	7,590,000
Volcanic tuff	1,160,000	1,000,000	615,000	454,000	469,000
Unspecified	6,080,000 <sup>r</sup>	7,800,000 <sup>r</sup>	7,290,000 <sup>r</sup>	7,620,000 <sup>r</sup>	7,120,000

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

<sup>1</sup>Grand 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 December 9, 2015.

<sup>3</sup>Pumice and related materials also are produced in a number of other countries, including China, Honduras, Iran, Japan, 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: 2010—93,800 (estimated); 2011—93,800 (estimated); 2012—zero (revised); 2013—zero (revised); and 2014—zero.