



2012 Minerals Yearbook

PUMICE AND PUMICITE

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In 2012, U.S. pumice and pumicite production was 397,000 metric tons (t). This was essentially unchanged from that of 2011, when the United States produced 398,000 t. The overall value of pumice production in 2012 was \$11.1 million, an increase of 3% from that in 2011. As the U.S. housing and construction industries continued to recover following the economic recession of 2008–09, pumice consumption, which is largely based on the production of building block and concrete, continued along a similar, if modest, path of resurgence. For comparative purposes, the 2012 production total remained 47% less than the overall 2008 production total of 744,000 t. The apparent consumption of pumice and pumicite in the United States in 2012 was 451,000 t, an increase of 11% compared with that of 2011. Imports nearly tripled to 67,000 t. Exports of 12,000 t represented a decrease of 14% compared with 14,000 t of exported pumice and pumicite in 2011. Pumice imports and exports represent relatively small amounts of U.S. apparent consumption and are subject to large annual fluctuations in terms of percentage. World production of pumice and related material was 16.5 Mt in 2012 (table 1).

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 2012, other major applications included abrasives, horticulture (including landscaping), and roofing. Minor applications incorporated the use of pumice as an absorbent, as a concrete aggregate and admixture, as a filter aid, and as 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, and a variety of heavy-duty hand cleaners. Imports were primarily used as raw material for blocks 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 review of U.S. pumice- and pumicite-producing sites and company operations. The canvass for 2012

included 11 companies with 12 active operations that produced, used, or sold pumice and pumicite in the United States. Ten of the 11 companies responded to the canvass. Data from the single nonrespondent producer, which stopped production in 2012 and later declared bankruptcy, were estimated from reported prior-year information adjusted to current employment and consumption 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 397,000 t was valued at \$11.1 million. States that produced pumice and pumicite were, in order of decreasing production, Oregon, Idaho, Arizona, California, 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 2012, 149,000 t, or 38% of the pumice and pumicite produced in the United States, was used for building and decorative blocks. This was a slight decrease from that of 2011. Pumice used for horticultural and landscaping purposes in 2012 decreased to 149,000 t from the 2011 reported total of 161,000 t. As a result of relatively small production totals, variations in pumice-use categories are subject to large annual fluctuations in terms of percentage. Horticultural and landscaping applications accounted for 38% of total consumption in 2012. Pumice and pumicite for concrete admixture and aggregate increased by 54% to 60,000 t in 2012 from 39,000 t in 2011 and accounted for 15% of consumption. Pumice used as an abrasive in 2012 increased by 20% to a total of 30,000 t, which accounted for 8% of consumption. The amount of pumice reported sold or used by several low-volume markets or for unreported uses grouped in the “other” category decreased by 55% to 10,000 t in 2012 from 22,000 t in 2011 and accounted for 3% of consumption (table 2). “Other” uses included absorbent (including pet litter), chinchilla chew stones, cosmetics, diluents, engineered fill, filter aids, geotechnical aids, pottery clays, highway snow control, road construction, and other unspecified uses. Several substitutes exist for pumice in agriculture, horticulture, as an aggregate, as a concrete additive, and in other end products.

Prices

As a result of the small number of pumice producers, coupled with producer-specific end-use products, the average prices

reported for pumice and pumicite in 2012 varied greatly by use compared with the average price for all uses in 2011. The overall average prices reported for all pumice and pumicite products increased by 3% to \$27.97 per metric ton in 2012 from \$27.22 per ton in 2011. The price change reflected increases in unit values of abrasives and horticulture and landscaping products. The unit value for the building block and decorative use category decreased by 3% to \$13.87 per ton in 2012 from \$14.30 per ton in 2011. The average price for pumice and pumicite used for horticultural and landscaping increased slightly to \$20.01 per ton in 2012 from \$19.66 per ton in 2011. The average price in 2011 for pumice and pumicite used in nonspecialty applications was \$126.63 per ton, a ten-fold increase from the reported amount of \$11.27 per ton in 2011. The large discrepancy was likely the result of producer reporting changes, which included specialty abrasives that were categorized as “other” in 2011. For concrete admixture and aggregates, \$35.46 per ton was reported for 2012, an decrease of 19% from the 2011 value of \$43.68 per ton. For other uses, the 2012 unit value of \$21.03 per ton was 87% less than the \$158.54 unit value reported in 2011 (table 2). As with the unit-value for abrasives, the noted decrease in other uses was likely the consequence of the increase in value for abrasives.

Foreign Trade

Export and import data presented here, which are from the U.S. Census Bureau, are non-specific. This is a result of a lack of detail for materials specified in the 2012 Harmonized Tariff Schedule of the United States (HTS), as issued by the U.S. International Trade Commission. The trade data were published under subheading 2513.10 of the 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 to approximately 12,000 t, with a value of \$6.83 million in 2012, or about \$547 per ton. This was a 13% decrease in tonnage from the 14,000 t valued at \$6.42 million in 2011. Canada accounted for 31% of 2012 exports, followed by Hong Kong with 12%, Italy with 8%, China with 7%, and the United Kingdom with 6%. Smaller quantities of pumice and pumice products were exported to 45 other countries.

Imports of crude or unmanufactured pumice and pumicite in 2012 nearly tripled to 66,700 t compared with 22,600 t reported in 2011. 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. Ninety-nine percent of imported crude pumice came from Greece (table 3), which supplied 66,000 t of crude pumice to the United States in 2012 and remained the leading source of pumice imports. Ten other countries supplied the remainder of pumice and pumicite imports in 2012.

World Review

World production of pumice and related material was 16.5 Mt in 2012, which was 7% less than the 17.6 Mt produced in 2011. Pumice is used more extensively as a building material outside the United States, which helps to explain 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 light-weight concrete walls 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 2012, Turkey was the leading exporter of pumice to Asia, Europe, and the United States.

Outlook

U.S. consumption of pumice and pumicite in 2013 may increase compared with that of 2012, as the U.S. residential housing sector, a major user of pumice- and pumicite-related products, continues to recover.

References Cited

- Bryan, S.E., Cook, A., 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, no. 1–2, October, p. 135–154.
- Harben, P.W., and Bates, R.L., 1984, *Geology of the nonmetals*: 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

- 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 STATISTICS¹

(Thousand metric tons and thousand dollars unless otherwise specified)

	2008	2009	2010	2011	2012	
United States:						
Sold and used by producers:						
Quantity	744 ^r	384 ^r	296 ^r	398 ^r	397	
Value ²	15,000 ^r	12,000 ^r	7,080 ^r	10,800 ^r	11,100	
Average value	dollars per metric ton	20.21 ^r	31.14 ^r	23.91 ^r	27.22 ^r	27.97
Exports ³	15	11	13	14	12	
Imports for consumption ³	65	26	34	23	67	
Apparent consumption ⁴	794 ^r	399 ^r	317 ^r	406 ^r	451	
World, production, pumice and related volcanic materials ^e	16,700 ^r	16,400 ^r	16,000 ^r	17,600 ^r	16,500	

^eEstimated. ^rRevised.

¹Data 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
PUMICE AND PUMICITE SOLD AND USED BY PRODUCERS IN THE UNITED STATES, BY USE¹

Use	2011			2012		
	Quantity (thousand metric tons)	Value (thousands)	Average unit value	Quantity (thousand metric tons)	Value (thousands)	Average unit value
Abrasives ²	25	\$278	\$11.27	30	\$3,740	\$126.63
Building block, includes decorative block	151 ^r	\$2,170 ^r	14.30 ^r	149	2,070	13.87
Concrete admixture and aggregate	39	1,680 ^r	43.68 ^r	60	2,110	35.46
Horticulture and landscaping	161	3,160 ^r	19.66 ^r	149	2,980	20.01
Other ³	22	3,540	158.54 ^r	10	215	21.03
Total or average	398 ^r	10,800 ^r	27.22 ^r	397	11,100	27.97

^rRevised.

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

²Includes cleaning and scouring compounds.

³Includes 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 COUNTRY¹

Country	Crude or unmanufactured		Wholly or partly manufactured	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2011:				
China	5	\$6	30	\$320
Germany	7	3	55	76
Greece	22,300	402	--	--
Ireland	--	--	236	236
Japan	40	27	15	11
Mexico	331	56	178	49
Turkey	--	--	7	7
Other	--	--	(2)	21
Total	22,600	494	521	721
2012:				
Australia	--	--	3	31
China	1	4	215	165
Germany	20	14	78	81
Greece	66,000	1,070	--	--
Iceland	--	--	7,910	349
Japan	57	34	14	7
Mexico	641	110	164	43
Other	--	--	2	35
Total	66,700	1,230	8,390	711

-- Zero.

¹Data 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 4
PUMICE AND RELATED MATERIALS: ESTIMATED WORLD PRODUCTION, BY COUNTRY^{1,2}

(Metric tons)

Country ³	2008	2009	2010	2011	2012
Algeria, pozzolan	490,567 ⁴	328,000 ⁴	236,961 ⁴	300,000	300,000
Argentina, pumice	6,500 ⁴	7,020 ⁴	7,582 ⁴	6,445 ^{r,4}	7,000
Burkina Faso	10,000	10,000	10,000	10,000	10,000
Cameroon, pozzolan	600,000	600,000	600,000	600,000	500,000
Chile, pumice and pozzolan	1,063,176 ⁴	919,249 ⁴	824,049 ⁴	816,565 ^{r,4}	820,000
Croatia, volcanic tuff	15,000	15,000	15,000	15,000	15,000
Dominica, pumice and volcanic tuff	100,000	100,000	100,000	100,000	100,000
Ecuador:					
Pumice	137,141 ^{r,4}	44,171 ⁴	100,000 ^r	100,000	100,000
Pozzolan	803,503 ^{r,4}	884,774 ^{r,4}	640,620 ⁴	600,000 ^r	550,000
Eritrea, pumice	60	60	60	60	50
Ethiopia ⁵	35,000 ⁴	250,000 ^r	350,000 ^r	350,000 ^r	350,000
France, pozzolan and lapilli	276,000	276,000	276,000	276,000	276,000
Greece:					
Pumice	828,000 ⁴	381,000	380,000	375,000	375,000
Pozzolan, Santorin earth	1,059,000 ⁴	830,000	900,000	850,000	800,000
Guadeloupe, pumice	210,000	200,000	200,000	210,000	200,000
Guatemala, pumice	393,779 ⁴	394,955 ⁴	340,000	150,000	150,000
Iceland:					
Pumice	100,000	100,000	100,000	100,000	100,000
Scoria	1,000	1,000	1,000	1,000	1,000
Italy:					
Pumice and pumiceous lapilli	20,000	20,000	20,000	20,000	20,000
Pozzolan	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
Jamaica, pozzolan	124,304 ⁴	132,470 ⁴	125,000	125,000	125,000
Kosovo, volcanic tuff ^{6,7}	45,005 ^{r,4}	58,788 ^{r,4}	60,000 ^r	60,000 ^r	60,000
Macedonia, volcanic tuff	103,476 ⁴	113,064 ⁴	113,323 ^{r,4}	57,356 ^{r,4}	60,000
Martinique, pumice	130,000	130,000	130,000	130,000	130,000
New Zealand	174,729 ⁴	159,357 ⁴	118,249 ⁴	229,268 ^{r,4}	200,000
Philippines:					
Pumice	2,063 ⁴	2,064 ⁴	2,274 ⁴	2,797 ^{r,4}	2,800
Volcanic tuff	17,570 ⁴	18,830 ⁴	19,166 ⁴	22,106 ^{r,4}	22,200
Saudi Arabia, pozzolan and scoria	810,000 ⁴	802,000 ^{r,4}	915,000 ⁴	1,000,000 ^r	1,000,000
Slovenia, volcanic tuff	40,000	40,000	40,000	40,000	35,000
Spain, including Canary Islands	600,000	600,000	600,000	600,000	600,000
Syria, volcanic tuff	901,000 ⁴	957,639 ⁴	950,000	900,000	300,000
Tanzania, pozzolanic materials	260,403 ⁴	171,904 ⁴	199,698 ^{r,4}	222,592 ^{r,4}	230,000
Turkey	3,449,773 ⁴	4,322,543 ⁴	4,198,751 ^{r,4}	5,822,501 ^{r,4}	5,500,000
Uganda, pozzolanic materials	140,000	140,000	140,000	140,000	125,000
United States, pumice, sold and used by producers ⁴	744,000 ^r	384,000 ^r	296,000 ^r	398,000 ^r	397,000
Grand total	16,700,000 ^r	16,400,000 ^r	16,000,000 ^r	17,600,000 ^r	16,500,000
Of which:					
Pumice	2,550,000 ^r	1,640,000 ^r	1,560,000 ^r	1,470,000 ^r	1,460,000
Pozzolan	6,480,000 ^r	6,090,000 ^r	5,840,000 ^r	5,840,000 ^r	5,630,000
Scoria	1,000	1,000	1,000	1,000	1,000
Volcanic tuff	1,120,000	1,200,000	1,200,000 ^r	1,090,000 ^r	492,000
Unspecified	6,540,000 ^r	7,460,000 ^r	7,410,000 ^r	9,220,000 ^r	8,880,000

¹Revised.

²World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

³Table includes data available through July 17, 2013.

⁴Pumice and related materials also are produced in a number of other countries, including China, Honduras, Iran, Japan, and Mexico, but available information is inadequate for the formulation of reliable estimates of output levels.

⁵Reported figure.

⁶Data are for year ending July 7 of that stated.

⁷On February 17, 2008, the Kosovo Assembly declared independence from Serbia.

⁸Converted from reported data, in cubic meters, as follows: 2008—45,005; 2009—58,788; 2010—60,000 (estimated); 2011—60,000 (estimated); and 2012—60,000 (estimated).