



# 2009 Minerals Yearbook

## PUMICE AND PUMICITE

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In 2009, U.S. pumice and pumicite production was 410,000 metric tons (t). This was a decrease of 48% compared with that of 2008, when the United States produced 791,000 t. The overall value of pumice production in 2009 was \$12.3 million, a decrease of 23% from that in 2008. The observed decreases in total production and value came as a result of the stagnant U.S. housing and construction industries, where pumice is used in building blocks, concrete, and landscaping. The apparent consumption of pumice and pumicite in the United States in 2009 was 425,000 t, a decrease of 50% compared with that of 2008. Imports decreased by 60% to 26,000 t. Exports of 11,000 t represented a decrease of approximately 27% compared with 15,000 t of exported pumice and pumicite in 2008 (table 1). Pumice imports and exports represent relatively small amounts of U.S. apparent consumption and are subject to large annual fluctuations in terms of percentage.

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). The low density allows some pumice to float on water. Large pumice rafts, 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 0.10 inch [4 millimeters (mm)] 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 2009, other major applications included abrasives, horticulture (including landscaping), and stonewashing of denim. 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 2009 included 15 companies with 17 active operations that produced, used, or sold pumice and pumicite in the United States. All 15 companies responded, accounting for 100% of the 410,000 t

produced in 2009. 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 410,000 t was valued at \$12.3 million. Pumice and pumicite were produced in seven States in 2009, with 26% of production from California, followed by Oregon with 24%, and New Mexico with 21%. Other States that produced pumice, in order of decreasing production, were Idaho, Nevada, Arizona, 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 2009, more than 239,000 t, or 58% of the pumice and pumicite produced in the United States, was used for building and decorative blocks (table 2). This was a 62% decrease from that of 2008. Pumice used for horticultural and landscaping purposes in 2009 increased by 120% to 101,000 t from the 2008 reported total of 46,000 t. Horticultural and landscaping applications accounted for 25% of total consumption in 2009. Pumice and pumicite for concrete admixture and aggregate decreased by 32% to 28,000 t in 2009 from 41,000 t in 2008 and accounted for 7% of consumption. Pumice used as an abrasive in 2009 decreased by 64% to a total of 8,000 t, which accounted for 2% 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 45% to 34,000 t in 2009 from 62,000 t in 2008 and accounted for 8% of consumption. “Other” uses nominally included absorbent (including pet litter), cosmetics, diluents, engineered fill, filter aids, geotechnical aids, pottery clays, highway snow control, and other unspecified uses. There are several substitutes for pumice in agriculture, horticulture, as an aggregate, as a concrete additive, and other end products.

## Prices

As a result of a small pumice-producing community, coupled with producer-specific end-use products, the average prices reported for pumice and pumicite in 2009 varied greatly by use compared with the average price for all uses in 2008. The overall average prices reported for all pumice and pumicite products increased by 49% to \$29.97 per metric ton in 2009 from \$20.13 per ton in 2008. The price change reflected the increases in unit values of specialty abrasive products, building block, and concrete admixture and aggregate. Decreases in the

unit values of pumice were seen in nonspecialty abrasives and in horticulture and landscaping. The unit value of the building block and decorative use category increased by 80% to \$23.13 per ton in 2009 from \$12.86 per ton in 2008. This large increase was the result of a significant production drop, coupled with higher prices from the fewer producers that continued to manufacture products in this category. The average price for pumice and pumicite used for horticultural and landscaping decreased by 24% to \$29.57 per ton in 2009 from \$38.89 per ton in 2008. The average price in 2009 for pumice and pumicite used in nonspecialty abrasive applications was \$9.38 per ton, a drop of 85% from the reported amount of \$60.95 per ton in 2008. This significant decrease was caused by a single company's production cessation of this product. For concrete admixture and aggregates, \$29.93 per ton was reported for 2009, an increase of 11% from the 2008 value of \$26.90 per ton. For other uses, the 2009 unit value of \$84.97 per ton was 42% more than the \$60.06 unit value reported in 2008 (table 2).

### Foreign Trade

Export and import data presented here, which are from the U.S. Census Bureau, are of limited accuracy. This is a result of inconsistencies in producer reporting, coupled with a lack of detail for materials specified in the 2009 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 11,000 t, with a value of \$5.1 million in 2009, or about \$465 per ton. This was a 27% decrease in tonnage from the 15,000 t valued at \$7.2 million in 2008. Canada accounted for 30% of 2009 exports, followed by Hong Kong with 13%, China with 12%, the United Kingdom with 9%, Italy with 8%, and the United Arab Emirates with 5%. Small amounts of pumice and pumice products were exported to 57 other countries.

Imports of crude or unmanufactured pumice and pumicite in 2009 decreased by 60% to 26,000 t compared with 65,000 t reported in 2008. By volume, most imports of pumice and pumicite were raw materials for blocks and lightweight aggregate in construction-related uses, with smaller amounts used in a range of abrasives and for stonewashing denim. Eighty-one percent of imported crude pumice came from Greece (table 3), which supplied 21,000 t of crude pumice to the United States in 2009 and remained the leading source of pumice imports. Pumice from Montserrat totaled 3,600 t, or 14% of total imported pumice, in 2009. Twelve other countries supplied small amounts of pumice and pumicite in 2009. Italy, which had been a major source of pumice into the United States until 2007, provided small amounts in 2009 owing to the continued closure of the mining facilities of Pumex S.p.A. on the island of Lipari.

### World Review

Pumice is used more extensively as a building material outside the United States, which helps to explain the large global production and sales of pumice. 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 lightweight, strength, and cementitious properties, pumice and pumicite perform well in European-style construction. In 2009, Greece was the leading exporter of pumice to Asia, Europe, and the United States.

### Outlook

U.S. consumption of pumice and pumicite in 2010 was expected to remain static or could continue to decrease compared with that of 2009, largely owing to the status of the U.S. residential housing sector, a major user of pumice- and pumicite-related products. Imports and exports were likewise expected to remain about the same or decrease in 2010 for similar reasons.

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### 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 STATISTICS<sup>1</sup>

(Thousand metric tons and thousand dollars unless otherwise specified)

	2005	2006	2007	2008	2009
United States:					
Sold and used by producers:					
Quantity	1,270	1,540	1,270	791	410
Value <sup>2</sup>	39,300	44,300	28,900	15,900	12,300
Average value      dollars per metric ton	31.00	28.85	22.85	20.13	29.97
Exports <sup>3</sup>	15	18	9	15	11
Imports for consumption <sup>3</sup>	240	109	37	65	26
Apparent consumption <sup>4</sup>	1,490	1,630	1,290	841	425
World, production, pumice and related volcanic materials					
	18,300 <sup>r</sup>	20,400 <sup>r</sup>	20,700	18,900 <sup>r</sup>	17,200 <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  
PUMICE AND PUMICITE SOLD AND USED BY PRODUCERS IN THE UNITED STATES, BY USE<sup>1</sup>

Use	2008			2009		
	Quantity (thousand metric tons)	Value (thousands)	Average unit value	Quantity (thousand metric tons)	Value (thousands)	Average unit value
Abrasives <sup>2</sup>	22	\$1,340	\$60.95	8	\$78	\$9.38
Building block, includes decorative block	620	7,970	12.86	239	5,540	23.13
Concrete admixture and aggregate	41	1,100	26.90	28	826	29.93
Horticulture and landscaping	46	1,790	38.89	101	2,980	29.57
Other <sup>3</sup>	62	3,720	60.06	34	2,870	84.97
Total or average	791	15,900	20.13	410	12,300	29.97

<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, 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)
2008:				
Austria	(2)	11	(2)	5
China	53	127	198	779
Germany	--	--	119	212
Greece	55,700	2,120	52	707
Iceland	5,950	230	--	--
Italy	--	--	19	39
Mexico	1,550	210	33	8
Poland	1,640	184	(2)	11
Other	47	13	15	127
Total	65,000	2,890	436	1,890
2009:				
Austria	--	--	(2)	11
China	9	49	74	307
Germany	--	--	68	70
Greece	21,000	367	20	289
Italy	--	--	(2)	3
Mexico	1,360	209	86	19
Montserrat	3,600	130	--	--
Poland	--	--	6	98
Other	68	29	4	35
Total	26,000	784	258	832

-- 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>	2005	2006	2007	2008	2009 <sup>c</sup>
Algeria, pozzolan	494,000	433,190	570,000	490,567 <sup>r</sup>	500,000
Argentina, pumice	15,361	17,665	16,200	6,500 <sup>r</sup>	7,020 <sup>4</sup>
Austria, trass	2,943	--	--	--	--
Burkina Faso <sup>e</sup>	10,000	10,000	10,000	10,000	10,000
Cameroon, pozzolan <sup>e</sup>	600,000	600,000	600,000	600,000	600,000
Chile, pumice and pozzolan	1,620,099	1,423,144	1,135,771	1,063,176 <sup>r</sup>	919,000 <sup>4</sup>
Costa Rica <sup>e</sup>	8,000	8,000	--	--	--
Croatia, volcanic tuff	20,988	17,157	15,085 <sup>r</sup>	15,000 <sup>r,e</sup>	15,000
Dominica, pumice and volcanic ash <sup>e</sup>	100,000	100,000	100,000	100,000	100,000
Ecuador:					
Pozzolan	540,318	700,007	582,560	600,000 <sup>e</sup>	500,000
Pumice	107,178	8,730	153,500	150,000 <sup>e</sup>	100,000
El Salvador, pozzolan <sup>e</sup>	223,000	223,000	223,000	223,000	200,000
Eritrea, pumice	23 <sup>r</sup>	1,072 <sup>r</sup>	55 <sup>r</sup>	60 <sup>r,e</sup>	60
Ethiopia <sup>5</sup>	255,334	255,622	22,000 <sup>r</sup>	35,000 <sup>r</sup>	35,000
France, pozzolan and lapilli <sup>e</sup>	400,000	272,000	250,000	276,000	276,000
Greece: <sup>e</sup>					
Pozzolan, Santorin earth	1,400,000	1,400,000	1,400,000	1,059,000 <sup>r,4</sup>	830,000 <sup>4</sup>
Pumice	850,000	850,000	850,000	828,000 <sup>r,4</sup>	381,000 <sup>4</sup>
Guadeloupe, pumice <sup>e</sup>	210,000	210,000	210,000	210,000	200,000
Guatemala, pumice	82,118	447,184	220,389	395,299 <sup>r</sup>	394,955 <sup>4</sup>
Honduras, pozzolan <sup>e</sup>	100,000	100,000	100,000	100,000	100,000
Iceland: <sup>e</sup>					
Pumice	50,000	105,000 <sup>4</sup>	100,000	100,000	100,000
Scoria	1,000	1,000	1,000	1,000	1,000
Iran <sup>e</sup>	1,500,000 <sup>4</sup>	1,400,000	1,500,000	1,500,000	1,500,000
Italy: <sup>e</sup>					
Pozzolan	4,000,000	4,000,000	4,000,000	3,000,000	3,000,000
Pumice and pumiceous lapilli	28,000	20,000	20,000	20,000	20,000
Jamaica, pozzolan	--	149,279	114,482	124,304	132,470 <sup>4</sup>
Kosovo, volcanic tuff	-- <sup>6</sup>	-- <sup>6</sup>	-- <sup>6</sup>	39,631 <sup>r,7</sup>	51,769 <sup>4,7</sup>
Macedonia, volcanic tuff	50,000 <sup>e</sup>	60,000 <sup>r,e</sup>	80,910 <sup>r</sup>	103,476 <sup>r</sup>	113,064 <sup>4</sup>
Martinique, pumice <sup>e</sup>	130,000	130,000	130,000	130,000	130,000
New Zealand	245,080	303,659	354,903	174,729 <sup>r</sup>	200,000
Philippines:					
Pumice	--	1,917	1,912	2,063	2,064 <sup>4</sup>
Volcanic tuff	17,850	17,590	16,490	17,570	18,830 <sup>4</sup>
Saudi Arabia, pozzolan <sup>e</sup>	372,000	400,000	784,000 <sup>4</sup>	810,000 <sup>r</sup>	800,000
Serbia, volcanic tuff <sup>e</sup>	100,000 <sup>8</sup>	100,000	100,000	100,000	100,000
Slovenia, volcanic tuff <sup>e</sup>	40,000	40,000	40,000	40,000	40,000
Spain, including Canary Islands <sup>e</sup>	600,000	600,000	600,000	600,000	600,000
Syria, volcanic tuff <sup>e</sup>	650,000	650,000	810,000 <sup>r</sup>	901,000 <sup>4</sup>	957,639 <sup>4</sup>
Tanzania, pozzolanic materials	163,499	129,295	184,070	180,000 <sup>e</sup>	180,000
Turkey	1,860,037	3,515,644	3,995,423	4,000,000 <sup>e</sup>	3,500,000
Uganda, pozzolanic materials <sup>e</sup>	140,000	140,000	140,000	140,000	140,000

See footnotes at end of table.

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

(Metric tons)					
Country <sup>3</sup>	2005	2006	2007	2008	2009 <sup>6</sup>
United States, pumice, sold and used by producers	1,270,000	1,540,000	1,270,000	791,000	410,000 <sup>4</sup>
Grand total	18,300,000 <sup>r</sup>	20,400,000 <sup>r</sup>	20,700,000	18,900,000 <sup>r</sup>	17,200,000
Of which:					
Pumice	2,710,000	3,310,000 <sup>r</sup>	2,950,000	2,610,000 <sup>r</sup>	1,720,000
Pozzolan	8,030,000	8,270,000 <sup>r</sup>	8,700,000 <sup>r</sup>	7,330,000 <sup>r</sup>	6,980,000
Trass and scoria	3,940	1,000	1,000	1,000	1,000
Volcanic tuff	879,000 <sup>r</sup>	885,000 <sup>r</sup>	1,060,000 <sup>r</sup>	1,220,000 <sup>r</sup>	1,300,000
Unspecified	6,630,000	7,910,000	7,990,000 <sup>r</sup>	7,780,000 <sup>r</sup>	7,160,000

<sup>6</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>Table includes data available through April 21, 2010.

<sup>3</sup>Pumice and related materials also are produced in a number of other countries, including China, Japan, Mexico, and the Commonwealth of Independent States, 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>On February 17, 2008, the Kosovo Assembly declared independence from Serbia. Kosovo's data for 1999–2007 is not included in Serbian statistics.

<sup>7</sup>Coverted from reported data, in cubic meters, as follows: 2008—45,005; and 2009—58,788.

<sup>8</sup>Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.