



# 2011 Minerals Yearbook

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## PUMICE

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# PUMICE AND PUMICITE

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In 2011, U.S. pumice and pumicite production was 489,000 metric tons (t). This was an increase of 25% compared with that of 2010, when the United States produced 390,000 t. The overall value of pumice production in 2011 was \$11.2 million, an increase of 43% from that in 2010. The observed increase in total production and particularly in value followed 3 years of depressed production as a result of the stagnant U.S. housing and construction industries, where pumice is used in building blocks and concrete. Despite the increase, the 2011 production total remained 61% less than the overall 2007 production total of 1.27 million metric tons (Mt). The apparent consumption of pumice and pumicite in the United States in 2011 was 498,000 t, an increase of 21% compared with that of 2010. Imports decreased by 32% to 23,000 t. Exports of 14,000 t represented an increase of approximately 8% compared with 13,000 t of exported pumice and pumicite in 2010. 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 17.4 Mt in 2011 (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 2011, 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 2011 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 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 489,000 t was valued at \$11.2 million. States that produced pumice and pumicite were, in order of decreasing production, Oregon, Nevada, 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 2011, 242,000 t, or 49% of the pumice and pumicite produced in the United States, was used for building and decorative blocks (table 2). This was an 10% decrease from that of 2010. Pumice used for horticultural and landscaping purposes in 2011 almost tripled to 161,000 t from the 2010 reported total of 60,000 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 33% of total consumption in 2011. Pumice and pumicite for concrete admixture and aggregate more than doubled to 39,000 t in 2011 from 16,000 t in 2010 and accounted for 8% of consumption. Pumice used as an abrasive in 2011 increased by 9% to a total of 25,000 t, which accounted for 5% of consumption. The amount of pumice reported sold or used by several low-volume markets or for unreported uses grouped in the “other” category increased by 10% to 22,000 t in 2011 from 20,000 t in 2010 and accounted for 5% of consumption. “Other” uses included absorbent (including pet litter), cosmetics, diluents, engineered fill, filter aids, geotechnical aids, pottery clays, highway snow control, road construction, 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 the small number of pumice producers, coupled with producer-specific end-use products, the average prices reported for pumice and pumicite in 2011 varied greatly by use compared with the average price for all uses in 2010. The overall average prices reported for all pumice and pumicite products increased by 14% to \$22.89 per metric ton in 2011 from \$20.00 per ton in 2010. The price change reflected increases in unit values of abrasives, concrete admixture and aggregate, and horticulture and landscaping products. The unit value for the building block and decorative use category decreased by 4% to \$11.56 per ton in 2011 from \$12.05 per ton in 2010. The average price for pumice and pumicite used for horticultural and landscaping increased by 35% to \$19.09 per ton in 2011 from \$14.11 per ton in 2010. The average price in 2011 for pumice and pumicite used in nonspecialty abrasive applications was \$11.27 per ton, an increase of 10% from the reported amount of \$10.25 per ton in 2010. For concrete admixture and aggregates, \$38.91 per ton was reported for 2011, an increase of 34% from the 2010 value of \$29.12 per ton. For other uses, the 2011 unit value of \$158.53 per ton was 8% more than the \$146.36 unit value reported in 2010 (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 a lack of detail for materials specified in the 2011 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, increased to approximately 14,000 t, with a value of \$6.42 million in 2011, or about \$447 per ton. This was an 8% increase in tonnage from the 13,000 t valued at \$5.97 million in 2010. Canada accounted for 34% of 2011 exports, followed by Hong Kong with 13%. Italy, Japan, and Trinidad and Tobago each accounted for 7%. Small amounts of pumice and pumice products were exported to 40 other countries.

Imports of crude or unmanufactured pumice and pumicite in 2011 decreased by 34% to 22,600 t compared with 34,100 t reported in 2010. 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. Ninety-eight percent of imported crude pumice came from Greece (table 3), which supplied 22,300 t of crude pumice to the United States in 2011 and remained the leading source of pumice imports. Nine other countries supplied the remainder of pumice and pumicite imports in 2011.

## World Review

World production of pumice and related material was 17.4 Mt in 2011, which was 3% more than the 16.9 Mt produced in 2010. As in the United States in 2011, the increase in world

production is attributed to a slight rebound in commercial and residential construction following the 2008 financial crisis. 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 2011, Greece was the leading exporter of pumice to Asia, Europe, and the United States.

## Outlook

U.S. consumption of pumice and pumicite in 2012 may increase compared with that of 2011, as the U.S. residential housing sector, a major user of pumice- and pumicite-related products, continues to recover.

## References Cited

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## GENERAL SOURCES OF INFORMATION

### U.S. Geological Survey Publications

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- 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)

	2007	2008	2009	2010	2011	
United States:						
Sold and used by producers:						
Quantity	1,270	791	410	390	489	
Value <sup>2</sup>	28,900	15,900	12,300	7,810	11,200	
Average value	dollars per metric ton	22.85	20.13	29.97	20.00	22.89
Exports <sup>3</sup>	9	15	11	13	14	
Imports for consumption <sup>3</sup>	35 <sup>r</sup>	65	26	34 <sup>r</sup>	23	
Apparent consumption <sup>4</sup>	1,290	841	425	411 <sup>r</sup>	498	
World, production, pumice and related volcanic materials <sup>e</sup>						
	20,500 <sup>r</sup>	18,300 <sup>r</sup>	17,700 <sup>r</sup>	16,900 <sup>r</sup>	17,400	

<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	2010			2011		
	Quantity (thousand metric tons)	Value (thousands)	Average unit value	Quantity (thousand metric tons)	Value (thousands)	Average unit value
Abrasives <sup>2</sup>	23	\$239	\$10.25	25	\$278	\$11.27
Building block, includes decorative block	270	3,260	12.05	242	2,800	11.56
Concrete admixture and aggregate	16	476	29.12	39	1,500	38.91
Horticulture and landscaping	60	842	14.11	161	3,070	19.09
Other <sup>3</sup>	20	2,990	146.36	22	3,540	158.53
Total or average	390	7,810	20.00	489	11,200	22.89

<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)
<b>2010:</b>				
China	9	\$40	54	\$278
Germany	--	--	231	131
Greece	33,200	556	41	569
Iceland	--	--	236	236
Japan	28	16	35	37
Mexico	818	146	516	118
Turkey	--	--	19	19
Other	--	--	5	41 <sup>r</sup>
<b>Total</b>	<b>34,100</b>	<b>758</b>	<b>1,140</b>	<b>1,430</b>
<b>2011:</b>				
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
<b>Total</b>	<b>22,600</b>	<b>494</b>	<b>521</b>	<b>721</b>

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

(Metric tons)

Country <sup>3</sup>	2007	2008	2009	2010	2011
Algeria, pozzolan	570,000 <sup>4</sup>	490,567 <sup>4</sup>	328,000 <sup>4</sup>	236,961 <sup>r,4</sup>	300,000
Argentina, pumice	16,200 <sup>4</sup>	6,500 <sup>4</sup>	7,020 <sup>4</sup>	7,582 <sup>r,4</sup>	7,000
Burkina Faso	10,000	10,000	10,000	10,000	10,000
Cameroon, pozzolan	600,000	600,000	600,000	600,000	600,000
Chile, pumice and pozzolan	1,135,771 <sup>4</sup>	1,063,176 <sup>4</sup>	919,249 <sup>4</sup>	824,049 <sup>r,4</sup>	850,000
Croatia, volcanic tuff	15,085 <sup>4</sup>	15,000	15,000	15,000	15,000
Dominica, pumice and volcanic tuff	100,000	100,000	100,000	100,000	100,000
Ecuador:					
Pozzolan	803,502 <sup>r,4</sup>	901,379 <sup>r,4</sup>	884,773 <sup>r,4</sup>	640,620 <sup>r,4</sup>	700,000
Pumice	153,500 <sup>4</sup>	137,241 <sup>r,4</sup>	44,171 <sup>r,4</sup>	75,000 <sup>r</sup>	100,000
El Salvador, pozzolan	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	--
Eritrea, pumice	55 <sup>4</sup>	60	60	60	60
Ethiopia <sup>5</sup>	22,000 <sup>4</sup>	35,000 <sup>4</sup>	25,000 <sup>r,4</sup>	35,000 <sup>r,4</sup>	35,000
France, pozzolan and lapilli	250,000	276,000	276,000	276,000	276,000
Greece:					
Pozzolan, Santorin earth	1,400,000	1,059,000 <sup>4</sup>	830,000	900,000	850,000
Pumice	850,000	828,000 <sup>4</sup>	381,000	380,000	375,000
Guadeloupe, pumice	210,000	210,000	200,000	200,000	210,000
Guatemala, pumice	220,389 <sup>4</sup>	393,779 <sup>4</sup>	394,955 <sup>4</sup>	340,000 <sup>r</sup>	150,000
Honduras, pozzolan	NA <sup>r</sup>	NA <sup>r</sup>	NA <sup>r</sup>	NA <sup>r</sup>	NA
Iceland:					
Pumice	100,000	100,000	100,000	100,000	100,000
Scoria	1,000	1,000	1,000	1,000	1,000
Iran	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Italy:					
Pozzolan	4,000,000	3,000,000	3,000,000	3,000,000	3,000,000
Pumice and pumiceous lapilli	20,000	20,000	20,000	20,000	20,000
Jamaica, pozzolan	114,482 <sup>4</sup>	124,304 <sup>4</sup>	132,470 <sup>4</sup>	125,000	125,000
Kosovo, volcanic tuff	NA <sup>r,6,7</sup>	39,631 <sup>r,4,7</sup>	51,769 <sup>r,4,7</sup>	52,800 <sup>r,7</sup>	52,800 <sup>7</sup>
Macedonia, volcanic tuff	80,910 <sup>4</sup>	103,476 <sup>4</sup>	113,064 <sup>4</sup>	113,000	113,000
Martinique, pumice	130,000	130,000	130,000	130,000	130,000
New Zealand	354,903 <sup>4</sup>	174,729 <sup>4</sup>	159,357 <sup>4</sup>	118,249 <sup>r,4</sup>	120,000
Philippines:					
Pumice	1,912 <sup>4</sup>	2,063 <sup>4</sup>	2,064 <sup>4</sup>	2,274 <sup>r,4</sup>	2,300
Volcanic tuff	16,490 <sup>4</sup>	17,570 <sup>4</sup>	18,830 <sup>4</sup>	19,166 <sup>r,4</sup>	19,500
Saudi Arabia, pozzolan	784,000 <sup>4</sup>	810,000	800,000	915,000 <sup>r,4</sup>	950,000
Serbia, volcanic tuff	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	--
Slovenia, volcanic tuff	40,000	40,000	40,000	40,000	40,000
Spain, including Canary Islands	600,000	600,000	600,000	600,000	600,000
Syria, volcanic tuff	810,000	901,000 <sup>4</sup>	957,639 <sup>4</sup>	950,000	900,000
Tanzania, pozzolanic materials	184,070 <sup>4</sup>	260,403 <sup>4</sup>	171,904 <sup>r,4</sup>	45,240 <sup>r,4</sup>	45,000
Turkey	3,995,423 <sup>4</sup>	3,449,773 <sup>4</sup>	4,322,543 <sup>4</sup>	4,000,000	4,500,000
Uganda, pozzolanic materials	140,000	140,000	140,000	140,000	140,000
United States, pumice, sold and used by producers <sup>4</sup>	1,270,000	791,000	410,000	390,000	489,000
Grand total	20,500,000 <sup>r</sup>	18,300,000 <sup>r</sup>	17,700,000 <sup>r</sup>	16,900,000 <sup>r</sup>	17,400,000
Of which:					
Pumice	2,950,000	2,600,000 <sup>r</sup>	1,670,000 <sup>r</sup>	1,630,000 <sup>r</sup>	1,560,000
Pozzolan	8,600,000 <sup>r</sup>	7,390,000	6,890,000 <sup>r</sup>	6,600,000 <sup>r</sup>	6,710,000
Scoria	1,000	1,000	1,000	1,000	1,000
Volcanic tuff	962,000 <sup>r</sup>	1,120,000 <sup>r</sup>	1,200,000 <sup>r</sup>	1,190,000 <sup>r</sup>	1,140,000
Unspecified	7,990,000	7,230,000	7,930,000 <sup>r</sup>	7,480,000 <sup>r</sup>	8,010,000

See footnotes at end of table.

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

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<sup>1</sup>Revised. NA Not available. -- 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 May 5, 2012.

<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 2007 are not included in Serbian statistics.

<sup>7</sup>Converted from reported data, in cubic meters, as follows: 2007—not available; 2008—45,005; 2009—58,788; 2010—60,000 (estimated); and 2011—60,000 (estimated).