



2006 Minerals Yearbook

PUMICE AND PUMICITE

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In 2006, U.S. pumice and pumicite production was 1.54 million metric tons (Mt). This was an increase of 21% compared with that of 2005 and constituted a record high year for U.S. pumice production, topping the 2004 production of 1.49 Mt, which was the previous high. The overall value of pumice production was also a record and increased to \$44.3 million in 2006 from \$39.3 million in 2005. The apparent consumption of pumice and pumicite in the United States in 2006 was 1.88 Mt, an increase of 26% compared with that of 2005. Imports increased by 52% to 365,000 metric tons (t). Exports of 22,000 t represented an increase of about 5% compared with exports of 21,000 t in 2005 (table 1).

The main use for pumice continued to be as an aggregate in lightweight building blocks and assorted building products. Other major applications for pumice and pumicite included abrasives, absorbents, concrete aggregate and admixture, filter aids, horticulture (including landscaping), stonewashing of denim, and as a traction enhancer for tires. Imports were used primarily as raw material for blocks and as a lightweight aggregate. A very small percentage of pumice imports was used in abrasive applications and cosmetics.

Domestic Data Coverage

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 2006 covered 16 companies with 17 active operations that produced and sold or used all the domestic pumice and pumicite in the United States. Only six companies responded, accounting for 61% of the 1.54 Mt produced. Sold and used data for 7 of the 10 companies that did not respond to the 2006 survey were estimated. Data are rounded to no more than three significant digits. All percentages in this report were computed based on unrounded data.

Production

U.S. pumice and pumicite production of 1.54 Mt was valued at \$44 million. Pumice and pumicite were produced in seven States in 2006, with 29% of production from Arizona followed closely by Oregon with 28%. Other States that produced pumice and pumicite were, in descending order of production, California, Idaho, New Mexico, Nevada, and Kansas.

Pumice is usually extracted by simple open pit methods using rippers, bulldozers, and front-end loaders. Processing is usually just drying, crushing, and screening, though some abrasive grades may require fine grinding and classification and blocks may be sawn into shapes and sizes.

Consumption

In 2006, more than 1.3 Mt, or 70% of apparent consumption, of the pumice and pumicite produced in the United States went into the building and decorative blocks use category (table 2). This was a 26% increase from that of 2005. Pumice used for horticultural and landscaping purposes decreased by 52% to 75,000 t in 2006 from a total of 143,000 t in 2005 and accounted for 5% of consumption. Pumice use as an abrasive was up by 10% to 45,000 t in 2006 from 41,000 t in 2005 and again accounted for 3% of consumption. Pumice and pumicite use for concrete admixture and aggregate also fell by 10% in 2006 to 27,000 t from 30,000 t in 2005 and accounted for 2% of consumption. The amount of the pumice reported sold or used by several low-volume markets or for unreported uses grouped in the “other” category rose in 2006 to 75,000 t from 15,000 t in 2005 and accounted for 5% of consumption. This may have been owing to producers being less precise in categorizing sales on the survey forms rather than to a real increase in consumption for “other” uses. This may account for the apparent inverse relationship between the decrease in agricultural and the increase in “other” use categories. “Other” uses nominally included absorbent (including pet litter), cosmetics, diluents, engineered fill, filter aids, in geotechnical uses, in laundries (stone-washing), in pottery clays, and for other unspecified uses. There are several substitutes for pumice for agriculture, horticulture, aggregate, as a concrete additive and other uses.

Prices

The average prices reported for pumice and pumicite varied greatly by use compared with the average price for all uses in 2006. The overall average prices reported for all pumice and pumicite products decreased by 7% to \$28.85 per metric ton in 2006 compared with \$31.00 per ton in 2005. The price change was the result of decreases in the unit values of pumice building blocks, abrasives, and other uses. Increases in the unit values of pumice as a soil additive, for horticultural, landscaping, and as an aggregate were not enough to offset the decreases. The unit value of the building block and decorative use category decreased by 6% to \$23.87 per ton in 2006 from \$25.52 per ton in 2005. The average price for pumice and pumicite used for horticultural and landscaping increased by 6% to \$21.19 per ton in 2006 from \$16.30 per ton in 2005. The average price in 2006 for pumice and pumicite used for abrasives was \$208.69 per ton; for concrete admixture and aggregates, \$28.19 per ton; and for other uses, \$16.68 per ton (table 2).

Foreign Trade

Export and import data presented here, which are from the U.S. Census Bureau and Journal of Commerce Port Import/Export Reporting Service data, are of limited accuracy owing to inconsistencies in producer reporting and because there is a lack of detail for the various materials specified in the 2006 Harmonized Tariff Schedule of the United States (HTS) issued by the U.S. International Trade Commission. The trade data were issued under heading/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 includes corundum garnets and other natural abrasives

Exports of pumice, mostly specialty products, increased to about 22,300 t in 2006 with a value of \$5.94 million or about \$266 per ton. Canada accounted for 56% of exports, followed by Mexico with 11%, Hong Kong with 8%, China with 7%, and with small amounts of pumice and pumice products exported to 38 other countries.

Imports of pumice and pumicite in 2006 increased by 52% to 365,000 t compared with 240,000 t in 2005. By volume, most imports of pumice and pumicite were raw materials for blocks and for lightweight aggregate in construction-related uses, with smaller amounts used in a range of abrasives and for the stonewashing of denim. Ninety-seven percent of imported pumice was from Greece and Italy (table 3). All imports from Greece and the majority of imports from Italy were thought to have been shipped to the United States by a single company. Greece supplied 232,000 t, accounting for almost 64% of pumice imports in 2006 and remained the leading source of pumice imports. Italy supplied 131,000 t, almost 36%, and 14 other countries supplied small amounts of pumice and pumicite in 2006.

World Review

Estimated world pozzolan and pumice (and related materials) production was 18.8 Mt in 2006, about 7% more than in 2005 (table 4). Most of the data published were provided by government agencies in each country. Significant revisions of data are sometimes reported by these agencies, usually without supporting explanations. Italy remained the leading producer of pumice and pozzolan with production estimated to be 4.6 Mt. Strictly defined, pozzolans are volcanic tuffs of the type found near Pozzuoli in southern Italy. However, internationally, the term pozzolan is commonly applied to any of the many silicious materials, such as diatomaceous earth, fly ash, opaline

shale, pumicite, tuff, and volcanic ash, which when added to the cement in concrete improve the strength or other properties of the concrete. Greece was the second ranked producer in 2006 with production estimated to be 2.25 Mt. Chile was third with 1.62 Mt, Iran was fourth with 1.60, and the United States, with 1.59 Mt, was the fifth ranked producer. In addition, 30 other countries were known to have produced pumice.

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, for example, basic home construction uses significantly less gypsum sheetrock because stone and concrete are the preferred building materials. Prefabricated lightweight concrete walls often are produced and shipped to construction locations. Because of their lightweight, strength, and cementitious properties, pumice and pumicite perform very well in European-style construction.

Outlook

U.S. consumption of pumice and pumicite in 2007 is expected to rise slightly along with the popularity and use of artificial blocks made with pumice for construction and decoration. Imports and exports are also expected to rise slightly in 2007. Worldwide consumption of pumice is expected to be about the same as in 2006.

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 Handybook, The Industrial Minerals Information, 2002.

Industrial Minerals, monthly.

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 rocks and minerals* (7th ed.): Littleton, CO, Society for Mining, Metallurgy, and Exploration, p. 743-754.

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)

	2002	2003	2004	2005	2006
United States:					
Sold and used by producers:					
Quantity	956	870	1,490	1,270	1,540
Value ²	19,800	21,900	25,000	39,300	44,300
Average value dollars per metric ton	20.69	25.20	16.80	31.00 ^r	28.85
Exports ³	30	26	27	21	22
Imports for consumption ³	360	367	402	240	365
Apparent consumption ⁴	1,290	1,210	1,870	1,490	1,880
World, production, pumice and related volcanic materials					
	16,300 ^r	16,500 ^r	18,900 ^r	18,400 ^r	18,800 ^e

^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	2005			2006		
	Quantity (thousand metric tons)	Value (thousands)	Average unit value	Quantity (thousand metric tons)	Value (thousands)	Average unit value
Abrasives ²	41	\$9,340	\$228.42	45	\$9,390	\$208.69
Building block, includes decorative block	1,040	26,500	25.52	1,310	31,300	23.87
Concrete admixture and aggregate	30	648	21.42	27	761	28.19
Horticulture and landscaping	143	2,340	16.30	75	1,590	21.19
Other ³	15	486	32.04	75	1,250	16.68
Total or average	1,270	39,300	31.00	1,540	44,300	28.85

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, and other unspecified uses.

TABLE 3
U.S. IMPORTS FOR CONSUMPTION OF PUMICE,
BY CLASS AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	Crude or unmanufactured		Wholly or partly manufactured	
	Quantity	Value	Quantity	Value
2005:				
Greece ²	188	11,500	(3)	3,400
Italy ²	45	17,200	(3)	507
Turkey ²	4	1,020	--	--
Other ⁴	2	2,080	(3)	1,850
Total	239	31,800	1	5,750
2006:				
Greece ²	232	6,080	(3)	1,040
Italy ²	131	5,450	(3)	410
Other ⁵	1	3	(3)	1,930
Total	364	11,500	1	3,380

-- Zero.

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

²Quantity of crude or unmanufactured pumice derived from the Journal of Commerce Port Import/Export Reporting Service data.

³Less than ½ unit.

⁴Includes Austria, China, France, Germany, Hong Kong, India, Indonesia, Japan, the Republic of Korea, Malaysia, Mexico, Poland, Taiwan, Thailand, and the United Kingdom.

⁵Includes Austria, Bangladesh, China, France, Germany, Hong Kong, Indonesia, Japan, the Republic of Korea, Mexico, Norway, the Philippines, Poland, South Africa, Turkey, and Vietnam.

Source: U.S. Census Bureau and the Journal of Commerce Port Import/Export Reporting Service data.

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

(Metric tons)

Country ³	2002	2003	2004	2005 ^c	2006 ^c
Algeria, pozzolan ^c	451,000	500,000	508,000	494,000 ⁴	500,000
Argentina, pumice	3,070	3,531	9,188	9,969 ^{r,4}	10,000
Austria, trass ^c	5,000	5,000	5,000	5,000	5,000
Burkina Faso ^c	10,000	10,000	10,000	10,000	10,000
Cameroon, pozzolan ^c	620,000	600,000	600,000	600,000	600,000
Chile, pumice and pozzolan	826,407	1,242,094	1,535,228	1,620,099 ⁴	1,620,000
Costa Rica ^c	8,000	8,000	8,000	8,000	8,000
Croatia, volcanic tuff ^c	41,000	29,000	30,000	30,000	30,000
Dominica, pumice and volcanic ash ^c	100,000	100,000	100,000	100,000	100,000
Ecuador:					
Pozzolan	519,090	190,747	612,256 ^r	540,318 ^{r,4}	540,000
Pumice	130,459 ^r	88,830 ^r	183,119 ^r	107,178 ^{r,4}	100,000
El Salvador, pozzolan	279,389	294,871	222,826	230,000 ^r	230,000
Eritrea, pumice	212	50	439	440 ⁴	450
Ethiopia ⁵	210,000 ^c	218,676	270,994	255,334 ^{r,4}	255,622 ⁴
France, pozzolan and lapilli ^c	450,000	450,000	450,000	450,000	450,000
Germany, pumice, marketable ^c	43,000	--	--	--	--
Greece:					
Pozzolan	1,291,198	1,383,546	1,400,000 ^c	1,400,000	1,400,000
Pumice ^c	850,000	850,000	850,000	850,000	850,000
Guadeloupe, pumice ^c	210,000	210,000	210,000	210,000	210,000
Guatemala, pumice	377,403	273,933	226,459	88,729 ^{r,4}	90,000
Honduras, pozzolan ^c	190,000	190,000	190,000	190,000	190,000
Iceland:					
Pumice	56,478	50,193	50,000 ^c	50,000	105,000
Scoria ^c	1,000	1,000	1,000	1,000	1,000
Iran	1,181,543	1,228,388 ^r	1,536,448 ^r	1,500,000 ^r	1,600,000
Italy: ^c					
Pozzolan	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000
Pumice and pumiceous lapilli	600,000	600,000	600,000	600,000	600,000
Macedonia, volcanic tuff ^c	50,000	50,000	50,000	50,000	50,000
Martinique, pumice ^c	130,000	130,000	130,000	130,000	130,000
New Zealand	203,700	173,400 ^r	280,950 ^r	245,080 ^{r,4}	250,000
Saudi Arabia, pozzolan ^c	152,000 ^r	162,000 ^r	320,000 ^r	372,000 ^r	400,000
Serbia and Montenegro, volcanic tuff ^{c,6}	100,000	100,000	100,000	100,000	100,000
Slovenia, volcanic tuff ^c	40,000	40,000	40,000	40,000	40,000
Spain, including Canary Islands	701,528 ^r	711,898 ^r	896,296 ^r	900,000 ^r	900,000
Syria, volcanic tuff ^c	650,000	650,000	650,000	650,000	650,000
Tanzania, pozzolanic materials	52,000	105,910	152,679	163,499 ^{r,4}	170,000
Turkey	820,347	895,616	1,035,975	1,000,000	900,000
Uganda, pozzolanic materials	12,388	65,587	134,644	140,000	140,000
United States, pumice, sold and used by producers	956,000	870,000	1,491,015	1,270,000 ⁴	1,540,000 ^{4,7}
Grand total	16,300,000 ^r	16,500,000 ^r	18,900,000 ^r	18,400,000 ^r	18,800,000
Of which:					
Pumice	2,760,000	2,480,000 ^r	3,150,000 ^r	2,710,000 ^r	3,030,000 ⁷
Pozzolan	7,570,000 ^r	7,490,000 ^r	8,140,000 ^r	8,130,000 ^r	8,170,000
Trass and scoria	6,000	6,000	6,000	6,000	6,000
Volcanic tuff	881,000	869,000	870,000	870,000	870,000
Unspecified	5,110,000 ^r	5,640,000 ^r	6,720,000 ^r	6,690,000 ^r	6,690,000

See footnotes at end of table.

TABLE 4—Continued
PUMICE AND RELATED MATERIALS: WORLD PRODUCTION, BY COUNTRY^{1,2}

⁰Estimated. ¹Revised. -- Zero.

¹World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through April 24, 2007.

³Pumice 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.

⁴Reported figure.

⁵Data are for year ending July 7 of that stated.

⁶In June 2006, Montenegro and Serbia formally declared their independence from each other and dissolved their union. Mineral production data for 2006, however, still reflect the unified country.

⁷Correction posted December 20, 2007.