

DIATOMITE

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Diatomite, or diatomaceous earth, is a sedimentary rock composed of the fossilized skeletal remains of diatoms, one-celled algae-like plants ranging in size typically from 10 to 200 microns. In commercial applications, the silica content (SiO_2) is usually over 86% and may be as high as 94%, and the skeletal structure can contain up to 80% to 90% voids. Diatomite's porous structure, low density, and high surface area result in industrial applications as a filtration media for various beverages, inorganic and organic chemicals, and as an absorbent for pet litter and oil spills.

Production

For the United States, the diatomite production data shown in table 1 were collected by a voluntary survey of producers with 100% response. These surveys cover the 6 diatomite producers with 12 facilities in California, Nevada, Oregon, and Washington. Major producers were Celite Corp. (Lompoc, CA and Quincy, WA); Grefco Minerals, Inc. (Burney and Lompoc, CA); Moltan Company (Fernley, NV); and Eagle-Picher Industries Inc. (Lovelock and Fernly, NV and Vale, OR). California continued to be the lead producing State. The deposits at Lompoc, CA are marine, all other U.S. production is from lake-formed deposits. Recovery of diatomite from these deposits is by open pit mining using different combinations of dozers, scrapers, and front-end loaders. Diatomite processing typically involves a series of crushing, drying, and calcining operations to remove organic contaminants.

The United States is the world's largest producer and consumer of diatomite. U.S. production in 1996 remained steady at 698,000 metric tons valued at \$176 million f.o.b. plant, comparable with 1995 production levels of 687,000 tons valued at \$171 million.

Consumption

Apparent domestic consumption of processed diatomite in 1996 was 557,000 tons comparable with 1995 consumption of 544,000 tons. The principal products are various grades of straight-calcined or flux-calcined powders, plus minor amounts of uncalcined product. The principal use of diatomite is in filtration of various alcoholic beverages, sugar, vegetable and animal fats, organic and inorganic chemicals, water, and pharmaceutical and biotechnological media. (See table 2.) In 1996, domestic and export sales of filter-grade diatomite were 470,000 tons, 3% less than in 1995.

Sales of diatomite as a absorbent, the second largest use,

were 98,000 tons. Pet litter and oil spill absorbents are the primary markets. Filler use accounted for 90,000 tons, 18% more than in 1995. Diatomite applications include pesticide carrier; catalyst carrier; roughness and flattening agent in paint and polishes; an antiblocking agent in polyethylene film; a soft abrasive in silver and automotive polishes; bulk extender; and thermal insulator.

Prices

The estimated average unit value of U.S. diatomite, f.o.b. plant was \$252 per metric ton in 1996 compared with \$249 ton in 1995. (See table 3.) The average value per ton for the major end uses in 1996 were \$268 for filtration and \$293 for fillers.

Foreign Trade

In 1996, the United States exported 143,000 tons, approximately 20% of domestic production, to 77 countries. (See table 4.) Main export markets were Canada (23,000 tons) and Germany (18,000 tons). Other major markets included France (12,000 tons), Japan (11,000 tons), and the United Kingdom (9,000 tons). The average unit value of exported diatomite was \$294 per metric ton, comparable with 1995 values of \$301 per ton. Imports of diatomite were 1,550 tons, of which 95% was supplied by France.

World Review

World production remained steady with 1995 values of 1.4 million tons. (See table 5.) Major producers were the United States, distantly followed by France and the Republic of Korea. These countries accounted for 61% of world production. Denmark accounted for 7% of world production and remained the only source of molar and impure diatomite containing up to 30% clay. Molar is used in insulation materials, especially bricks for kiln and furnace applications. It is also used in industrial applications as an absorbent, filter, and bulk extender. The countries that made up the former Soviet Union together account for 7% of world production.

Outlook

Diatomite is losing market share to other filtration technologies that utilize ceramic, polymeric or carbon membrane filters. However, its use as an absorbent is growing. These two markets, one rising, the other decreasing indicate only a slow overall growth for the industry.

SOURCES OF INFORMATION

USGS Publications

Diatomite. Ch. in Mineral Commodity Summaries, annual.
Diatomite. Ch. in United States Mineral Resources, U.S.
Geological Professional Paper 820.

Other

Industrial Minerals (London), monthly.

TABLE 1
DIATOMITE SOLD OR USED, 1/ BY MAJOR USE

(Thousand metric tons)

	1995	1996
Domestic production (sales)	687	698
Value	thousands	
	\$171,000	\$176,000

1/ Data are rounded to three significant digits.

TABLE 2
DIATOMITE SOLD OR USED, 1/ BY MAJOR USE

(Percent of U.S. production)

Major use	1995	1996
Absorbents	13	14
Fillers	11	13
Filtration	70	67
Insulation	3	3
Other 2/	3	3

1/ Includes exports.

2/ Includes additives and silicate admixtures.

TABLE 3
AVERAGE ANNUAL VALUE PER METRIC TON 1/
OF DIATOMITE, BY MAJOR USE

Major use	1995	1996
Fillers	\$302.29	\$292.56
Filtration	269.75	268.42
Insulation	113.77	115.72
Other 2/	146.48	180.86
Weighted average	249.48	252.10

1/ Based on unrounded data.

2/ Includes absorbents, additives, and silicate admixtures.

TABLE 4
U.S. EXPORTS OF DIATOMITE 1/

(Thousand metric tons and thousand dollars)

Year	Quantity	Value 2/
1995	144	43,300
1996	143	42,000

1/ Data are rounded to three significant digits.

2/ U.S. customs value.

Source: Bureau of the Census.

TABLE 5
DIATOMITE: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

Country	1992	1993	1994	1995	1996 e/
Algeria	4	3	4 e/	4 e/	4
Argentina	5	3	6 r/	5 r/	5
Australia e/	11	11	11	11	11
Brazil (marketable)	15	16	17 r/	14 r/	14
Canada e/ 3/	10	10	10	10 r/	10
Chile	6	6	10	10 e/	10
Colombia e/	4 4/	4	4	4	4
Costa Rica e/	12	12	12	12	12
Denmark: e/ 5/					
Diatomite	1	1	1	1	1
Moler	95	95	95	95	95
France e/	85	85	90	80 r/	85
Germany	52	52	52 e/	50 e/	50
Iceland	20	19 e/	25 r/	24 r/ e/	20
Iran 6/	(7/)	(7/)	(7/) e/	(7/) e/	(7/)
Italy e/	26	25	25	25	25
Kenya	1	1	1	1	1
Korea, Republic of	77	67	83	81 r/	80
Macedonia e/	5	5	5	5	5
Mexico	46	46	52 r/	55 r/	56
Peru e/	25	35 r/	35 r/	35 r/	35
Portugal	2	2	2	2 e/	2
Romania	15	10 r/	35 r/	48 r/	45
South Africa	1	--	--	--	--
Spain e/	36 4/	38	36	36	40
Thailand	10	8	6 r/	6 r/	6
U.S.S.R. e/ 8/	190	150	120	110	100
United Kingdom e/	(7/)	(7/) 4/	(7/)	-- r/	--
United States 9/	595	599	613	687 e/	698
Total	1,350	1,300	1,350 r/	1,410 r/	1,410

e/ Estimated. r/ Revised.

1/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Table includes data available through Apr. 7, 1997.

3/ Includes an unknown quantity of fuller's earth.

4/ Reported figure.

5/ Data represent sales.

6/ Data are for Iranian years beginning Mar. 21 of that stated.

7/ Less than 1/2 unit.

8/ Dissolved in Dec. 1991; however, information is inadequate to formulate reliable estimates for individual countries.

9/ Sold or used by producers.