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 from 10 to 500 microns. In commercial applications, the silica content is usually over 86% and may be as high as 94%, and the skeletal structure can contain up to 80% to 90% voids. The honeycomb silica structure gives diatomite useful characteristics such as high absorptive capacity and surface area, chemical stability, and low bulk density.

Production

For the United States, the diatomite production data shown in table 1 were collected by a voluntary survey 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); Dicalite Corp. (Grefco) (Burney and Lompoc, CA); and Eagle-Picher Minerals Inc. (Lovelock and Sparks, 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.

The United States is the world's largest producer and consumer of diatomite. U.S. production in 1995 was 687,000 metric tons valued at $171 million f.o.b. plant, a 12% increase by weight from production of 613,000 tons valued at $152 million in 1994.

Consumption

Apparent domestic consumption of processed diatomite increased 19% to 544,000 tons from 456,000 tons reported for 1994. The principal products are various grades of straight-calcined or flux-calcined powders, plus minor amounts of uncalcined product. The principal use of diatomite, as shown in table 2, is in filtration of various alcoholic beverages, sugar, oil, organic and inorganic chemicals, and water. In 1995, domestic and export sales of filter-grade diatomite were 483,000 tons, 8% more than in 1994.

Sales of diatomite as a filler, the second largest use, were 76,000 tons, 12% less than in 1994. Filler applications include absorbents for pet litter and oil spills; pesticide carrier; roughness and flatting agent in paint; an anti-blocking agent in polyethylene film; a soft abrasive in silver and automotive polishes; or as bulk extender. Minor amounts of diatomite also are used as a thermal insulator and catalyst carrier.

Prices

The estimated average unit value of U.S. diatomite, f.o.b. plant, as shown in table 3, was $249 per metric ton in 1995 compared with $248 ton in 1994. The average value per ton for the major end uses in 1995 were $270 for filtration and $302 for fillers.

Foreign Trade

In 1995, the United States exported 144,000 tons, approximately 21% of domestic production, to 75 countries as shown in table 4. Main export markets were Canada (22,262 tons) and Germany (21,421 tons). Other major markets included France (13,177 tons), Japan (10,960 tons), the United Kingdom (9,230 tons) and Australia (7,003 tons). U. S. exports of processed diatomite were about 8% less than in 1994. The average unit value of exported diatomite was $302 per metric ton, comparable with 1993 values of $303 per ton, but down from the high of $361 per ton in 1994. Imports of diatomite were 259 tons , or which 58% was supplied by France and 31% by Mexico.

World Review

World production is estimated to be 1.4 million tons in 1995 as shown in table 5. Major producers were the United States, distantly followed by France and the Republic of Korea. These countries accounted for 63% 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 extensively in insulation materials, especially bricks for kiln and furnace applications.

Outlook

Diatomite is losing market share to other filtration technologies that utilize ceramic, polymeric or carbon membrane filters, but may find growth markets in biotechnology particularly in pharmaceutical applications. One growing market for diatomite use is in environmental clean-up applications. Currently, diatomite is being used in the United States in toxic liquid waste thickening.

OTHER SOURCES OF INFORMATION

U.S. Geological Survey Publication

Mineral Commodity Summaries, Diatomite, 1996, pp. 54-55.

Other Sources

Durham, D. L., 1973, Diatomite, *in* Brobst, D. A., and Pratt, W. P., eds., United States Mineral Resources: U.S. Geological Survey Professional Paper 820, p.p. 191-195.

Jenkins, D., 1995, Diatomaceous earth operation, Gefco, Lompoc, California, *in* Tabilio, M., and Dupras, D. L., eds., 1995, 29th Forum on the Geology of Industrial Minerals: Proceedings; California Department of Conservation, Division of Mines and Geology Special Publication 110, p.p. 155-160.

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

(Thousands metric tons)

		1994	1995
Domestic production (sales)		613	687
Value	thousands	$152,000	$171,000

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	1994	1995
Fillers	14	11
Filtration	73	70
Insulation	3	3
Other 2/	10	16

1/ Includes exports.
2/ Includes absorbents, additives, and silicate admixtures.

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

Major use	1994	1995
Fillers	$319.49	$302.29
Filtration	237.79	269.75
Insulation	137.38	113.77
Other 2/	259.14	146.48
Weighted average	247.81	249.48

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/
1994	157	56,600
1995	144	43,300

1/ Data are rounded to three significant digits.
2/ U.S. Customs.

Source: Bureau of the Census.

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

(Thousand metric tons)

Country	1991	1992	1993	1994	1995 e/
Algeria	4	4	3 r/	4 e/	4
Argentina	6	5	3	3 e/	3
Australia e/	11	11	11	11	11
Brazil (marketable)	12 r/	15 r/	16 r/	16 r/ e/	16
Canada e/ 3/	8	10	10	10	11
Chile	6	6	6	10 r/	10
Colombia	4	4	4 r/ e/	4 r/ e/	4
Costa Rica e/	12	12	12	12	12
Denmark: e/ 4/					
Diatomite	1	1	1	1	1
Moler	95	95	95	95	95
France e/	250	85 r/	85 r/	90 r/	100
Germany	47	52	52	52 e/	50
Iceland	23	20	19 e/	20 e/	20
Iran 5/	(6/)	(6/)	(6/)	(6/) e/	(6/)
Italy e/	23	26	25	25	25
Kenya	1	1	1	1	1
Korea, Republic of	91	77	67	83 r/	80
Macedonia e/ 7/	XX	5	5	5	5
Mexico	46	46	46	46 e/	47
Peru e/	26 8/	25	25	25	25
Portugal	2	2	2	2	2
Romania	30	15	14 e/	10 r/	10
South Africa	2	1	--	--	--
Spain e/	60	36 8/	38	36	36
Thailand	7	10	8	9 e/	9
U.S.S.R. e/ 9/	220	190	150	120	110
United Kingdom e/	(6/)	(6/)	(6/)	(6/)	(6/)
United States 10/	610	595	599	613	670
Yugoslavia 7/ 11/	4 e/	XX	XX	XX	XX
Total	1,600	1,350 r/	1,300 r/	1,300 r/	1,360

e/ Estimated. r/ Revised. XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Table includes data available through May 6, 1996.

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

4/ Data represent sales.

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

6/ Less than 1/2 unit.

7/ All production in Yugoslavia in 1991 came from Macedonia.

8/ Reported figure.

9/ Dissolved in Dec. 1991; however, information is inadequate to formulate reliable estimates for individual countries. Production is known to occur in Georgia and Russia.

10/ Sold or used by producers.

11/ Dissolved in Apr. 1992.