TALC AND PYROPHYLLITE

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The mineral talc is a hydrous magnesium silicate. A massive talcose rock is called steatite, and an impure massive variety is known as soapstone. Talc is used commercially because of its fragrance retention, luster, purity, softness, and whiteness. Other commercially important properties of talc are its chemical inertness, high dielectric strength, high thermal conductivity, low electrical conductivity, and oil and grease adsorption. Major markets for talc are ceramics, paint, paper, and plastics.

Pyrophyllite is a hydrous aluminum silicate with a structure similar to talc. Such properties as chemical inertness, high dielectric strength, high melting point, and low electrical conductivity make it useful for ceramic and refractory applications.

Legislation and Government Programs

In 1998, the U.S. Department of Defense authorized the disposal of 909 metric tons (t) of block and lump talc from the National Defense Stockpile (NDS), which is the entire uncommitted inventory in that category; 1 t was sold. The NDS also contains 988 t of ground talc.

Production

***Talc.*—**In 1998, 10 companies operating 14 mines in 6 States produced soapstone, steatite, and talc. All but two operations were open-pit mines. The producers were, in decreasing order of production, Luzenac America Inc., Dal Minerals Co., Barrett's Minerals Inc., Gouverneur Talc Co., Milwhite Inc., United Clays Inc. of Texas, Suzorite Mineral Products Inc. (SMP), Canyon Mines Inc., Steatite of Southern Oregon Inc., and NuTech Minerals Inc. Barrett's Minerals, Dal Minerals, Gouverneur Talc, and Luzenac America were the largest domestic producers, accounting for more than 85% of the tonnage.

In 1998, U.S. mine production was 1.06 million metric tons (Mt) valued at $33.3 million, compared with 1.05 Mt and $33 million in 1997 (tables 1 and 2). Production increased in Montana, Texas, and Vermont; decreased in California; and remained unchanged in New York, Oregon, and Texas. Montana led all States in the tonnage and value of talc produced, followed by Texas, Vermont, New York, California, and Oregon. Mines that operated in Montana, New York, Texas, and Vermont accounted for nearly all the domestic talc production.

Luzenac America constructed a slurry plant with an 18,000-metric-ton-per-year capacity in Auburn, ME. The plant will process talc from Luzenac's mines in Montana and Vermont and its operations in Canada. The slurry will be sold to paper mills in New England and southeastern Canada for pitch-control applications (North American Minerals News, 1998).

Domestic production data were obtained through a voluntary U.S. Geological Survey (USGS) survey of U.S. mining companies. Survey forms were sent to 10 companies with responses accounting for approximately 60% of the data presented in table 1; the remainder was estimated from reported prior-year data adjusted according to industry trends.

***Pyrophyllite.*—**Piedmont Minerals Co. Inc. and Standard Mineral Co. Inc. operated three mines in North Carolina. Standard Industrial Minerals Inc., which has a mine in California, sold from stocks and did not operate its mine in 1998. Production of pyrophyllite decreased slightly from that of 1997.

Domestic production data were acquired through a voluntary USGS survey of the three U.S. companies that mine pyrophyllite. All responded to the survey.

Consumption

***Talc.*—**Slightly more than 934,000 t of talc valued at $109 million was sold or used in 1998, a decrease from 942,000 t valued at $111 million in 1997. Sales or use of talc increased in Montana, Ohio (milling facility), and Texas; decreased in California, Nebraska (milling facility), and Vermont; and remained unchanged in Alabama (milling facility), New York, and Oregon. Of the 934,000 t of talc sold or used, producers reported that 785,000 t was sold for domestic use and approximately 149,000 t was exported.

Domestic markets include, in decreasing order of consumption, ceramics (pottery, sanitaryware, tiles, etc.), paper, paint, roofing, plastics, rubber, cosmetics, insecticides, and refractories (table 3). Domestic sales to the ceramics, roofing, and rubber industries increased in 1998. Sales for all markets, except roofing, did not change significantly between 1997 and 1998. Roofing increased by 45%, to 61,000 t in 1998 from 42,000 t in 1997, regaining much of the market it had lost to substitute materials in previous years.

Approximately 66,000 t of talc was reported under the "Other" category by respondents in 1998. Of this amount, respondents reported that 60,900 t was used in automobile body fillers, caulks, joint compounds, paint and putties, sculpture media, tile flooring, and vinyl sheet flooring. The remainder of the "Other" category (5,100 t) was used in applications that were not identified by respondents.

Most of the imported talc was not included in the domestic end-use data listed in table 3. More than 80% of the imported talc was purchased by mineral brokers who do not participate in the USGS canvass. An estimate of the end-use breakdown based on countries of origin, ports of entry, importing companies, and regional end-use patterns is ceramics and refractories, 10,000 t; cosmetics, 14,000 t; paint, 15,000 t; paper, 8,000 t; plastics, 68,000 t; rubber, 11,000 t; and unknown, 19,000 t.

Pyrophyllite.—Domestic consumption of pyrophyllite decreased by 8% from that of 1997. Pyrophyllite was used, in decreasing order of consumption, in ceramics, refractories, paint, plastics, insecticides, and rubber. Sales increased for paint and plastics applications and decreased for the others. Ceramic and refractory uses accounted for 76% of the pyrophyllite sales.

Domestic consumption data for talc and pyrophyllite were developed by the USGS from a voluntary survey of U.S. mills. Survey forms were sent to 12 companies operating 19 mills in 10 States for talc and 3 companies operating 3 mills in 2 States for pyrophyllite. Approximately 45% of the talc data presented in table 3 was reported by the companies; the remainder was estimated from reported prior-year data adjusted according to industry trends. All the pyrophyllite producers responded to the survey.

Prices

Talc prices varied depending on the quality and the degree and method of processing. The unit value of crude talc was estimated to be $31 per ton. More than 80% of the crude ore value included in table 1 was estimated because most producers do not sell crude talc and could not provide a crude ore value. The average reported unit value of processed talc was $117 per ton. The average unit values of crude and processed pyrophyllite decreased slightly in 1998.

The average unit value for exports of unmilled talc was $133 per ton, and that of milled talc was $184 per ton. The average unit value for imports was $78 per ton for crude talc, $110 per ton for ground talc, and $1,090 per ton for cut or sawed talc. The decrease in the average unit value for imported ground talc was large. This was caused by a large, low-valued shipment of talc from France that could have been the result of an improper classification of imported goods. With that shipment excluded, the average unit value of ground talc was approximately $151 per ton, or 7% less than that of 1997.

Approximate equivalents, in dollars per metric ton, of prices for talc ranged from $83 to $371 per ton (table 4; Industrial Minerals, 1998c). Quoted prices should be used only as a guideline because actual prices depend on the terms of the contract between seller and buyer.

Foreign Trade

Talc exports decreased 18% in tonnage to 146,000 t and 24% in value to $26.0 million. Canada was the largest importer of U.S. talc, followed by Mexico, Belgium, the United Kingdom (11,500 t), Venezuela (8,780 t), Japan, Indonesia (4,560 t), and Taiwan (3,840 t) (table 5). Since 1990, data reported by domestic producers concerning exports to Mexico gradually have diverged from the Bureau of the Census data. On the basis of industry data, exports to Mexico are estimated to be more than three times those reported by the Bureau of the Census.

Talc imports reported by the Bureau of the Census increased by 34% in tonnage, to 165,000 t, and increased by 10% in value, to $23.3 million. Excluding one shipment from France that appears to be an error in product classification, the imports are estimated to be 145,000 t valued at $23.1 million. Canada, China, and France supplied more than 85% of all talc imports (table 6). Some of the talc imported from Japan was likely to have been transshipments from other Southeast Asian countries or Australia.

More than 50% (88,200 t) of talc imported into the United States came through the port district of New Orleans, LA. Of this amount, 6,000 t was imported from Australia; 76,200 t from China; and 6,050 t from France. The second leading port district was Buffalo, NY, with 11,200 t of talc from Canada. The remaining imports were scattered among the many other port districts.

World Review

China remained the world's leading producer of talc, followed by the United States, India, Brazil, and Finland. Japan was the largest producer of pyrophyllite, followed by the Republic of Korea, India, and Brazil. China, Japan, the Republic of Korea, and the United States produced 63% of the world's talc and pyrophyllite (table 7).

Australia.—SMP, a subsidiary of Zemex Industrial Minerals, entered into a joint venture with Industria Mineraria Italiana Fabi Srl (IMI Fabi) to process ore from IMI Fabi's Mount Seabrook deposit in Western Australia. The joint venture will be called Zemex Fabi-Benwood LLC. SMP will manage the joint venture and use its Benwood, WV, mill to process the talc from Australia (Industrial Minerals, 1998d).

Gwalia Consolidated Ltd. sold its remaining share of the Mount Seabrook talc operation to Commercial Minerals Ltd. Two years earlier, Gwalia had sold 50% of its share to IMI Fabi. Commercial Minerals and IMI Fabi will continue to develop and expand the Mount Seabrook talc operation (Industrial Minerals, 1998a).

Finland.—Pluess-Staufer AG and Western Mining Corp. (WMC) strengthened their joint venture with Finnminerals Oy by merging more of their European talc activities with those of Finnminerals. The new venture will operate as Mondo Minerals Oy. The agreement will give Mondo Minerals access to talc from Australia, China, Egypt, Finland, and Norway and milling facilities in Finland, the Netherlands, Norway, and Sweden (Industrial Minerals, 1998b).

Outlook

Apparent consumption of talc has increased by 4.6% per year since 1996. This far exceeds the 1% average annual growth rate of the past 25 years. In light of the fact that major talc

markets, such as ceramics, paint, paper, and plastics, are projected to experience slow growth through 2003, the rate of growth in talc consumption probably will be in the 1.5%-to-2.5% range for the next few years. The plastics market should continue to offer the greatest growth potential for talc. Domestic producers are likely to face increased competition from imported talc, although many have already become importers themselves to minimize the impact of this competition. No major changes are anticipated in pyrophyllite markets, and consumption probably will not change significantly for the next few years.

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[1]Prior to January 1996, published by the U.S. Bureau of Mines

TABLE 1
SALIENT TALC AND PYROPHYLLITE STATISTICS 1/

(Thousand metric tons unless otherwise specified)

		1994	1995	1996	1997	1998
United States:						
Mine production, crude:						
Talc		935	1,060	994	1,050	1,060
Pyrophyllite		W	W	W	W	W
Total		935	1,060	994	1,050	1,060
Value:						
Talc	thousands	$30,400	$31,700	$31,100	$33,000	$33,300
Pyrophyllite	do.	W	W	W	W	W
Total	do.	$30,400	$31,700	$31,100	$33,000	$33,300
Sold by producers, crude and processed:						
Talc		923	901	909	942	934
Pyrophyllite		W	W	W	W	W
Total		923	901	909	942	934
Value:						
Talc	thousands	$116,000	$99,900	$100,000	$111,000	$109,000
Pyrophyllite	do.	W	W	W	W	W
Total	do.	$116,000	$99,900	$100,000	$111,000	$109,000
Exports (talc) 2/		154	183	192	179	146
Value	thousands	$29,800	$37,100	$37,900	$34,200	$26,000
Imports for consumption		155	146	187	123	165
Value	thousands	$14,900	$14,800	$20,500	$21,100	$23,300
Apparent consumption 3/		936	1,020	989	992	1,080
World: Production		8,260	8,460 r/	8,240 r/	8,690 r/	8,140 e/

e/ Estimated. r/ Revised. W Withheld to avoid disclosing company proprietary data.

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

2/ Excludes powders--talcum (in package), face, and compact.

3/ Production plus imports minus exports plus adjustments in Government and industry stock. Does not include pyrophyllite.

TABLE 2
CRUDE TALC PRODUCED IN THE UNITED STATES, BY STATE 1/ 2/

(Thousand metric tons and thousand dollars)

	1997		1998	
State	Quantity	Value	Quantity	Value
Texas	274	6,760	274	6,770
Other 3/	774	26,200	788	26,500
Total	1,050	33,000	1,060	33,300

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

2/ Excludes pyrophyllite.

3/ Includes California, Montana, New York, Oregon, and Vermont.

TABLE 3
END USES FOR GROUND TALC 1/ 2/

(Thousand metric tons)

	1997	1998
Ceramics	235	240
Cosmetics	22	21
Insecticides	10	9
Paint	145	142
Paper	178	168
Plastics	58	57
Refractories	5	5
Roofing	42	61
Rubber	24	26
Other 3/	88	66
Total	807	796

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Excludes pyrophyllite.
3/ Includes art sculpture, asphalt filler, auto body filler, construction caulks, joint compounds, flooring, and other uses not specified.

TABLE 4
PRICES OF TALC

(U.S. dollars per metric ton)

	1998
New York:	
Paint:	
200 mesh	100
400 mesh	180
Ceramic:	
200 mesh	83
325 mesh	92
Italian, cosmetic-grade	288
Chinese, normal (ex-store):	
UK 200 mesh	321-363
UK 350 mesh	338-371

Source: Industrial Minerals, December 1998.

TABLE 5
U.S. EXPORTS OF TALC 1/ 2/

(Thousand metric tons and thousand dollars)

	1997		1998	
Country	Quantity	Value	Quantity	Value
Belgium	2	370	15	1,960
Canada 3/	59	9,970	45	8,270
Japan	9	1,550	6	1,000
Mexico	28	2,810	18	2,290
Other 4/	81	19,500	61	12,500
Total	179	34,200	146	26,000

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Excludes powders-talcum (in package), face, and compact.
3/ Probably includes shipments in transit through Canadian ports.
4/ Includes 66 countries in 1997 and 62 countries in 1998.

Source: Bureau of the Census.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF TALC, BY COUNTRY 1/

Country	Not crushed or powdered		Crushed or powdered		Cut and sawed		Total unmanufactured	
	Quantity (metric tons)	Value (thou-sands)	Quantity (metric tons)	Value (thou-sands)	Quantity (metric tons)	Value (thou-sands)	Quantity (metric tons)	Value (thou-sands)
1997:								
Brazil	23	$27	118	$25	620	$544	761	$596
Canada	1	1	26,100	5,540	384	254	26,500	5,800
China	44,400	3,320	5,170	440	754	498	50,300	4,260
France	6,000	600	658	336	5,870	5,970	12,500	6,910
Japan	--	--	12,200	746	3	11	12,200	757
Other 2/	19,100	1,620	1,510	389	219	813	20,800	2,820
Total	69,500	5,570	45,800	7,480	7,850	8,090	123,000	21,100
1998:								
Brazil	6	6	114	28	928	824	1,050	858
Canada	19	8	29,700	6,640	84	108	29,800	6,750
China	68,400	5,010	7,850	132	732	515	77,000	5,660
France	6,060	656	28,000	313	5,670	5,700	39,700	6,670
Japan	--	--	5,820	538	--	--	5,820	538
Other 2/	10,200	894	1,450	402	519	1,520	12,200	2,820
Total	84,700	6,580	72,900	8,050	7,930	8,660	165,000	23,300

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Includes 25 countries in 1997 and 26 countries in 1998.

Source: Bureau of the Census.

TABLE 7
TALC AND PYROPHYLLITE: WORLD PRODUCTION, BY COUNTRY AND PRODUCT 1/ 2/

(Metric tons)

Country 3/	1994	1995	1996	1997	1998 e/
Argentina:					
Pyrophyllite	1,996	4,189	2,180	2,100 e/	2,000
Steatite e/	500	300	300	300	300
Talc	16,850	12,474	11,777	12,000 e/	12,200
Australia: e/					
Pyrophyllite	5,000	5,000	5,000	5,000	5,000
Talc	210,000	210,000	210,000	210,000	210,000
Austria: Steatite	130,602	131,614	130,000 e/	155,730 r/	156,000
Brazil: Unspecified 4/	666,408	450,684 r/	452,180 r/	452,000 r/ e/	452,000
Canada: Pyrophyllite, soapstone, talc	130,000	116,000	77,000	76,000	75,000
Chile: Talc	5,351	4,107	4,276	3,986 r/	4,000
China: Unspecified e/	2,400,000	2,400,000	2,400,000	2,350,000	2,300,000
Colombia: Pyrophyllite, soapstone, talc	18,000	19,248	14,800 r/ e/	14,832 r/	15,400
Egypt: Pyrophyllite, soapstone, steatite, talc e/	4,125 5/	4,000	4,000	4,000	4,000
Eritrea: Talc	3	--	--	--	--
Finland: Talc	453,000	464,000	345,000 r/	350,000 e/	350,000
France: Talc	306,300	322,300	349,270	350,000 e/	325,000
Germany: Talc (marketable)	11,583	14,170	10,005 r/	8,819 r/	9,000
Greece: Steatite e/	500	500	--	--	--
Hungary: Talc e/	1,500	1,150	1,200	1,200	1,200
India:					
Pyrophyllite	85,335	131,137	143,172	140,000 e/	142,000
Steatite	398,006	469,692	472,001	470,000 e/	471,000
Iran: Talc e/ 6/	27,000	25,000	25,000	25,000	25,000
Italy: Steatite and talc e/	139,200	136,000	168,000	142,000 r/	140,000
Japan:					
Pyrophyllite	934,007	947,713	913,973	913,822 r/	913,000
Talc	56,120	57,269	56,153	53,000 r/ e/	52,000
Korea, North: Unspecified e/	180,000	180,000	180,000	180,000	150,000
Korea, Republic of:					
Pyrophyllite	707,951	789,994	780,062	994,366 r/	800,000
Talc	35,340	29,364	19,066	25,751 r/	22,000
Macedonia: Talc e/	10,000	10,000	10,000	10,000	10,000
Mexico: Talc	14,900	11,134	11,100 e/	13,586 r/	13,500
Morocco	--	2,000 e/	8,429	13,053	19,850 5/
Nepal: Talc e/ 7/	1,500	1,500	5,323 r/ 5/	6,809 r/ 5/	6,500
Norway: Talc e/	28,000	30,000	30,000	30,000	28,000
Pakistan: Pyrophyllite	37,151	35,043	34,095	34,000 e/	33,000
Paraguay: Unspecified e/	200	200	200	200	200
Peru: e/					
Pyrophyllite	8,000	8,000	8,000	8,000	8,000
Talc	1,200	13,818 r/ 5/	12,985 r/ 5/	13,000 r/	13,000
Portugal: Talc	8,367	8,400 e/	8,277 r/	8,500 e/	8,500
Romania: Talc	8,952	9,976	10,248	7,578 r/	8,000
Russia: Talc e/	100,000	100,000	100,000	90,000	90,000
South Africa:					
Pyrophyllite	5,507	5,519	2,140	2,129 r/	2,100
Talc	8,202	9,173	16,397	21,055 r/	21,000
Spain: Steatite e/	65,000	112,000 5/	100,000	100,000	100,000
Sweden: Talc e/	20,000	25,000	30,000 5/	25,000	25,000
Taiwan: Talc	4,290	3,500	1,500	1,331 r/	1,200
Thailand:					
Pyrophyllite	55,326	76,189	64,330 r/	304,524 r/	45,000
Talc	8,950	4,252	7,238 r/	7,139 r/	2,000
Turkey e/	4,000	4,000	4,000	4,000	4,000
United Kingdom: Talc, soapstone, pyrophyllite	5,275	4,298	5,322	5,500 r/ e/	5,000
United States:					
Pyrophyllite	W	W	W	W	W
Talc	935,000	1,060,000	994,000	1,050,000	1,060,000 5/
Uruguay: Talc, soapstone, pyrophyllite	1,500 e/	1,000 e/	898 r/	1,133 r/	1,000

See footnotes at end of table.

TABLE 7--Continued
TALC AND PYROPHYLLITE: WORLD PRODUCTION, BY COUNTRY AND PRODUCT 1/ 2/

(Metric tons)

Country 3/	1994	1995	1996	1997	1998 e/
Zambia: Talc e/	76 5/	80	80	80	80
Zimbabwe: Talc	2,049	2,080	1,076	1,000 e/	1,000
Grand total	8,260,000	8,460,000 r/	8,240,000 r/	8,690,000 r/	8,140,000
Of which:					
Pyrophyllite	1,840,000	2,000,000	1,950,000 r/	2,400,000 r/	1,950,000
Steatite	595,000	714,000	702,000	726,000 r/	727,000
Talc	2,270,000	2,430,000 r/	2,270,000 r/	2,320,000 r/	2,300,000
Unspecified	3,550,000	3,320,000 r/	3,310,000 r/	3,240,000 r/	3,170,000

e/ Estimated. r/ Revised. W Withheld to avoid disclosing company proprietary data; not included in "Total."

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 April 24, 1999.

3/ In addition to the countries listed, the former Czechoslovakia produces talc, but information is inadequate to make reliable estimates of output levels.

4/ As reported in the Sumário Mineral 1997-98.

5/ Reported figure.

6/ Data based on Iranian fiscal year beginning March 21 of year stated.

7/ Data based on Nepalese fiscal year beginning mid-July of year stated.