

TALC AND PYROPHYLLITE

By Robert L. Virta¹

Domestic production of talc and pyrophyllite increased 7% from that of 1987. Sales of crude and processed talc and pyrophyllite increased 5% in tonnage and 6% in value. Imports for consumption increased 66% in tonnage and 19% in value. Exports increased 32% in tonnage and 38% in value.

DOMESTIC DATA COVERAGE

Domestic production and sales data for talc and pyrophyllite are developed by the Bureau of Mines from a voluntary survey of U.S. mines and mills. Of the 52 mines and mills to which a survey request was sent, 32 responded, representing 62% of the U.S. production data shown in table 1. Production for the 20 nonrespondents was estimated using reported prior-year production levels adjusted by trends in employment and other guidelines.

LEGISLATION AND GOVERNMENT PROGRAMS

The Occupational Safety and Health Administration (OSHA) extended through July 21, 1989, an administrative stay on its 1986 regulation governing worker exposure to the nonasbestiform varieties of actinolite, anthophyllite, and tremolite. During the stay, OSHA continued to analyze the impact of using the asbestos standard to regulate the nonasbestiform varieties of the minerals. An exposure limit of 2 fibers per cubic centimeter will remain in effect during the stay.²

OSHA also proposed revisions to air contaminant standards. The proposed ruling establishes or modifies exposure limits for more than 300 substances, including soapstone and nonasbestiform talc. Permissible exposure limits of 6 and 3 milligrams per cubic meter

were proposed for respirable and total soapstone dust, respectively. A permissible exposure limit of 2 milligrams per cubic meter was proposed for nonasbestiform talc.³

The Environmental Protection Agency (EPA) continued its review of the national emission standards for hazardous air pollutants. As part of this review, the EPA continued to collect data for a study of the asbestos and other mineral fiber content of mine emissions for producers of eight mineral commodities, including talc.

DOMESTIC PRODUCTION

Talc

U.S. mine production of crude talc increased 7% in tonnage and 1% in value. Talc and soapstone were produced at mines in 10 States. Mines that operated in Montana, New York, Texas, and Vermont accounted for 92% of domestic talc production. Montana led all States in the tonnage and value of talc produced. Montana Talc Co. applied for operating permits for a pro-

TABLE 1
SALIENT TALC AND PYROPHYLLITE STATISTICS

(Thousand short tons and thousand dollars)

	1984	1985	1986	1987	1988
United States:					
Mine production, crude:					
Talc	1,042	1,188	1,219	¹ 1,190	1,269
Pyrophyllite	85	81	83	92	107
Total¹	1,127	1,269	1,302	¹1,282	1,377
Value:					
Talc	\$21,755	\$27,768	\$29,687	¹ \$27,265	\$27,624
Pyrophyllite	1,412	1,420	1,540	1,607	1,820
Total	23,167	29,188	31,227	¹28,872	29,444
Sold by producers, crude and processed:					
Talc	1,101	1,067	1,070	¹ 1,075	1,123
Pyrophyllite	97	81	83	90	103
Total	1,198	1,148	1,153	¹1,165	1,226
Value:					
Talc	\$112,515	\$114,542	\$111,924	¹ \$113,394	\$119,460
Pyrophyllite	3,578	3,273	3,366	3,712	4,188
Total¹	116,093	117,815	115,290	¹117,107	123,648
Exports ² (talc)	256	237	234	318	421
Value	\$16,162	\$14,282	\$16,302	\$21,040	\$29,091
Imports for consumption ³ (talc)	45	47	52	53	88
Value	\$9,156	\$9,532	\$8,715	\$10,348	\$12,268
Consumption, apparent ⁴	1,009	1,079	1,120	¹ 1,017	1,044
World: Production	¹ 8,345	¹ 8,443	8,251	^P 8,367	^Q 8,432

^QEstimated. ^PPreliminary. ¹Revised.

¹Data may not add to total shown because of independent rounding.

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

³Excludes imported pyrophyllite.

⁴Production, plus imports, minus exports, plus adjustments in Government and industry stock changes.

posed mine about 12 miles southeast of Dillon, MT. The company planned to produce approximately 624,000 short tons of ore over an 8-year period.⁴

Cyprus Industrial Minerals Inc. completed its acquisition of Vermont Talc Co. The purchase of Vermont Talc included one mine in Windham, one mine near Troy, a mill in Chester, and a flotation mill in Johnson. Cyprus Industrial Minerals indicated that pharmaceutical-, paint-, paper-, and plastic-grade talc can be produced at the Johnson site and industrial-grade talc can be produced at the Chester site.⁵

The company also completed its acquisition of Windsor Minerals Inc., a major talc producing company in Vermont. Windsor Minerals owns several mines and two mills. The company produces cosmetic- and industrial-grade talc.⁶

Pyrophyllite

Pyrophyllite was produced by four companies operating six mines in California and North Carolina. Production increased 16% over that of 1987.

CONSUMPTION AND USES

Apparent domestic consumption of crude and processed talc and pyrophyllite increased 3%. Sales of talc and pyrophyllite increased 5% in tonnage and 6% in value.

End-use distribution of ground talc was ceramics, 34%; paint, 14%; paper, 13%; roofing, 11%; plastics, 10%; cosmetics, 5%; and insecticides, refractories, rubber, and other, 13%. The largest portion, 55%, of domestically produced ground pyrophyllite was used in ceramics; 14% in refractories, 7% in insecticides, and 24% in paint, plastics, roofing, rubber, and other.

PRICES

Talc prices varied depending on the

TABLE 2
CRUDE TALC AND PYROPHYLLITE PRODUCED IN THE UNITED STATES, BY STATE

(Thousand short tons and thousand dollars)

State	1987		1988	
	Quantity	Value	Quantity	Value
Georgia (talc)	20	286	26	260
Montana (talc)	356	11,334	378	11,309
Texas (talc)	255	4,380	261	4,466
Other ¹	650	12,872	712	13,409
Total	1,282	28,872	1,377	29,444

¹ Revised.

¹ Includes Alabama, Arkansas, California, New York, North Carolina, Oregon, Vermont, and Virginia.

² Data do not add to total because of independent rounding.

TABLE 3
END USES FOR GROUND TALC AND PYROPHYLLITE

(Thousand short tons)

Use	1987			1988		
	Talc ¹	Pyrophyllite	Total ¹	Talc	Pyrophyllite	Total ¹
Ceramics	314	83	398	343	81	425
Cosmetics ²	45	—	45	50	—	50
Insecticides	(³)	12	12	(³)	10	11
Paint	141	2	143	143	—	143
Paper	128	—	128	135	—	135
Plastics	88	1	89	100	4	103
Refractories	2	21	23	1	20	21
Roofing	104	1	105	106	1	106
Rubber	19	(³)	20	20	(³)	21
Other ⁴	122	14	136	110	30	140
Total¹	963	135	1,099	1,008	147	1,154

¹ Revised.

¹ Data may not add to totals shown because of independent rounding.

² Incomplete data. Some cosmetic talc known to be included in "Other."

³ Less than 1/2 unit.

⁴ Includes art sculpture, asphalt filler and coatings, crayons, floor tile, foundry facings, rice polishing, stucco, and other unspecified uses.

quality and on the degree and method of processing. The average unit values of crude talc and crude pyrophyllite were \$22 and \$17 per ton, respectively. The average unit values of processed talc and processed pyrophyllite were \$106 and \$41 per ton, respectively. Unit values for imported crude and ground talc ranged from \$66 per ton to \$583

per ton. The average unit value for all imported talc was \$140 per ton. Unit values for exported talc ranged from \$25 per ton to \$498 per ton and averaged \$69 per ton.

Prices, quoted by the Engineering and Mining Journal, April 1988, per short ton of domestic ground talc, in carload lots, f.o.b. mine or mill, in-

cluding containers, follows:

New Jersey:	
Mineral pulp, bags extra	\$18.50-\$20.50
Vermont:	
98% through 325 mesh, bulk	70.00
99.99% through 325 mesh, bags:	
Dry processed	147.00
Water beneficiated	213.00-228.00
New York:	
96% through 200 mesh	67.00- 75.00
98% to 99.25% through 325 mesh	83.00-100.00
100% through 325 mesh, fluid-energy ground	165.00
California:	
Standard	130.00
Fractionated	37.00- 71.00
Micronized	150.00-220.00
Cosmetic steatite	44.00- 65.00
Georgia:	
98% through 200 mesh	50.00
99% through 325 mesh	60.00
100% through 325 mesh, fluid-energy ground	100.00

Prices, quoted by the American Paint & Coatings Journal, December 26, 1988, in U.S. dollars per short ton for paint-grade talc in carload lots were as follows:

California:	
Bags, mill:	
White, Hegman No. 3-3½	\$103.00
Hegman No. 4-5	129.00
Canada: Fine micron, Hegman No. 6	205.00
Montana: Ultrafine grind, Hegman No. 6	203.00
New York:	
Nonfibrous, bags, mill:	
98% through 325 mesh	80.00
99.6% through 325 mesh	95.00
Trace retained on 325 mesh	160.00

Approximate equivalents, in dollars per short ton, of price ranges quoted in Industrial Minerals (London), Decem-

ber 1988, for talc, c.i.f. main European ports, were as follows:

Norwegian:	
Ground (ex store)	\$162-\$180
Micronized (ex store)	207- 288
French, fine-ground	216- 342
Italian, cosmetic-grade	315
Chinese, normal (ex store):	
UK 200 mesh	254
UK 325 mesh	265
New York, paint, minimum 20-ton lot	175

FOREIGN TRADE

Talc exports increased 32% in tonnage and 38% in value. Mexico remained the largest importer of talc, followed by Canada, Belgium-Luxembourg, and Japan. Favorable exchange rates and slightly increased usage in Europe resulted in increased exports to Belgium. Exports to Mexico also increased in 1988.

Talc imports increased 64% in tonnage and 19% in value. Australia and Canada provided 77% of all talc imports.

WORLD CAPACITY

The data in table 6 are annual rated capacity for mines and refineries as of December 31, 1988. Rated capacity is defined as the maximum quantity of product that can be produced in a period of time on a normally sustainable long-term operating rate, based on the physical equipment of the plant, and given acceptable routine operating procedures involving labor, energy, materials, and maintenance. Capacity includes both operating plants and plants temporarily closed that, in the judgment of the author, can be brought into production within a short period of time with minimum capital expenditure.

WORLD REVIEW

The United States remained the world's largest talc producer, and Japan remained the largest pyrophyllite producer. China, Japan, and the United States accounted for 46% of the world's talc and pyrophyllite production.

Cyprus Industrial Minerals completed its acquisition of Distribuidora Malagueña de Talcos S.A. (DIMITASA). DIMITASA owned surface mines and a mill near Málaga, Spain. Cyprus Industrial Minerals will process high-value talc from Australia and the United States at the Málaga mill for the paint, paper, and plastics industries. The company will continue to sell talc from the Malaga mine to industrial markets in northern and southern Europe.⁷

TECHNOLOGY

In modernizing its mines in Italy, Talco e Grafite Val Chisone Co. increased production capabilities by changing from an overhand cut-and-fill method to an underhand horizontal slicing method with cemented backfill. To take advantage of the increased production capabilities, the company investigated electrically powered, rubber-tired loaders as replacements for compressed-air-powered rocker shovels and battery-powered trains as a means of improving the efficiency of ore loading and transport. The change from rocker shovels and trains to rubber-tired loaders resulted in greater safety for the miners, less dust because of the absence of compressed air exhaust, fewer loading maneuvers, lower noise levels, and a 32% reduction in the production cost per ton.⁸

¹ Physical scientist, Branch of Industrial Minerals.

² Federal Register. Occupational Safety and Health Administration. Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite. V. 53, No. 139, July 20, 1988, pp. 27345-27346.

³——. Occupational Safety and Health Administration. Air Contaminants. V. 53, No. 109, June 7, 1988, pp. 20960-21393.

⁴Montana (Butte) Standard. Talc Companies Apply for Permits Near Dillon. Jan. 23, 1988.

⁵Rutland Herald. Vermont Talc's Assets Are Sold. Apr. 22, 1988, p. 15.

⁶Cyprus Industrial Minerals News Bulletin. Cyprus Minerals Acquires U.S. and European Talc Properties. Sept. 8, 1988, p. 1.

⁷Work cited in footnote 6.

⁸Partrucco, M., A. Rostagnotto, and G. Longo. The Use of Rubber-Tired LHD's in Fontane Talc Mine, Italy. Min. Mag., June 1988, pp. 460-465.

TABLE 4

U.S. EXPORTS OF TALC¹

(Thousand short tons and thousand dollars)

Year	Belgium-Luxembourg		Canada ²		Japan		Mexico		Other ³		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1984	11	722	76	5,265	22	1,518	107	3,696	40	4,961	256	16,162
1985	6	373	81	4,864	18	1,422	108	4,492	24	3,131	237	14,282
1986	15	1,273	59	4,411	22	1,707	112	4,464	27	4,447	⁴ 234	16,302
1987	30	2,482	61	5,000	26	2,405	149	5,614	52	5,538	318	⁴ 21,040
1988	61	8,017	68	5,079	39	4,549	204	6,150	49	5,296	421	29,091

¹Excludes powders-talcum (in package), face, and compact.

²Probably includes shipments in transit through Canadian ports.

³Includes 43 countries in 1988.

⁴Data do not add to total shown because of independent rounding.

Source: Bureau of the Census.

TABLE 5
U.S. IMPORTS FOR CONSUMPTION OF TALC, BY COUNTRY

Country	Crude and unground		Ground, washed, powdered, or pulverized		Cut and sawed		Talc n.s.p.f.	Total unmanufactured ¹	
	Quantity (short tons)	Value (thousands)	Quantity (short tons)	Value (thousands)	Quantity (short tons)	Value (thousands)	Value (thousands)	Quantity (short tons)	Value (thousands)
1986	10,086	\$715	40,253	\$5,951	1,634	\$1,254	\$795	51,973	\$8,715
1987:									
Australia	1,450	87	—	—	—	—	—	1,450	87
Brazil	—	—	277	42	398	151	12	675	205
Canada	—	—	38,729	5,362	108	128	65	38,837	5,555
China	—	—	—	—	386	288	275	386	563
Italy	216	24	85	24	1,123	1,090	—	1,424	1,138
Korea, Republic of	—	—	917	252	34	19	—	951	271
Other ²	8,438	805	777	431	288	341	952	9,503	2,529
Total¹	10,104	916	40,784	6,112	2,337	2,017	1,304	53,225	10,348
1988:									
Australia	20,122	1,468	22	2	—	—	—	20,144	1,470
Brazil	—	—	543	88	204	59	36	747	184
Canada	402	36	46,305	6,384	110	149	40	46,817	6,609
China	9,126	599	—	—	768	435	342	9,894	1,376
Japan	694	95	811	330	19	24	66	1,524	515
Korea, Republic of	—	—	1,916	402	19	13	2	1,935	418
Other ²	4,917	419	1,353	473	183	200	604	6,453	1,696
Total	35,261	2,617	50,950	7,679	1,303	880	1,090	87,514	12,268

¹ Data may not add to totals shown because of independent rounding.

² Includes 21 countries.

Source: Bureau of the Census.

TABLE 6
**WORLD TALC AND
 PYROPHYLLITE ANNUAL
 PRODUCTION CAPACITY,
 DECEMBER 31, 1988**

(Thousand short tons)

	Rated capacity ¹
North America:	
Canada	330
United States	1,500
Total	1,830
Latin America:	
Argentina	50
Brazil	500
Mexico	40
Other	40
Total	630
Europe:	
Austria	150
Finland	400
France	400
Italy	180
Norway	150
U.S.S.R.	600
Other	260
Total	2,140
Africa:	
Egypt	14
South Africa, Republic of	20
Other	1
Total	35
Asia:	
China	1,300
India	500
Iran	35
Japan	1,800
Korea, North	200
Korea, Republic of	1,100
Other	90
Total	5,025
Oceania:	
Australia	250
World total	9,910

¹Includes capacities of operating plants as well as plants on standby basis.

TABLE 7
TALC AND PYROPHYLLITE: WORLD PRODUCTION, BY COUNTRY¹
(Short tons)

Country ²	1984	1985	1986	1987 ^P	1988 ^Q
Argentina (talc, steatite, pyrophyllite)	^r 25,104	^r 17,575	24,640	25,585	22,000
Australia (talc, chlorite, steatite, pyrophyllite)	205,867	153,652	207,294	209,196	210,000
Austria (unground talc)	147,722	144,903	146,959	143,255	143,000
Brazil (talc and pyrophyllite) ³	455,637	426,647	416,736	440,924	441,000
Burma	100	141	62	24	28
Canada (shipments) (talc, pyrophyllite, soapstone)	138,891	139,993	135,584	155,000	155,000
Chile	465	1,432	2,488	1,080	990
China ^Q	1,050,000	1,100,000	1,100,000	1,100,000	1,100,000
Colombia	7,479	9,492	9,935	13,147	13,200
Egypt	13,463	8,488	9,700	^r 7,300	7,700
Finland	360,976	351,138	313,253	^Q 364,000	364,000
France (ground talc)	322,315	342,705	347,189	^r 362,440	364,000
Germany, Federal Republic of (marketable)	19,030	22,835	24,123	21,809	22,000
Greece (steatite)	1,887	1,901	^Q 2,000	1,661	1,750
Hungary ^Q	19,300	18,700	17,700	16,500	14,300
India (pyrophyllite and steatite)	460,473	422,111	436,520	453,239	452,000
Iran	39,022	33,951	^Q 34,200	^Q 34,200	34,200
Italy (talc and steatite)	157,329	142,875	166,676	166,138	170,900
Japan ⁴	1,652,303	1,580,978	1,470,441	1,429,661	1,395,500
Korea, North ^Q	185,000	185,000	185,000	185,000	185,000
Korea, Republic of (talc and pyrophyllite)	935,475	1,027,880	879,291	939,026	937,000
Mexico	9,811	32,959	26,787	19,256	22,000
Nepal ⁵	8,372	6,630	9,678	3,901	4,400
Norway ^Q	^Q 124,561	110,000	110,000	110,000	110,000
Pakistan (pyrophyllite)	17,161	22,248	25,376	^Q 27,500	27,500
Paraguay ^Q	^Q 165	132	132	132	132
Peru (talc and pyrophyllite)	10,183	551	10,040	9,370	8,800
Philippines	1,022	380	^Q 1,100	(⁷)	—
Portugal	6,838	3,976	4,565	^Q 4,400	4,400
Romania ^Q	72,000	72,000	72,000	72,000	72,000
South Africa, Republic of ⁸	15,886	15,925	14,602	12,646	^Q 14,576
Spain (steatite)	^r 87,775	97,859	89,812	^Q 88,000	93,700
Sweden	19,712	15,432	2,205	^Q 2,200	2,200
Taiwan	20,591	19,357	23,757	24,363	22,000
Thailand (talc and pyrophyllite)	31,393	47,926	43,046	46,132	44,000
U.S.S.R. ^Q	570,000	570,000	570,000	580,000	580,000
United Kingdom	^r 21,399	22,046	13,230	13,811	13,200
United States (talc and pyrophyllite)	1,127,421	1,268,750	1,302,179	^r 1,281,789	1,376,560
Uruguay ^Q	^Q 1,828	1,700	1,700	1,700	1,700
Zambia	405	^r 2,200	293	284	290
Zimbabwe	314	482	879	569	550
Total	^r8,344,675	^r8,442,950	8,251,172	8,367,238	8,431,576

^Q Estimated. ^P Preliminary. ^r Revised.

¹ Table includes data available through May 24, 1989.

² In addition to the countries listed, Czechoslovakia produces talc, but available information is inadequate to make reliable estimates of output levels.

³ Total of beneficiated and salable direct shipping production of talc and pyrophyllite.

⁴ Includes talc, pyrophyllite, and pyrophyllite clay.

⁵ Data based on Nepalese fiscal year beginning mid-July of year stated.

⁶ Reported figure.

⁷ Revised to zero.

⁸ Includes talc and wonderstone.

