GYPSUM

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Pure gypsum is a white to transparent mineral, but sometimes impurities color it grey, brown, or pink. Its chemical name is calcium sulphate dihydrate, and its chemical formula is CaSO₄•2H₂O. When gypsum is heated, it loses about threequarters of its water and becomes hemihydrate gypsum (CaSO₄•½H₂O), which is soft and can be easily ground to a powder called hemihydrate gypsum plaster or plaster of paris. If this powder is then mixed with water to form a paste or slurry, then it will dry and set rock hard. The chemically combined water, previously driven off by heating, will recombine, and the material will revert to the original chemical composition of gypsum. While the hemihydrate gypsum plaster is in slurry form, it can be poured between two paper layers to make wallboard, used to fill cracks and crevices, or poured into a mold. Gypsum makes an ideal building material because it is fire resistant, abundant, economical, versatile, and fairly strong. It also can reduce or control sound, and its use can have environmental benefits.

Gypsum has been known for centuries and is one of the oldest building materials in the world. The earliest use of gypsum yet discovered was in Anatolia around 6000 B.C. Later, in about 3700 B.C., gypsum was used on the interiors of the great pyramids in Egypt.

Gypsum is found in every continent of the world and is one of the most widely used minerals. Gypsum mines are located all across North America, and some western States possess large desert deposits of powdery gypsum rock.

Synthetic gypsum is generated as a byproduct of reducing the emissions levels of coal-fired powerplants with flue-gas desulphurization (FGD) systems. These FGD systems not only keep the air clean, but they also provide a sustainable, ecologically sound source of pure gypsum. Synthetic gypsum also is generated by various other acid-neutralizing industrial processes.

In the United States, most gypsum is used to manufacture wallboard and plaster for homes, offices, and commercial buildings. An average new American home contains more than 7.31 metric tons (t) of gypsum or, in other terms, more than 6,144 square feet (571 square meters) of gypsum wallboard (Mineral Information Institute, 2001). Worldwide, gypsum is used in portland cement, which is used in concrete for highways, bridges, buildings, and many other structures that are part of our everyday life. Gypsum is also extensively used as a soil conditioner on large tracts of land in suburban areas and in agricultural regions.

Production

After a record setting year in 1999, the gypsum industry in the United States has experienced drops in both production and consumption in both 2000 and 2001. Synthetic gypsum increased in its use as a raw material for wallboard plants in both 2000 and 2001.

During 2001 and for the previous 5 years, the U.S. gypsum industry experienced several acquisitions, mergers, bankruptcy reorganization filings, and announcements of construction of new plants and expansion of production capacity at existing plants. Also in 2001, several older, less efficient manufacturing facilities were temporarily idled, closed, or dismantled.

On June 25, USG Corp. and its domestic subsidiaries, U.S. Gypsum Co., USG Interiors, Inc., and L&W Supply Corp., filed voluntary petitions for reorganization under chapter 11 of the U.S. Bankruptcy Code (USG Corp., 2001§¹). This filing was done to manage the growing costs of asbestos litigation and to resolve asbestos claims fairly. Since 1994, U.S. Gypsum has paid more than \$450 million to manage and resolve asbestos-related litigation (Sharpe, 2002).

In February, U.S. Gypsum permanently closed its old plant in Oakfield, NY, and a manufacturing line at the Fort Dodge, IA, plant. The Oakfield, NY, plant is currently [2001] being dismantled. National Gypsum Co. completed construction and startup of a new plant at Apollo Beach in the Tampa, FL, area. The raw material source for this plant is synthetic gypsum supplied from Tampa Electric Co. Also during 2001, Georgia-Pacific Gypsum Co. announced the permanent closure of wallboard operations in Savannah, GA, and Long Beach, CA, and the indefinite idling of wallboard production lines at Acme, TX, Sigurd, UT, and Blue Rapids, KS. Georgia-Pacific Gypsum also sold its Delair, NJ, wallboard paper mill to National Gypsum. These closures and idling of Georgia-Pacific Gypsum plants represent curtailing the company's North American production by about 45%. During 2001, Georgia-Pacific Gypsum also began construction of an industrial plaster manufacturing facility at its wallboard plant near Las Vegas, NV. James Hardie Gypsum closed the guarry at the Blue Diamond plant site and sold the properties. Early in 2002, British Plasterboard, plc (BPB), acquired James Hardie Gypsum's three U.S. plants located in Nashville, TN, Las Vegas, NV, and Seattle, WA. James Hardie Gypsum will now concentrate on its fiber cement business. BPB Celotex closed its wallboard plant in Port Clinton, OH, during 2001. Also in 2001, Lafarge North America Inc. began operations at its new wallboard plant near Palatka, FL. The raw material for this plant is synthetic gypsum supplied from the nearby Seminole Electric Cooperative, Inc. power generating unit. In early 2002, Lafarge also acquired the Newark, NJ, wallboard plant of Continental Gypsum Co. (Sharpe, 2002).

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¹References that include a section twist (§) are found in the Internet References Cited section.

Gypsum industry data for this report are collected by the U.S. Geological Survey (USGS) from semiannual and annual surveys of gypsum operations and are derived from monthly statistics provided by the Gypsum Association in Washington, DC. The 2001 USGS survey, which canvassed 105 gypsum production operations, which accounted for almost all domestic output, had a response rate of approximately 96%. The output of producers who did not respond to the survey was estimated from their survey responses in previous years or from other sources familiar with the gypsum industry.

The United States continued to lead the world in gypsum production in 2001, accounting for 15.6% of reported global output. During 2001, domestic output of crude gypsum decreased by 16.6% from that of 2000 to 16.3 million metric tons (Mt) valued at \$119 million (table 1).

Crude gypsum was mined in the United States by 27 companies at 51 mines in 19 States. Nearly 73% of the gypsum was mined by only 6 companies with 29 mines. The top producing States, in descending order, were Oklahoma, Iowa, Nevada, Texas, California, and Arkansas. These States, with 27 mines, each produced more than 1 Mt and together accounted for 66% of total domestic output (table 2).

The U.S. gypsum industry consisted primarily of a few large, vertically integrated companies that mined gypsum and manufactured wallboard, plaster, and other gypsum products. Companies with the most mines were U.S. Gypsum with nine; National Gypsum, seven; Georgia-Pacific, six; Celotex, three; Harrison Gypsum Inc., three; James Hardie Gypsum, two; and PABCO Gypsum, two. These companies produced slightly more than 76% of total U.S. crude gypsum. The 10 largest gypsum mines in the United States accounted for more than 45% of domestic output in 2001. These mines, which were owned by six companies, each had an average output of 736,000 t.

During 2001, gypsum was "calcined" (partially dehydrated by heating) at 66 plants operated by 10 companies in 29 States, principally to produce feedstock for wallboard and plaster plants. The leading States, in descending order, were California, Arkansas, Iowa, Texas, Florida, Nevada, and Indiana. These 7 States, with 28 plants, each produced more than 1.0 Mt of calcined gypsum and together accounted for more than 51% of national output (table 3).

Companies with the most calcining plants were U.S. Gypsum with 21; National Gypsum, 18; Georgia-Pacific, 14; and Celotex, 4. These companies produced more than 79% of national output. The largest 10 calcining plants in the United States accounted for more than 32% of production in 2001. These plants, owned by seven companies, each had an average output of more than 618,000 metric tons per year.

In addition to mined gypsum production, synthetic gypsum was generated as a byproduct by various industrial processes. The primary source of synthetic gypsum was FGD at coal-fired electric powerplants. Smaller amounts of synthetic gypsum were derived from acid neutralization processes and titanium dioxide production. Synthetic gypsum was used as a substitute for mined gypsum, principally for wallboard manufacturing, agricultural purposes, and cement production. In response to USGS surveys, 7 companies operating in 11 States reported that almost 1.17 Mt of synthetic gypsum generated by

industrial processes at their mines and plants was sold or used for such applications in 2001. In addition to these companies, about 80 domestic coal-fired electric utilities generated approximately 25.8 Mt of synthetic gypsum from their FGD systems during 2001 (American Coal Ash Association, written commun., 2002). During 2001, almost 27% of all synthetic gypsum generated by domestic coal-fired electric utility FGD systems was used, compared with 19% in 2000. Of this 25.8 Mt total of synthetic gypsum generated, 5.65 Mt of the synthetic gypsum generated during the year was used for wallboard production, 471,000 t of the synthetic gypsum was used in cement and concrete manufacture, and 104,000 t was used for agricultural purposes (R.S. Kalyoncu, Physical Scientist, U.S. Geological Survey, written commun., 2002).

During 2001, 10 companies manufactured gypsum wallboard at 80 plants in the United States. Plant production capacity was expanded by 4.6% to 36.8 billion square feet (3.42 billion square meters) by yearend (Gypsum Association, 2001, 2002). Several new wallboard plants became operational during 2001, providing additional production capacity and replacing older, less efficient manufacturing facilities (Sharpe, 2002). Wallboard shipments during 2001 increased by 6% from those of 2000 to approximately 29.5 billion square feet (2.74 billion square meters). This represents only 79.7% of the total production capacity (Gypsum Association, 2001, 2002).

Eleven new wallboard plants were built in the United States during the past few years, and all the new wallboard plants use as their raw material only high-quality, low-cost synthetic gypsum generated by FGD systems operated by electric utilities. Some gypsum companies have expanded or will be expanding synthetic gypsum use at existing wallboard plants, as well (Sharpe, 2002). At least a dozen wallboard plants in the United States already are using some synthetic gypsum to augment their feedstock from gypsum mines.

A portion of more than 4 Mt of gypsum waste generated every year by wallboard manufacturing, wallboard installation, and building demolition was recycled. Gypsum waste generated by the wallboard manufacturing process can be recycled easily. The gypsum core and paper are disaggregated and fed back into the raw material stream along with new material. Wallboard scrap from new construction may be ground and used as a soil conditioner, and in some cases, wallboard scrap from new construction may be returned to a plant for recycling (Sharpe, 2002). Other potential markets for recycled gypsum waste are in cement production, as a stucco additive, in sludge drying, in water treatment, in grease absorption, and for marking athletic fields (Turley, 1998; California Integrated Waste Management Board, 2000§).

Consumption

In 2001, the domestic construction industry activity was fairly level, with some sectors showing small increases, and others showing small decreases. In 2001, new housing starts increased by 2.17% compared with those of 2000, but nonresidential and commercial construction in 2001 decreased by 3.43% compared to that of 2000. Apparent domestic consumption (defined as mine output plus reported synthetic used plus imports minus exports plus adjustments for industry stock changes) was nearly

31.4 Mt during the year. This was a 7.79% decline in U.S. gypsum consumption compared with that of 2000. Domestic sources (mining plus an estimated 6.82 Mt of synthetic gypsum) met more than 74% of domestic consumption requirements; imports satisfied the remaining needs. In 2001, nearly 22% of the gypsum consumed in the United States came from synthetic sources compared with about 15% in 2000.

Gypsum output is categorized as either calcined or uncalcined (table 4). Calcined gypsum was produced domestically from crude gypsum to manufacture wallboard and plaster products during 2001. Uncalcined gypsum, used for portland cement production and agriculture, accounted for virtually all remaining consumption during the year.

In 2001, nearly 40% of the calcined gypsum used to manufacture wallboard was consumed in the production of regular ½-inch wallboard. Fire-resistant wallboard, mobile-home board, water- and moisture-resistant board, lath, veneer base, and sheathing composed most of the balance (table 5). Metropolitan areas in the mid- and south Atlantic, east north-central, and the Pacific regions were the leading sales areas for gypsum wallboard products.

During 2001, more than 76% of the uncalcined gypsum consumed in the United States was for portland cement production; the remainder was used primarily in agriculture. Gypsum, which is added to cement to retard its setting time, accounted for about 2% to 5% by weight of cement output (Dutton, 1997). Finely ground gypsum rock was used in agriculture and other industries to neutralize sodic soils, to improve soil permeability, to add nutrients, to stabilize slopes, and to provide catalytic support for maximum fertilizer benefits. Small amounts of high-purity gypsum also were used in a wide range of industrial operations, including the production of glass, paper, foods, and pharmaceuticals.

Prices

In 2001, the average values (free on board mine or plant) reported by U.S. producers were \$7.31 per metric ton for crude gypsum and \$18.42 per ton for calcined gypsum. The average value for plaster reported by domestic producers during the year was \$5.44 per 100 pounds (\$11.99 per 100 kilograms). In 2001, the average value of uncalcined gypsum used in agriculture and in cement production was \$15.98 per ton.

During 2001, prices for gypsum wallboard generally decreased in response to decreased demand and supply. Prices for regular ½-inch wallboard dropped in 11 of the 20 major U.S. metropolitan areas that were sampled, remained the same in 3 of the 20, and increased in 6 of the 20. During 2001, the changes in prices for each metropolitan area ranged from a decrease of \$65 per 1,000 square feet (\$70 per 100 square meters) to an increase of \$145 per 1,000 square feet (\$156 per 100 square meters). Prices in these 20 U.S. cities ranged from \$93 to \$311 per 1,000 square feet (\$100 to \$335 per 100 square meters) at yearend. The average of the prices in these 20 U.S. cities was \$201 per 1,000 square feet (\$216 per 100 square meters) in January of 2001 and \$199 per 1,000 square feet (\$214 per 100 square meters) at yearend (Engineering News-Record, 2001a, b).

Foreign Trade

In 2001, the United States was the world leader in the international trade of gypsum and gypsum products. The Nation imported crude gypsum from 10 countries (table 6) and exported gypsum wallboard to 69 countries and territories. U.S. imports accounted for most of the world's waterborne shipment of crude gypsum (Phillips, 1998). Only a small amount of crude gypsum was exported by the United States (table 7).

Net imports of crude gypsum in 2001, which decreased by 10% from those of 2000, accounted for nearly 27% of apparent consumption. Much of this import dependence can be attributed to the lack of adequate domestic gypsum resources near large East Coast wallboard markets. These imports came primarily from Canada and Mexico. The two countries primarily supplied wallboard plants in coastal markets; most imports from Canada went to East Coast plants, and Mexican sources chiefly served the West Coast. Foreign subsidiaries of U.S. gypsum companies produced much of the gypsum that was imported for the wallboard plants. Smaller amounts of imported gypsum were used in portland cement production.

Wallboard exports, totaling about 72.6 million square feet (6.75 million square meters) and valued at \$24.8 million, were primarily to countries and territories in Asia, Europe, and Latin America. Wallboard imports were about 614 million square feet (57.1 million square meters) valued at \$85.7 million.

World Review

In 2001, 90 countries produced gypsum, 8 of which accounted for nearly 67% of the total world production (table 8). Global gypsum production during 2001 is estimated to be more than 104 Mt. More than 110 million metric tons per year of synthetic gypsum is generated worldwide (Roskill Information Services Ltd., 2000). The high demand for gypsum in the United States generated by the domestic construction industry was not matched abroad, with the exception of Canada and Mexico, which export to U.S. markets. The estimate for world production is probably lower than actual production because output that is used by the gypsum producers in some countries to make other products onsite was not reported. Additionally, production from small deposits in developing nations was intermittent and in many cases unreported.

As a low-value, high-bulk commodity drawn from deposits widely distributed throughout the world, gypsum tended to be consumed within the many countries that mine it. Less than 20% of the world's crude gypsum production was estimated to enter international trade. Only a few countries, such as Canada, Mexico, Spain, and Thailand, were major crude gypsum exporters. The proximity of large U.S. wallboard markets also has made Canada and Mexico significant gypsum exporters.

Although use of gypsum wallboard increased worldwide, only industrialized nations, such as the United States, used gypsum primarily for wallboard products. In developing countries (especially in the Middle East and Asia), most gypsum was used in the production of cement or as a plaster product.

Estimated world production capacity for gypsum wallboard in 2001 exceeded 60 billion square feet (about 5.6 billion square meters) at more than 250 plants worldwide. Almost one-half of

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this capacity was in the United States, and Asia and Western Europe each accounted for about one-fifth. Construction or expansion of dozens of wallboard plants was underway during the year in many countries throughout the world, and as in the United States, the use of synthetic gypsum by other industrialized nations increased.

In early 2001, Boral Ltd. and Lafarge Group entered into a joint venture to build a wallboard manufacturing plant in Seoul, Republic of Korea. The plant will have maximum production capacity of 581 million square feet per year (54 million square meters per year) and is expected to become operational in the second half of 2002. Another Lafarge Group joint venture—this one with Arcom Gips—will expand the only wallboard plant near Bucharest, Romania. The increased production will help meet the needs of Romania and export to other Balkan countries. The Romanian plant has a capacity of 31.9 million square feet per year (2.97 million square meters per year) (Lafarge Group, 2002§). Lafarge also completed a new wallboard plant at Lippendorf, Germany. The plant uses synthetic gypsum from a nearby lignite-fired electric powerplant as its raw material and has a manufacturing capacity of 215 million square feet per year (20 million square meters per year). Lafarge also is part owner with Gyproc Benelux of a new plant in Poland that will begin production during the first half of 2002 and will have manufacturing capacity of 178 million square feet per year (54.1 million square meters per year) (Sharpe, 2002).

Knauf Group and Lafarge formed a joint venture to build a new wallboard plant in Brindisi, Italy. Plant construction began in 2001 and will run through 2003. The new plant will use synthetic gypsum as its raw material. A Kriwa-Knauf joint venture upgraded a gypsum processing facility in Moldova. During 2001, production also began at a new Knauf wallboard plant in Puerta del Inca, Argentina. The new plant has a capacity of 86 million square feet per year (7.99 million square meters per year) (Sharpe, 2002).

BPB built a new wallboard plant in Termoli, Italy, with capacity of 269 million square feet per year (25 million square meters per year). The new plant also will manufacture plaster. BPB commissioned another new wallboard plant in Chennai, Italy. BPB formed a joint venture with Orascom Group to secure controlling interest in Egypt Gypsum Co. BPB also closed its 112-million-square-foot-per-year (10.4-million-square-meter-per-year) wallboard plant at Gultstein, Germany. In 2001, BPB also acquired Turkey's second largest producer of building plasters—Dogan Alci (Sharpe, 2002).

Other significant project developments in 2001 were as follows: USG completed construction of a new wallboard plant near Monterrey, Mexico; Ceramicos Santiago SA is building a 160-million-square-foot-per-year (14.9-million-square-meter-per-year) wallboard plant near Santiago, Chile, that should be operational during 2002; and the Saudi Arabian Oil and Quarries Ministry conducted feasibility studies for constructing a new wallboard plant near Kasab, Saudi Arabia (Sharpe, 2002).

Outlook

Housing starts for the first half of 2002 suggest that U.S. production and consumption may rise slightly or at least match

the levels of 2001 (National Association of Home Builders, 2002§). Other supply-and-demand indicators, such as construction rates for new office and commercial buildings and the continuing trend to construct larger homes with more rooms, are also evidence that the gypsum industry will be close to the same level as in 2001. As the Transportation Equity Act for the 21st Century (Public Law 105-178, enacted June 9, 1998), for road building and repair through 2003, is implemented, it should be an important stimulant for the domestic cement industry and for the use of gypsum in cement.

During its restructuring period and beyond, U.S. Gypsum's operations will continue without interruption. U.S. Gypsum's goal is to address its asbestos liability through chapter 11, to complete its restructuring, and to emerge from chapter 11 as quickly as possible with a comprehensive and final resolution (USG Corp., 2001§). The bankruptcy court determined that January 15, 2003, will be the last day to file claims in the U.S. Gypsum chapter 11 proceeding (USG Inc., 2002§).

During the next several years, the use of mined gypsum may decline significantly in the United States as greater quantities of synthetic gypsum supplant it in wallboard manufacturing. Some actual and planned mine closings already have been attributed to substitution by synthetic gypsum (Gersten, 1999). At least an additional 6 billion square feet per year (about 560 million square meters per year) of new wallboard capacity designed for synthetic gypsum feedstock is scheduled to come online by 2002 (Henkels, 1999). This rate of substitution seems likely to accelerate additional mine closings during the next decade.

As public awareness comes to bear over the next few years, the gypsum industry probably will increase its recycling of scrap materials into raw materials streams. There also will be an increase in the use of ecolabels, such as the Scientific Certification System Green Cross, which certifies there is recycled and recovered content in each product.

The domestic gypsum industry is poised for a major change on the supply side. The appearance of very large capacity wallboard plants will trigger a major supply shift. As the U.S. gypsum industry undergoes this change towards large capacity wallboard plants supplied with synthetic gypsum, older, less efficient, and smaller, natural-gypsum-fed plants will find it increasingly difficult to compete. With prices declining, producers will continue to retire older capacity (Harris, 2001).

Industry trends also indicate significant developments abroad in the coming decade. For example, the pace and magnitude of wallboard plant construction in China indicates that China, with more than a billion potential consumers, could become one of the world's leading gypsum wallboard markets. Elsewhere, the extent of wallboard capacity growth in regions of Asia, Europe, South America, and Latin America reveals that wallboard manufacturing is likely to become a more significant application of gypsum worldwide.

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TABLE 1 SALIENT GYPSUM STATISTICS 1/

(Thousand metric tons and thousand dollars)

	1997	1998	1999	2000	2001
United States:					
Crude:					
Mined	18,600	19,000	22,400	19,500	16,300
Value	\$132,000	\$132,000	\$157,000	\$165,000	\$119,000
Imports for consumption	8,420	8,680	9,340	9,210	8,270
Synthetic gypsum sales	2,700	3,000	5,200	4,950	6,820
Calcined:					
Produced	17,200	19,400	22,300	21,000	19,100
Value	\$302,000	\$330,000	\$381,000	\$353,000	\$352,000
Products sold, value	\$2,550,000	\$3,150,000	\$3,540,000	\$2,860,000	\$2,470,000
Exports, value	\$89,700	\$96,300	\$93,300	\$102,000	\$96,400
Imports for consumption, value	\$229,000	\$262,000	\$465,000	\$269,000	\$231,000
World, production	107,000 r/	104,000 r/	109,000 r/	108,000 r/	104,000 e/

e/ Estimated. r/ Revised.

 $\begin{tabular}{ll} TABLE~2\\ CRUDE~GYPSUM~MINED~IN~THE~UNITED~STATES,~BY~STATE~$1/$\\ \end{tabular}$

		2000			2001	
		Quantity			Quantity	
	Active	(thousand	Value	Active	(thousand	Value
State	mines	metric tons)	(thousands)	mines	metric tons)	(thousands)
Arizona and New Mexico	5	1,440	\$7,480	5	872	\$5,960
Arkansas, Kansas, Louisiana	4	2,320	21,000	4	1,980	20,600
California, Nevada, Utah		3,390	20,800	13	3,680	17,200
Colorado, South Dakota, Wyoming	- 6	1,650	13,400	5	1,030	7,750
Indiana, New York, Ohio, Virginia	_ 4	1,970	32,900	4	1,580	11,100
Iowa	- 6	2,210	17,000	5	1,870	14,000
Michigan	_ 4	1,980	19,800	3	929	10,600
Oklahoma	- 8	2,830	23,500	6	2,630	21,300
Texas	_ 5	1,760	8,980	6	1,730	10,500
Total	56	19,500	165,000	51	16,300	119,000

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

 ${\bf TABLE~3}$ CALCINED GYPSUM PRODUCED IN THE UNITED STATES, BY STATE 1/

		2000			2001			
		Quantity		Quantity				
	Active	(thousand	Value	Active	(thousand	Value		
State	plants	metric tons)	(thousands)	plants	metric tons)	(thousands)		
Alabama	1	444	\$11,400	1	488	\$11,600		
Arizona, Colorado, New Mexico, Utah	4	1,890	13,700	6	1,750	15,800		
Arkansas, Louisiana, Oklahoma	- 6	2,190	35,400	6	2,620	39,600		
California	- 6	1,840	36,500	6	1,790	35,500		
Maryland, North Carolina, Virginia	4	1,170	27,700	4	1,210	29,200		
Florida	_ 3	1,320	29,600	3	1,360	35,000		
Georgia	1	238	6,040	1	250	6,340		
Illinois, Indiana, Kansas	- 6	2,130	34,400	6	1,760	31,600		
Iowa	4	1,160	16,400	5	1,490	26,000		
Massachusetts, New Hampshire, New Jersey	_ 5	1,230	29,500	5	1,210	29,000		
Michigan	_ 3	366	11,200	3	392	13,200		
Nevada	4	1,450	13,000	4	1,240	7,350		
New York	_ 4	1,340	27,500	3	672	16,900		
Ohio	_ 3	444	7,640	3	286	6,270		
Pennsylvania	_ 1	234	5,390	1	490	9,830		
Texas	_ 5	1,470	21,300	5	1,410	23,400		
Washington and Wyoming	4	2,090	26,300	4	727	15,800		
Total	64	21,000	353,000	66	19,100	352,000		

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

^{1/} Data are rounded to no more three significant digits.

TABLE 4 SOLD OR USED IN THE UNITED STATES, BY USES 1/

(Thousand metric tons and thousand dollars)

	2	2000		001
Use	Quantity	Value	Quantity	Value
Uncalcined:				
Portland cement	3,800	44,100	2,690	34,400
Agriculture and miscellaneous 2/	1,920	28,100	844	22,000
Total	5,720	72,200	3,530	56,400
Calcined:				
Plasters	896	110,000	1,390	167,000
Prefabricated products 3/	22,900	2,680,000	24,300	2,250,000
Total calcined	23,800	2,790,000	25,700	2,410,000
Grand total	29,500	2,860,000	29,200	2,470,000

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

 ${\bf TABLE~5}$ PREFABRICATED GYPSUM PRODUCTS SOLD OR USED IN THE UNITED STATES 1/

		2000			2001	
	Quantity	Quantity		Quantity	Quantity	
	(thousand	(thousand	Value	(thousand	(thousand	Value
Product	square feet)	metric tons) 2/	(thousands)	square feet)	metric tons) 2/	(thousands)
Lath:						
3/8 inch	3,990	3	\$1,040	1,130	(3/)	\$286
1/2 inch	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)
Other	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)
Total	3,990	3	1,040	1,130	(3/)	286
Veneer base	431,000	419	49,900	472,000	471	45,400
Sheathing	240,000	214	29,300	252,000	218	26,800
Regular gypsumboard:						
3/8 inch	1,370,000	1,090	116,000	1,630,000	1,440	117,000
1/2 inch	12,100,000	9,760	1,170,000	13,300,000	9,690	908,000
5/8 inch	1,160,000	1,250	69,600	1,820,000	1,930	177,000
1 inch	168,000	189	39,500	201,000	223	46,200
Other 4/	274,000	240	36,800	569,000	485	57,200
Total	15,100,000	12,500	1,430,000	17,500,000	13,800	1,250,000
Type X gypsumboard	7,620,000	7,420	792,000	8,620,000	7,840	625,000
Predecorated wallboard	99,000	98	29,600	153,000	158	31,200
5/16-inch mobile home board	1,080,000	816	118,000	909,000	650	99,900
Water- and moisture-resistant board	1,170,000	989	143,000	1,190,000	928	117,000
Other	436,000	402	84,100	337,000	224	54,800
Grand total	26,100,000	22,900	2,680,000	29,500,000	24,300	2,250,000

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

^{2/} Includes synthetic gypsum.

^{3/} Includes weight of paper, metal, or other materials and some synthetic gypsum.

^{2/} Includes weight of paper, metal, or other materials.

^{3/} Less than 1/2 unit.

^{4/} Includes 1/4-, 7/16-, and 3/4-inch gypsumboard.

 ${\bf TABLE~6} \\ {\bf IMPORTS~FOR~CONSUMPTION~OF~CRUDE~GYPSUM,~BY~COUNTRY~1/}$

(Thousand metric tons and thousand dollars)

	200	00	200	01
Country	Quantity	Value	Quantity	Value
Australia	16	223		
Canada 2/	6,380	66,100	5,610	53,900
China	(3/)	2	(3/)	2
Cyprus			9	482
Dominican Republic	(3/)	3		
Germany	(3/)	13	(3/)	8
Japan	(3/)	64	(3/)	18
Korea, Republic of	(3/)	3		
Mexico	2,020	14,600	1,780	14,500
Morocco	(3/)	7	(3/)	2
South Africa	(3/)	14		
Spain	798	8,110	787	7,120
Thailand			74	1,060
United Kingdom	(3/)	229	(3/)	118
Total	9,210	89,300	8,270	77,300

⁻⁻ Zero.

Source: U.S. Census Bureau.

TABLE 7 SUMMATION OF U.S. GYPSUM AND GYPSUM PRODUCTS TRADE DATA 1/

(Thousand metric tons and thousand dollars)

	Crude	2/	Plaste	ers 3/	Boar	ds 4/	Other	Total
Year	Quantity	Value	Quantity	Value	Quantity	Value	value 5/	value
Exports:								
2000	161	12,600	248	30,200	58	27,100	32,200	102,000
2001	295	12,900	260	38,200	61	24,800	20,400	96,400
Imports for consumption:								
2000	9,210	89,300	15	3,920	783	113,000	62,600	269,000
2001	8,270	77,300	9	4,150	516	85,700	63,800	231,000

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

Source: U.S. Census Bureau.

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

^{2/} Includes anhydrite.

^{3/} Less than 1/2 unit.

^{2/} Import and export data are for "Gypsum, anhydrite," Harmonized Tariff Schedule of the United States (HTS) code 2520.10.0000.

^{3/} Import and export data are for "Plasters," HTS code 2520.20.0000.

^{4/} Import and export data are for "Boards, sheets, panels, tiles, and similar articles, not ornamented--faced or reinforced with paper or paperboard only," HTS code 6809.11.0000.

^{5/} Import and export data are for "Boards, sheets, panels, tiles, and similar articles, not ornamented: Other," HTS code 6809.1900.00 and "Other articles," HTS code 6809.90.0000.

 ${\bf TABLE~8}$ GYPSUM: WORLD PRODUCTION, BY COUNTRY 1/2/

(Thousand metric tons)

Country	1997	1998	1999	2000	2001 e/
Afghanistan e/	3	3	3	3	3
Algeria		275 e/	1,316 r/	1,341 r/	1,350
Argentina	— 729 r/	650	647 r/	514 e/	500
Australia e/	1,800	1,900	2,500	3,800	3,800
Austria e/ 3/	1,000	1,000	1,000	1,000	1,000
Azerbaijan e/		60	60	60	60
Bhutan		53	54 e/	54 e/	55
Bolivia	(4/)		e/	e/	
Bosnia and Herzegovina e/	30	30	30	30	30
Brazil 3/	1,507	1,632	1,456	1,541 r/	1,500
Bulgaria 3/	156	184 r/	169 r/	170 r/	170
Burma	38	36	45	48	51
Canada 3/	8,628	8,967	9,345	9,232 r/	8,556
Chile	398	781	886	376 r/	400
China e/	9,100	6,800	6,700	6,800	6,800
Colombia e/	565	560 e/	560 e/	560	560
Croatia	102	105 r/	137 r/	151 r/	150
Cuba e/	130	130	130	130	130
Cyprus	234	297	182	138	138
Czech Republic	241	222	136 r/	82 r/	82
Dominican Republic	115	80	812 r/	110 r/	176
Ecuador	2	2 e/	1 r/	1 r/	1
Egypt 3/	2,423	1,338	2,000 r/e/	2,000 e/	2,000
El Salvador e/	6	6	6	6	6
Eritrea	(4/)	(4/)	1 r/	(4/) r/	(4/)
Ethiopia 3/	120	120 r/	36 r/	47 r/	51
France e/ 3/	4,500	4,500	4,500	4,500	4,500
Germany (marketable) e/ 3/	3,000	3,000	2,500	2,500	2,500
Greece e/ 3/	663 5/	600	600	600	600
Guatemala e/	3	52 r/	110 r/	212 r/	100
Honduras e/		30	30	30	30
Hungary e/ 3/	192 r/	185 r/	203 r/.	251 r/	250
India	2,031	2,192	2,200 e/	2,210 e/	2,250
Indonesia		(4/)	6	5	6
Iran 6/	9,966 r/	11,843	10,834	11,000 e/	11,000
Iraq e/ 7/	85	100	100	80	100
Ireland	477	450	450	450 e/	450
Israel		56	140 r/	130 r/	133
Italy e/	1,300	1,300	1,300	1,300	1,300
Jamaica		154	236	330 r/	330
Japan	5,371 194	5,305 176	5,549 245 r/	5,917 r/ 158 r/	5,900
Jordan V / 2/				8 r/ 5/	163
Kenya e/ 3/	12 r/	11 r/ 130	10 r/		9 150
Laos			135	15 r/	
Latvia Lebanon e/		119 2 r/	97 2 r/	122 2 r/	125 16
Libya e/	125	150	150	175	150
Luxembourg e/ 3/	(4/)	(4/)	(4/)	(4/)	(4/)
Macedonia e/		30 r/	30 r/	30 r/	30
Mali e/	— 23 (4/)	1	1	1	1
Mauritania	— (4 <i>i</i>)	100	100 e/	100 e/	100
Mexico 3/	5,869	7,045	6,954	7,554 r/	7,500
Moldova		20 r/	19 r/	32 r/	32
Mongolia e/	25	25	25	25	25
Morocco e/	— 450	450	450	450	450
Namibia e/		3	1	1	1
Nicaragua 3/	16 e/	23	27 r/	28 r/	28
Niger		2 e/	2 7 17	1 r/	28
Nigeria e/	300	300	200	200 r/e/	200
Pakistan	465	244	245	377	350
Paraguay e/		5	4	4	4
Peru Peru	64	79	76	52	52
Poland 3/	1,618	1,703 r/	2,023 r/	2,000 r/	2,000
C = - C = - t = - t = - 1	1,010	1,705 1/	4,043 1/	2,000 1/	2,000

See footnotes at end of table.

TABLE 8--Continued GYPSUM: WORLD PRODUCTION, BY COUNTRY 1/2/

(Thousand metric tons)

Country	1997	1998	1999	2000	2001 e/
Portugal e/ 3/	500	500	500	500	500
Romania	79	75	75	75 e/	75
Russia	559	609	650	700 e/	700
Saudi Arabia e/	365	330	380 r/ 5/	400 r/	400
Serbia and Montenegro	32	28 r/	34 r/	47 r/	50
Sierra Leone e/	(4/)	(4/)	(4/)	(4/)	(4/)
Slovakia 3/	116	128	117	124 r/	125
Slovenia e/	10	10	10	10	10
Somalia e/	1	2	2	2	2
South Africa	365	488	505 r/	413	383
Spain e/ 3/	8,000	8,000	7,500	7,500	7,500
Sudan e/ 3/	4	3	4	4	4
Switzerland e/	300	300	300	300	300
Syria	330	325 r/	394 r/	333 r/	345
Taiwan	2	2	2 r/	2 r/	1
Tajikistan e/	26	32	35	35	35
Tanzania 3/	46	59	40 r/	60 r/	64
Thailand	8,858	4,334	5,005	5,830	5,900
Tunisia e/	100	100	100	100	100
Turkey	414	352	243 r/	303 r/	300
Turkmenistan e/	85	100	100	100	100
United Arab Emirates e/	90	90	90	90	90
United Kingdom e/ 3/	2,000	2,000	1,800	1,500	1,500
United States 8/	18,600	19,000	22,400	19,500	16,300
Uruguay	943	1,123	1,050	1,040 r/	1,050
Venezuela	30	80	42	25	30
Yemen	101 e/	102	103 r/	100 e/	100
Zambia e/ 7/ 9/	11	11	11	10	10
Total	107,000 r/	104,000 r/	109,000 r/	108,000 r/	104,000

e/ Estimated. r/ Revised. -- Zero.

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

^{2/} Table includes data available through July 15, 2002.

^{3/} Includes anhydrite.

^{4/} Less than 1/2 unit.

^{5/} Reported figure.

^{6/} Data are for years beginning March 21 of that stated.

^{7/} For cement production only. Information is insufficient to formulate reliable estimates for output for other uses (plaster, mortar, etc.).

^{8/} Excludes byproduct gypsum.

^{9/} Data are for years beginning March 1 of that stated.