



# 2017 Minerals Yearbook

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## GYPSUM [ADVANCE RELEASE]

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# GYPSUM

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In 2017, the United States ranked first worldwide in the production of crude mined gypsum, with 20.7 million metric tons (Mt) of production and a reported value<sup>1</sup> of \$155 million (tables 1, 7). That represented a 5% increase in tonnage and a slight decrease in value from the revised 2016 production of 19.8 Mt valued at \$158 million. The United States was the world's leading producer and consumer of mined crude gypsum, with estimated production of 20.7 Mt of crude gypsum, followed by Iran (16 Mt, estimated), and China (15.5 Mt, estimated) (table 7). The apparent consumption of gypsum in the United States increased by 14% to 46.3 Mt in 2017 from 40.7 Mt in 2016. Calcined gypsum production decreased slightly to 17.8 Mt in 2017 compared with 17.9 Mt produced in 2016.

The sales of synthetic gypsum increased by 24% to 22.8 Mt in 2017. Coal-burning electric powerplants in the United States are required to operate sulfur dioxide scrubbing systems, which results in the precipitation of large quantities of byproduct gypsum. Because byproduct gypsum was available, often at a substantially lower cost than its mined counterpart, a number of wallboard production facilities have been constructed adjacent to coal-fired electric powerplants. In 2017, approximately 30% of the synthetic gypsum produced in the United States was neither sold nor used and in most cases was discarded (American Coal Ash Association, 2018).

## Legislation and Government Programs

Several million tons of gypsum waste are generated every year during building demolition, wallboard installation, and wallboard manufacturing. Construction costs are lower when full pieces of uncut wallboard are used rather than multiple, smaller remnants. As a result, between 10% and 12% of the wallboard used in new construction and renovation is discarded as scrap. Only a small part of that waste has been recycled. The most recent legislative action concerning the disposal of gypsum was in 2010 when the Massachusetts Department of Energy and Environmental Affairs banned the disposal of clean wallboard from State waste disposal facilities (Massachusetts Department of Energy and Environmental Affairs, 2011). To date, no other State has instituted a similar regulation that addresses the disposal of wallboard. As landfill space becomes scarcer, recycling is expected to increase. In addition to recycling scrap in wallboard plants, wallboard scrap may also be ground and used as a soil conditioner.

Wallboard manufacturers and the construction industry have been exploring ways to return scrap and waste wallboard to plants for recycling. Other potential markets for recycled gypsum include cement production, as a stucco additive, sludge drying, water treatment, grease absorption, and athletic-field

marking. Until costs and legislation associated with the disposal of scrap gypsum in landfills become more restrictive, recycling likely will continue to remain a low priority within the industry.

Imports of corrosive wallboard from China into the United States remained an issue, although new complaint reports have ceased. By yearend 2017, the U.S. Consumer Product Safety Commission received 4,051 reports of possible corrosive wallboard from residents in 44 States, the District of Columbia, American Samoa, and Puerto Rico. Most complaints were filed for homes constructed during 2006 and 2007 (U.S. Consumer Product Safety Commission, 2017). Sulfide gases emitted from the problematic drywall were suspected of damaging copper wiring and plumbing and also posed concerns for human health (Global Gypsum Magazine, 2010a). Following several years of complaints regarding corrosive wallboard imported from China, a class-action settlement among owners of approximately 20,000 affected single-family homes, most of which were located in Gulf Coast States and the southern United States, and Chinese wallboard manufacturer Knauf Plasterboard Tianjin Co. Ltd. was settled on July 9, 2013, with claims accepted through October 25, 2013 (U.S. District Court, 2013). By March 2016, a total of 24,312 received claims had been reviewed with disbursed payments of \$82,565,727 under the Chinese Drywall Settlement Program (U.S. District Court, 2016). A separate lawsuit by Porter-Blaine Corp. and subsidiary Venture Supply Inc., filed against Beijing New Building Materials, Knauf Gips, Liberty Mutual Insurance, and Taishan Gypsum Co., remained unsettled through 2017 (U.S. District Court, 2017).

## Production

Industry data for gypsum were collected by the U.S. Geological Survey (USGS) from semiannual and annual surveys of gypsum operations and from quarterly data provided by the Gypsum Association. In 2017, the USGS annual survey canvassed 117 gypsum operations that accounted for all domestic output of crude, calcined, and byproduct gypsum. Data were available for all operations through this survey, the Gypsum Association, the American Coal Ash Association, State agencies, and Federal agencies. Of the 117 operations, 8 did not respond to the survey and their respective production levels were estimated on the basis of prior reported production levels in conjunction with employment records published by the Mine Safety and Health Administration.

The United States was the world's leading producer of crude gypsum in 2017, accounting for 13% of global output (table 7). The United States was also the leading producer of crude gypsum in 2016, accounting for 11% of global output during that year. For 2017, crude gypsum in the United States was produced at 50 mines in 16 States (table 2). The leading crude-gypsum-producing States were, in descending order, Oklahoma, Nevada, Texas, Iowa, Kansas, Colorado, Arkansas,

<sup>1</sup>Value information is based on unverified data and should not be used in contract negotiations or price-indexing.

Utah, California, and Wyoming, which together accounted for 86% of total domestic output.

The U.S. gypsum industry primarily consisted of a few large, vertically integrated companies that mined gypsum and manufactured wallboard, plaster, and other gypsum products. Companies with the highest production levels of crude gypsum were USG Corp. with nine mines, National Gypsum Co. with six mines, CertainTeed Corp. with four mines, American Gypsum Co. LLC with three mines, Georgia-Pacific LLC with three mines, and PABCO Gypsum with one mine. In 2017, these six companies produced an estimated 42% of U.S. crude gypsum. In 2017, domestic output of calcined gypsum decreased slightly to 17.8 Mt valued at \$534 million (table 1).

In addition to crude gypsum production, synthetic gypsum was generated as a byproduct of various industrial processes. The primary source of synthetic gypsum was flue gas desulfurization (FGD) systems at coal-fired electric powerplants. Smaller quantities of synthetic gypsum were derived as byproducts of chemical processes, such as acid neutralization, citric acid production, sugar production from sugar beets, and titanium dioxide production. Synthetic gypsum was used as a substitute for crude gypsum, principally for wallboard manufacturing, cement production, and agricultural purposes, in descending order of tonnage.

Approximately 400 synthetic gypsum producers synthesized an estimated 32.7 Mt of flue-gas-desulfurized gypsum in 2017 (American Coal Ash Association, 2018). Of the total synthetic gypsum produced, 22.8 Mt was sold or used in 2017, with a total estimated value of \$114 million. An estimated 48% of synthetic gypsum produced in 2016 was neither sold nor used and in most cases was discarded (American Coal Ash Association, 2016).

In 2017, gypsum-derived products, including agricultural products, cement, plasters, and wallboard, totaled 42.6 Mt with a value of \$4.91 billion. This represented a 5% increase in tonnage and a slight increase in value compared with the 40.7 Mt produced in 2016 valued at \$4.86 billion (table 3).

During 2017, seven companies manufactured gypsum wallboard products in the United States. Approximately 2.32 billion square meters (25.0 billion square feet) of wallboard products were shipped, which represented a slight increase compared with that of 2016 (table 4).

## Consumption

In 2017, U.S. apparent consumption of gypsum was 46.4 Mt, 14% more than that of 2016. Domestic sources (mined crude plus an estimated 22.8 Mt of synthetic gypsum sales) met approximately 89% of domestic consumption requirements; imports, totaling 4.89 Mt, satisfied the remaining need. Sales of synthetic gypsum were estimated to be slightly more than those of 2016. Significant use of synthetic gypsum in place of mined gypsum was largely the result of the lower costs associated with the purchase and transportation of FGD gypsum, which was often located near wallboard production facilities.

Gypsum products were categorized as either calcined or uncalcined (table 3). Calcined gypsum was produced by heating powdered natural or synthetic gypsum to approximately 350 degrees Fahrenheit, which partially dehydrates the gypsum

to form a hemihydrate base needed to manufacture a variety of gypsum products, including plaster and wallboard. Calcined gypsum was produced domestically from mined crude and synthetic gypsum to manufacture wallboard and plaster products. Uncalcined gypsum was used to produce portland cement and in agriculture. Miscellaneous uses, such as athletic field markings, accounted for less than 1% of consumption.

In 2017, more than 99% of calcined gypsum was estimated to have been used in the production of plaster and prefabricated products, much of which consisted of wallboard (table 3). Owing to an estimated under-reporting in specific end-use calcined gypsum products, the following percentages were based on reported calcined-gypsum board products. Type X gypsum board, so named because of extra fire retardation qualities, consumed 44%, by weight, of calcined gypsum. Half-inch wallboard accounted for 40% of calcined gypsum consumption. Water- and moisture-resistant board, typically used in bathroom and kitchen walls, accounted for 11% of calcined gypsum. Other wallboard, including mobile-home board, predecorated wallboard, sheathing, and veneer base, constituted most of the balance (table 4).

Uncalcined gypsum consumption in the United States increased by 9% to 24.8 Mt in 2017 from 22.8 Mt in 2016. About 4.43 Mt, or 18%, was consumed in portland and masonry cement production (table 3). Gypsum was added to cement to retard its setting time and accounted for 3% to 7%, by weight, of cement output (van Oss, 2005, p. 8; Roskill Information Services Ltd., 2009, p. 320). Most of the remainder of the uncalcined gypsum consumed, about 20.4 Mt, was used for agricultural purposes, an increase of 9% from that of 2016. The upturn in uncalcined gypsum use may reflect differences in reporting methods by gypsum producers rather than an actual rate of growth. Finely ground gypsum rock was used in agriculture and other industries to neutralize acidic soils, improve soil permeability, add nutrients, stabilize slopes, and provide catalytic support for maximum fertilizer benefits. Large amounts of uncalcined gypsum were also used by the oil and gas industry as a road base as well as ground cover for rig platforms (Layden, 2014). Small quantities of high-purity gypsum also were used in a wide range of industrial applications, including the production of food, glass, paper, and pharmaceuticals.

## Prices

In 2017, the average U.S. unit values (free on board, mine or plant) were estimated to be \$7.50 per metric ton for crude gypsum, a 6% decrease from that of 2016, and \$30 per ton for calcined gypsum, unchanged from that of 2016 (table 1). The average unit value for prefabricated products, which includes wallboard, reported by domestic producers during the year was \$231 per ton, unchanged from that of 2016 (table 3). The average unit value of uncalcined gypsum used primarily for agricultural purposes was estimated to be \$35 per ton, also unchanged from 2016, and that used in cement production was about \$18 per ton, 6% more than that of 2016 (table 3).

During 2017, the average combined unit value of prefabricated gypsum products, which includes wallboard, remained unchanged despite a slight increase in total gypsum products tonnage in 2016 (table 4).

## Foreign Trade

The United States imported crude gypsum from 17 countries and exported it to 71 countries and territories; 51% of total exports went to Canada. Imports of crude gypsum in 2017 increased by 13% from those of 2016 and accounted for 11% of apparent consumption. Canada, Mexico, and Spain accounted for more than 97% of imported gypsum. The majority of imports from Canada went to east coast plants, and sources in Mexico chiefly served the west coast. Most of the crude gypsum imported by the United States from Mexico was produced by *Compañía Minera Caopas, S.A. de C.V.*, and *Compañía Occidental Mexicana, S.A. de C.V.*, in Baja California Sur, both of which operate mines on the Baja California Peninsula (*Compañía Occidental Mexicana S.A. de C.V.*, 2018; Secretaría de Economía, 2018). Almost all gypsum imported from Canada came from Nova Scotia. The completion of large wallboard manufacturing plants near coal-fired electric powerplants along the east coast may reduce gypsum imports in the future.

Wallboard exports decreased by 29% in 2017, totaling about 514,000 metric tons (t) valued at \$104 million, of which more than 90% went to Canada. Wallboard imports, almost all of which originated from Canada and Mexico, increased by 18% in 2017 to 443,000 t valued at \$109 million (table 6).

## World Review

Global crude gypsum production in 2017 was estimated to be 155 Mt, a slight decrease from that of 2016 (table 1). In 2017, 81 countries produced gypsum, with the top 10 producers accounting for 69% of total world production (table 7). The United States was the leading producer of crude gypsum in 2017 with an estimated 20.7 Mt, followed by, in decreasing order of tonnage, Iran with 16.0 Mt, China with 15.5 Mt, Australia with 14.7 Mt, Thailand with 9.25 Mt, Turkey with 9.0 Mt, Spain with 7.0 Mt, Oman with 5.5 Mt, Mexico with 5.4 Mt, and Japan with 4.7 Mt. Gypsum production in Iran, 16.0 Mt in 2017, was based on dated historical production information that may not fully account for more than 20 years of double-digit inflation, unemployment as high as 10%, or the increased cost of land and housing in urban areas, all of which may have limited the actual production of gypsum (Esmaceli, 2008; Khajehpour, 2013). Despite these circumstances, Iran's economy expanded in 2016 and 2017 at a rate of 12.5%, likely boosting the domestic housing sector and leading to a corresponding increase in gypsum production. (World Bank Group, The, 2017; Salehi-Isfahani, 2018). Accurately determining Iran's gypsum production remains problematic.

Previous versions of this chapter included published gypsum production amounts for China that totaled up to 130 Mt. Additional information regarding the gypsum marketplace in China revealed that the vast majority of that amount was likely synthetic gypsum, which was not intended to be included in world production (table 7). Hence, the large decrease in reported gypsum production in China reflects a recategorization of gypsum material and should not be interpreted as a large decrease in the production of gypsum in China.

Production in North America accounted for 18% of total crude gypsum production. Although the use of gypsum wallboard

increased worldwide, only industrialized nations used gypsum primarily for wallboard products. In developing countries, especially in Asia and the Middle East, most gypsum was used in the production of cement or plaster products. World production may have been underestimated because output by some foreign gypsum producers was used to manufacture products onsite and may not have been reported. Additionally, production from small deposits in developing nations was intermittent and, in many cases, unreported.

Worldwide, the leading use of gypsum was in the manufacture of cement and concrete. Cement manufacture accounted for approximately 50% of worldwide gypsum consumption, and plaster products, including wallboard, accounted for approximately 30% of all consumption.

As a low-value, high-bulk mineral commodity mined from deposits widely distributed throughout the world, gypsum tended to be used within the many countries where it was produced. 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; of these, Canada and Mexico were significant exporters because their large deposits were near wallboard markets in the United States.

Estimated world production capacity for gypsum wallboard in 2017 exceeded about 17 billion square meters per year (183 billion square feet per year) at more than 250 plants worldwide.

**Australia.**—Boral Ltd., Australia's leading building and construction materials producer, recorded a fiscal year (FY) 2017 gypsum-related revenue of \$1.48 billion, 6% higher than that of FY 2016. The primary factors that led to the increase in year-over-year revenue were related to an increase in board price, sales volume, and overall share of growth in Australia and the Republic of Korea. The growth in these countries offset decreased earnings from China, Indonesia, and Thailand (Boral Ltd., 2018, p. 6). A joint venture (Boral Gypsum) owned equally by Boral and USG, which began production in March 2014, earned \$69.5 million in FY 2017, an 18% increase compared with that of FY 2016 (Boral Ltd., 2018, p. 7).

Knauf Plasterboard opened a new \$70 million wallboard plant in August 2017, following the completion of a 28-kilometer (17-mile) natural gas pipeline to the Port of Bundaberg facility in Queensland (Global Gypsum Magazine, 2016; Alout, 2017).

**Canada.**—Canada produced an estimated 1.70 Mt of crude gypsum in 2017, slightly more than that of 2016. About 1.48 Mt, or 87% of production, was exported to the United States. In 2016, CGC Inc. (a subsidiary of USG) was the leading manufacturer of gypsum wallboard in eastern Canada and accounted for approximately 12% of USG's total consolidated sales (USG Corp., 2018, p. 2). Red Moon Resources Inc., an industrial minerals company, submitted a formal development request to open a gypsum mine in western Newfoundland. The proposed location, which was formerly known as the Flat Bay Mine, had estimated annual crude gypsum production of 15 Mt prior to 1990 (Global Gypsum Magazine, 2018).

**China.**—In 2017, Beijing New Building Materials PLC (BNBM) and Taishan Gypsum, both owned by the China National Building Material Company Ltd., reported total gypsum board production of 1.83 billion square meters

(19.7 billion square feet) with a reported value of 9.49 renminbi (\$1.37 billion). These amounts reflect an increase of 12% in production with an accompanying 38% increase in value between 2016 and 2017 (China National Building Company Ltd., 2018, p. 39). From 2006 to 2013, China's wallboard production increased at an annual rate of 17%, with 2.7 billion square meters of wallboard manufactured in 2013 (Tiwari, 2014). Wallboard has become a standard building material in commercial construction for non-load-bearing walls and ceilings in China, with an estimated 80% of all domestically consumed wallboard used in commercial construction (Global Gypsum Magazine, 2011).

**Japan.**—Yoshino Gypsum Co., Ltd., which opened Japan's first wallboard factory in 1921, was the leading wallboard producer with 16 plants throughout Japan. The company's combined capacity of 350 million square meters per year of its Tiger Board product accounted for approximately 70% of Japan's total wallboard output (Global Gypsum Magazine, 2012; Yoshino Gypsum Co., Ltd., 2018). With few crude gypsum mining resources, Japan stopped mining gypsum in 1976 and has since relied on synthetic, recycled, and imported gypsum to meet much of its domestic demand (Pressler, 1984; Global Gypsum Magazine, 2010b).

**Mexico.**—In 2017, gypsum production in Mexico was estimated to be 5.40 Mt, unchanged from that of 2016. About 1.86 Mt, or 35% of Mexico's 2017 crude gypsum production, was exported to the United States. In 2017, USG Mexico, S.A. de C.V., the leading manufacturer of wallboard in Mexico with five mining and manufacturing facilities had net sales of \$245 million, an 11% increase compared with net sales of \$220 million in 2016 (USG Corp., 2018, p. 4, 27). Net sales from Mexico are grouped with USG's Latin America net sales, but are thought to compose more than half of such earnings.

## Outlook

The average sales price for residential new homes increased nationwide in 2017 by approximately 5% from that of 2016 (U.S. Census Bureau, 2018a). Although housing starts slowed in 2017 to just 2% more than 2016, a combination of historically low 30-year mortgage interest rates and a low level of housing inventory continued to encourage increased sales activities within the housing sector in 2017, and by extension, the wallboard market (Federal Home Loan Mortgage Corp., 2018; Nunn, 2018). Because the residential housing market is responsible for approximately 60% of the consumption of gypsum products, a key economic indicator used by the gypsum and wallboard industries is the number of new housing starts, as measured by the issuance of new building permits. Since 1959, an increase in housing starts has been closely paired with an increase in gypsum consumption. Likewise, during periods of economic recession when housing starts often precipitously decline, gypsum consumption also decreases (fig. 1).

The average number of housing starts from 1959 through 2017, including multidwelling units, was 1.5 million per year. Housing starts averaged about 1.8 million per year during the 5 years preceding the recessionary years that began in 2007. Housing starts in 2016 and 2017 were 1,174,000 and 1,203,000, respectively (U.S. Census Bureau, 2018b). As the surplus of

residential real estate constructed before 2009 was drawn down, the Nation's annual population growth of more than 3,000,000 may necessitate an increase in residential construction in the near future (Bachman, 2015; Reyes, 2015; U.S. Census Bureau, 2018c).

The future of synthetic gypsum, following more than 20 years of large annual growth rates, may begin to slow as significant supplies of comparatively less expensive and cleaner burning natural gas compete with coal in the generation of electric power. The increased production and consumption of domestic shale gas could lead to a corresponding decrease in coal consumption and, with it, a decrease in the production of synthetic gypsum. Shale-gas production in 2015, the most recent year for which data were available, was 431 million cubic meters (15.2 billion cubic feet), which was 13% more than that of 2014 and nearly three times the 151 million cubic meters (5.34 billion cubic feet) produced in 2010 (U.S. Energy Information Administration, 2016).

In the long term, as disposal areas for excess synthetic gypsum reach capacity and the opening of new disposal sites becomes increasingly difficult, power companies may continue in the trend of converting electric generating plants to operate on natural gas, especially if shale-gas supplies continue to offer an economically attractive alternative to coal. Because the retrofitting of coal-fired electric powerplants with desulfurization systems has been accomplished for most plants and less expensive natural gas is available for electrical generation, FGD gypsum production may stabilize. The changeover from using crude gypsum for wallboard production to FGD gypsum likely will be limited to FGD plants within close proximity to wallboard production facilities or to new wallboard plants that would be constructed adjacent to existing FGD facilities.

The U.S. gypsum industry has been moving toward the use of large-capacity wallboard plants supplied from multiple sources, including synthetic gypsum from coal-fired electric powerplants. These larger wallboard plants have been built in regions of high population and new construction growth, which are the areas of highest consumption. Older and less efficient crude-gypsum-fed plants could become less competitive, but could see a revival with regard to the possibility of lesser quantities of FGD gypsum produced. In response to increased public awareness, the gypsum industry may boost the recycling of scrap gypsum in its raw materials streams. The industry may also increase the use of labels, such as the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program, which certifies varying levels of ecologically conscious building practices (U.S. Green Building Council, undated).

Industry trends indicate significant developments abroad in the coming decade. The pace and magnitude of wallboard plant construction in Asia, particularly in China, India, and Thailand, suggest that the continent, with billions of potential consumers, will likely become one of the world's leading gypsum wallboard markets. Should the economic conditions in the United States more favorably affect the United States housing sector, and in turn domestic consumption for gypsum, Canada's gypsum production could increase. Elsewhere, wallboard production capacity growth and the recognition of the convenience and economy of wallboard as a building

material in Central America, Europe, and South America means that wallboard manufacturing may require increased gypsum production in the future. A decline in national and global economic conditions, however, could hamper such growth.

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TABLE 1  
 SALIENT GYPSUM STATISTICS<sup>1</sup>

(Thousand metric tons and thousand dollars)

	2013	2014	2015	2016	2017
United States:					
Crude:					
Production:					
Quantity	17,700 <sup>r</sup>	18,300 <sup>r</sup>	18,800 <sup>r</sup>	19,800 <sup>r</sup>	20,700 <sup>e</sup>
Value	133,000 <sup>r</sup>	146,000 <sup>r</sup>	146,000 <sup>r</sup>	158,000 <sup>r</sup>	155,000 <sup>e</sup>
Imports for consumption	3,290	3,720	4,030	4,340	4,890
Synthetic gypsum sales <sup>2</sup>	10,800	15,200	15,500 <sup>r</sup>	16,700 <sup>r</sup>	22,800 <sup>e</sup>
Calcined:					
Production:					
Quantity	16,000 <sup>r</sup>	16,100 <sup>r</sup>	16,500 <sup>r</sup>	17,900 <sup>r</sup>	17,800
Value	400,000 <sup>r</sup>	435,000 <sup>r</sup>	462,000 <sup>r</sup>	537,000 <sup>r</sup>	534,000
Products sold, value <sup>3</sup>	2,920,000 <sup>r</sup>	3,070,000 <sup>r</sup>	3,190,000 <sup>r</sup>	3,270,000 <sup>r</sup>	3,340,000
Exports, value	44,100	46,000	41,700	36,800	39,700
Imports for consumption, value	5,830	7,620	7,210	15,300	7,790
World, production	161,000 <sup>r</sup>	153,000 <sup>r</sup>	135,000 <sup>r</sup>	156,000 <sup>r</sup>	155,000 <sup>e</sup>

<sup>e</sup>Estimated. <sup>r</sup>Revised.

<sup>1</sup>Table includes data available through December 18, 2018. Data are rounded to no more than three significant digits.

<sup>2</sup>Source: American Coal Ash Association.

<sup>3</sup>Prefabricated gypsum products.

TABLE 2  
 CRUDE GYPSUM MINED IN THE UNITED STATES, BY STATE<sup>1</sup>

State	2016			2017		
	Active mines	Quantity (thousand metric tons)	Value (thousands)	Active mines	Quantity (thousand metric tons)	Value (thousands)
Arizona, Colorado, New Mexico	6 <sup>r</sup>	2,010	\$17,700 <sup>r</sup>	5	2,010	\$17,000
Nevada and Utah	10 <sup>r</sup>	3,710 <sup>r</sup>	32,700 <sup>r</sup>	9	4,580	43,600
Arkansas and Louisiana	2	W	W	2	W	W
California	4	814	7,180	5	858	11,900
Iowa and Indiana	4	1,550	13,700	4	1,630	13,500
Michigan	2	W	W	2	W	W
South Dakota and Wyoming	3	W	W	3	W	W
Kansas, Oklahoma, Texas	17 <sup>r</sup>	8,850 <sup>r</sup>	78,100 <sup>r</sup>	20	8,660	81,900
Total	48 <sup>r</sup>	19,800 <sup>r</sup>	158,000 <sup>r</sup>	50	20,700	155,000

<sup>r</sup>Revised. W Withheld to avoid disclosing company proprietary data; included in "Total."

<sup>1</sup>Table includes data available through December 18, 2018. Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 3  
GYPSUM PRODUCTS (MADE FROM DOMESTIC, IMPORTED, AND  
SYNTHETIC GYPSUM) SOLD OR USED IN THE UNITED STATES, BY USE<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	2016		2017	
	Quantity	Value	Quantity	Value
<b>Uncalcined:</b>				
Portland and masonry cement	4,110	69,900 <sup>r</sup>	4,430	79,700
Agriculture and other <sup>2</sup>	18,700 <sup>r</sup>	655,000 <sup>r</sup>	20,400	712,000
Total	22,800 <sup>r</sup>	725,000 <sup>r</sup>	24,800	792,000
<b>Calcined:</b>				
Plaster	82	27,100 <sup>r</sup>	82	27,100
Prefabricated gypsum products <sup>3</sup>	14,200 <sup>r</sup>	3,270,000 <sup>r</sup>	14,500	3,340,000
Other <sup>4</sup>	3,630	839,000	3,220	745,000
Total	17,900	4,140,000 <sup>r</sup>	17,800	4,110,000
Grand total	40,700 <sup>r</sup>	4,860,000 <sup>r</sup>	42,600	4,910,000

<sup>r</sup>Revised.

<sup>1</sup>Table includes data available through December 18, 2018. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes gypsum used for infrastructure purposes, unspecified uses, and estimated under-reported amount.

<sup>3</sup>Includes weight of paper, metal, or other materials.

<sup>4</sup>Estimated under-reported amount.

TABLE 4  
PREFABRICATED GYPSUM PRODUCTS SOLD OR USED IN THE UNITED STATES<sup>1</sup>

Product	2016			2017		
	Quantity (thousand square feet)	Quantity <sup>2</sup> (thousand metric tons)	Value (thousands)	Quantity (thousand square feet)	Quantity <sup>2</sup> (thousand metric tons)	Value (thousands)
Veneer base	292,000	212	\$58,400	292,000	212	\$58,300
Sheathing	502,000	364	181,000	525,000	381	189,000
<b>Regular gypsum board:</b>						
<sup>3</sup> / <sub>8</sub> -inch	395,000	125	27,600	392,000	124	27,400
<sup>1</sup> / <sub>2</sub> -inch	11,900,000	5,400	1,190,000	12,600,000	5,730	1,260,000
<sup>5</sup> / <sub>8</sub> -inch	704,000	415	110,000	180,000	106	28,100
Total	13,000,000	5,940	1,330,000	13,200,000	5,960	1,320,000
Type X gypsum board	8,550,000	6,200	1,540,000	8,770,000	6,360	1,580,000
Water- and moisture-resistant board	2,020,000	1,470	502,000	2,170,000	1,580	539,000
Grand total	24,400,000 <sup>r</sup>	14,200 <sup>r</sup>	3,270,000 <sup>r</sup>	25,000,000	14,500	3,340,000

<sup>r</sup>Revised.

<sup>1</sup>Table includes data available through December 18, 2018. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes weight of paper, metal, or other materials.

TABLE 5  
IMPORTS FOR CONSUMPTION OF CRUDE GYPSUM, BY COUNTRY OR LOCALITY<sup>1</sup>

(Thousand metric tons and thousand dollars)

Country or locality	2016		2017	
	Quantity	Value	Quantity	Value
Bulgaria	23	214	--	--
Canada <sup>2</sup>	1,090	13,100	1,480	16,300
Germany	1	151	1	168
Malta	10	104	10	330
Mexico	1,860	23,000	1,900	24,300
Oman	33	413	63	854
Spain	1,330	26,200	1,350	24,100
Turkey	--	--	95	3,460
Other	(3) <sup>3</sup> <sup>r</sup>	95 <sup>r</sup>	1	253
Total	4,340	63,200	4,890	69,800

<sup>r</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through December 18, 2018. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes anhydrite.

<sup>3</sup>Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 6  
U.S. GYPSUM AND GYPSUM PRODUCTS FOREIGN TRADE<sup>1</sup>

(Thousand metric tons and thousand dollars)

Year	Crude <sup>2</sup>		Plasters <sup>3</sup>		Boards <sup>4</sup>		Other, value <sup>5</sup>	Total, value
	Quantity	Value	Quantity	Value	Quantity	Value		
<b>Exports:</b>								
2016	43 <sup>r</sup>	18,700 <sup>r</sup>	93	36,800	726 <sup>r</sup>	131,000	75,500 <sup>r</sup>	262,000
2017	36	16,500	107	39,700	514	104,000	81,500	242,000
<b>Imports for consumption:</b>								
2016	4,340	63,200	41	15,300	375 <sup>r</sup>	88,500 <sup>r</sup>	35,600	203,000 <sup>r</sup>
2017	4,890	69,800	23	7,790	443	109,000	34,500	221,000

<sup>r</sup>Revised.

<sup>1</sup>Table includes data available through December 18, 2018. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Data are for "Gypsum, anhydrite," Harmonized Tariff Schedule of the United States (HTS) code 2520.10.0000.

<sup>3</sup>Data are for "Plasters," HTS code 2520.20.0000.

<sup>4</sup>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.

<sup>5</sup>Data are for "Boards, sheets, panels, tiles, and similar articles, not ornamented: Other," HTS code 6809.19.0000, and "Other articles," HTS code 6809.90.0000.

Source: U.S. Census Bureau.

TABLE 7  
MINED GYPSUM: WORLD PRODUCTION, BY COUNTRY OR LOCALITY<sup>1</sup>

(Thousand metric tons)

Country or locality <sup>2</sup>	2013	2014	2015	2016	2017
Afghanistan <sup>c</sup>	57	60	40	40	40
Albania	112	106	85	85	104
Algeria	2,078	1,360 <sup>r</sup>	1,770 <sup>r</sup>	2,170 <sup>r</sup>	2,170 <sup>c</sup>
Angola	189	190	190	190	190 <sup>c</sup>
Argentina	1,586 <sup>r</sup>	1,561 <sup>r</sup>	1,315 <sup>r</sup>	1,558 <sup>r</sup>	1,500 <sup>c</sup>
Armenia	29	22	19	15 <sup>r</sup>	15 <sup>c</sup>
Australia	2,270	2,418 <sup>r</sup>	2,542 <sup>r</sup>	14,725 <sup>r</sup>	14,700 <sup>c</sup>
Austria	635	730	715	674 <sup>r</sup>	670 <sup>c</sup>
Azerbaijan	170	145	130	111 <sup>r</sup>	110 <sup>c</sup>
Belarus	71	64	43	63 <sup>r</sup>	68
Bhutan	351	414	389	318 <sup>r</sup>	318 <sup>c</sup>
Bolivia	1	1	1	1	1 <sup>c</sup>
Bosnia and Herzegovina	73	68	59	59	59 <sup>c</sup>
Brazil	3,333	3,447	3,400	3,400	3,400 <sup>c</sup>
Bulgaria	119	88	99	99	99 <sup>c</sup>
Burma	61	105	100	338 <sup>r</sup>	242 <sup>c</sup>
Canada	1,837	1,811	1,793 <sup>r</sup>	1,679 <sup>r</sup>	1,700 <sup>c</sup>
Chile, crude	1,015	843	860	934 <sup>r</sup>	930 <sup>c</sup>
China, natural <sup>3,4</sup>	28,000 <sup>r</sup>	19,970 <sup>r</sup>	16,300 <sup>r</sup>	15,500 <sup>r,c</sup>	15,500 <sup>c</sup>
Croatia	114	120	138	170 <sup>r</sup>	170 <sup>c</sup>
Cuba	87	98	91	74 <sup>r</sup>	74 <sup>c</sup>
Cyprus:					
Calcined	4	3	3	3	5
Crude	315	348	472	472	703
Czechia	11	11	11	10 <sup>r</sup>	10 <sup>c</sup>
Dominican Republic	144 <sup>r</sup>	243 <sup>r</sup>	244 <sup>r</sup>	140 <sup>r</sup>	140 <sup>c</sup>
Egypt <sup>5</sup>	941	872	872	2,200	2,200 <sup>c</sup>
Eritrea <sup>c</sup>	12	12	13 <sup>r</sup>	13 <sup>r</sup>	13
Ethiopia	150	244	290	320	320 <sup>c</sup>
France <sup>5</sup>	3,455 <sup>r</sup>	3,279 <sup>r</sup>	2,027 <sup>r</sup>	4,183 <sup>r</sup>	4,200 <sup>c</sup>
Georgia	22	24	40	53	53 <sup>c</sup>
Germany <sup>5</sup>	1,778	1,802	1,800	3,090 <sup>r</sup>	3,100 <sup>c</sup>
Greece	760	664	649	778 <sup>r</sup>	880
Guatemala	118	82	111 <sup>r</sup>	131 <sup>r</sup>	130 <sup>c</sup>
India	3,190	2,902	2,640	2,700 <sup>r</sup>	2,700 <sup>c</sup>
Iran <sup>6</sup>	21,119	19,550	12,298 <sup>r</sup>	16,377 <sup>r</sup>	16,000 <sup>c</sup>
Iraq <sup>c</sup>	1,500	1,200	1,000	1,000	1,000
Ireland	210	210	250 <sup>r</sup>	250 <sup>r</sup>	250 <sup>c</sup>
Israel	27	82	159	147 <sup>r</sup>	148 <sup>c</sup>
Italy	3,192 <sup>r</sup>	5,887 <sup>r</sup>	572 <sup>r</sup>	617 <sup>r</sup>	620 <sup>c</sup>
Jamaica	48	45	43 <sup>r</sup>	50 <sup>r</sup>	50 <sup>c</sup>
Japan	4,771	4,674	4,670	4,670	4,700 <sup>c</sup>
Jordan	857	900	900	900	900 <sup>c</sup>
Kazakhstan	124	113	82	137 <sup>r</sup>	137 <sup>c</sup>
Kenya	6	6	6	6 <sup>c</sup>	6 <sup>c</sup>
Kyrgyzstan	(7)	(7)	(7)	(7)	(7)
Laos	772	708	708 <sup>r</sup>	708	710 <sup>c</sup>
Libya <sup>c</sup>	120	150	150	150	200
Madagascar <sup>c</sup>	(7)	(7)	(7)	(7)	(7)
Mauritania <sup>c</sup>	60	60	70	70	70
Mexico <sup>5</sup>	5,091	5,496	5,457 <sup>r</sup>	5,403 <sup>r</sup>	5,400 <sup>c</sup>
Moldova <sup>c</sup>	120	125	120	120	120
Nicaragua	37	57	50	42 <sup>r</sup>	42 <sup>c</sup>
Niger	--	--	--	-- <sup>c</sup>	-- <sup>c</sup>
Nigeria	56	32	25 <sup>r</sup>	20 <sup>r</sup>	20 <sup>c</sup>
Oman	2,785	3,387	6,049	5,483 <sup>r</sup>	5,500 <sup>c</sup>
Pakistan	1,229 <sup>r</sup>	1,446 <sup>r</sup>	1,660	1,660	2,000 <sup>c</sup>
Paraguay <sup>c</sup>	5	5	5	5	5

See footnotes at end of table.

TABLE 7—Continued  
MINED GYPSUM: WORLD PRODUCTION, BY COUNTRY OR LOCALITY<sup>1</sup>

(Thousand metric tons)

Country or locality <sup>2</sup>	2013	2014	2015	2016	2017
Peru, crude	298	544	438	438	287
Poland:					
Anhydrite	133	147	136	137	140 <sup>c</sup>
Gypsum rock	952	905	882	898 <sup>r</sup>	900 <sup>c</sup>
Portugal	299	329	310	255 <sup>r</sup>	152
Qatar <sup>c</sup>	150	200	210	210	210
Romania	676	807	840 <sup>r</sup>	620 <sup>r</sup>	620 <sup>c</sup>
Russia	4,223	4,419	4,223	3,996 <sup>r</sup>	4,000 <sup>c</sup>
Saudi Arabia <sup>c</sup>	1,700	1,780	2,780 <sup>r</sup>	3,000 <sup>r</sup>	3,150
Slovakia	60	65	65	53 <sup>r</sup>	60
South Africa	559	376	232	267	270 <sup>c</sup>
Spain <sup>5</sup>	7,125	7,000 <sup>c</sup>	7,000 <sup>c</sup>	7,000 <sup>c</sup>	7,000 <sup>c</sup>
Sri Lanka	1	1	1	1	1 <sup>c</sup>
Sudan	132	111	180 <sup>r</sup>	355 <sup>r</sup>	338
Switzerland	340	340	320 <sup>r</sup>	340 <sup>r</sup>	320
Syria	300	181	150	150 <sup>c</sup>	150 <sup>c</sup>
Tajikistan	12	12	9 <sup>r</sup>	9 <sup>r</sup>	13 <sup>c</sup>
Tanzania	280 <sup>r</sup>	200	239	214 <sup>r</sup>	124
Thailand	12,383	12,445	11,267	10,407 <sup>r</sup>	9,254
Tunisia	632	850	900	850	850 <sup>c</sup>
Turkey	13,357	12,600	8,639	9,000	9,000 <sup>c</sup>
Turkmenistan <sup>c</sup>	105	107	110	110	110
Ukraine <sup>5</sup>	2,175 <sup>r</sup>	1,525 <sup>r</sup>	1,255	1,303 <sup>r</sup>	1,300 <sup>c</sup>
United Arab Emirates <sup>c</sup>	700	700	700	700	700
United Kingdom <sup>c,3</sup>	1,200	1,200	1,200	1,200	1,200
United States <sup>8</sup>	17,700 <sup>r</sup>	18,300 <sup>r</sup>	18,800 <sup>r</sup>	19,800 <sup>r</sup>	20,700
Uzbekistan <sup>c</sup>	50	40	42	35	35
Yemen <sup>c</sup>	100	100	100	100	100
Total	161,000 <sup>r</sup>	153,000 <sup>r</sup>	135,000 <sup>r</sup>	156,000 <sup>r</sup>	155,000 <sup>c</sup>

<sup>c</sup>Estimated. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through September 18, 2018. All data are reported unless otherwise noted. Totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>In addition to the countries listed and (or) localities, Colombia, El Salvador, Honduras, Latvia, Luxembourg, Mongolia, and Serbia may have produced gypsum, but available information was inadequate to make reliable estimates of output.

<sup>3</sup>Amount includes reported crude gypsum and synthetic gypsum. Synthetic gypsum amount is based on an estimated 70% utilization rate.

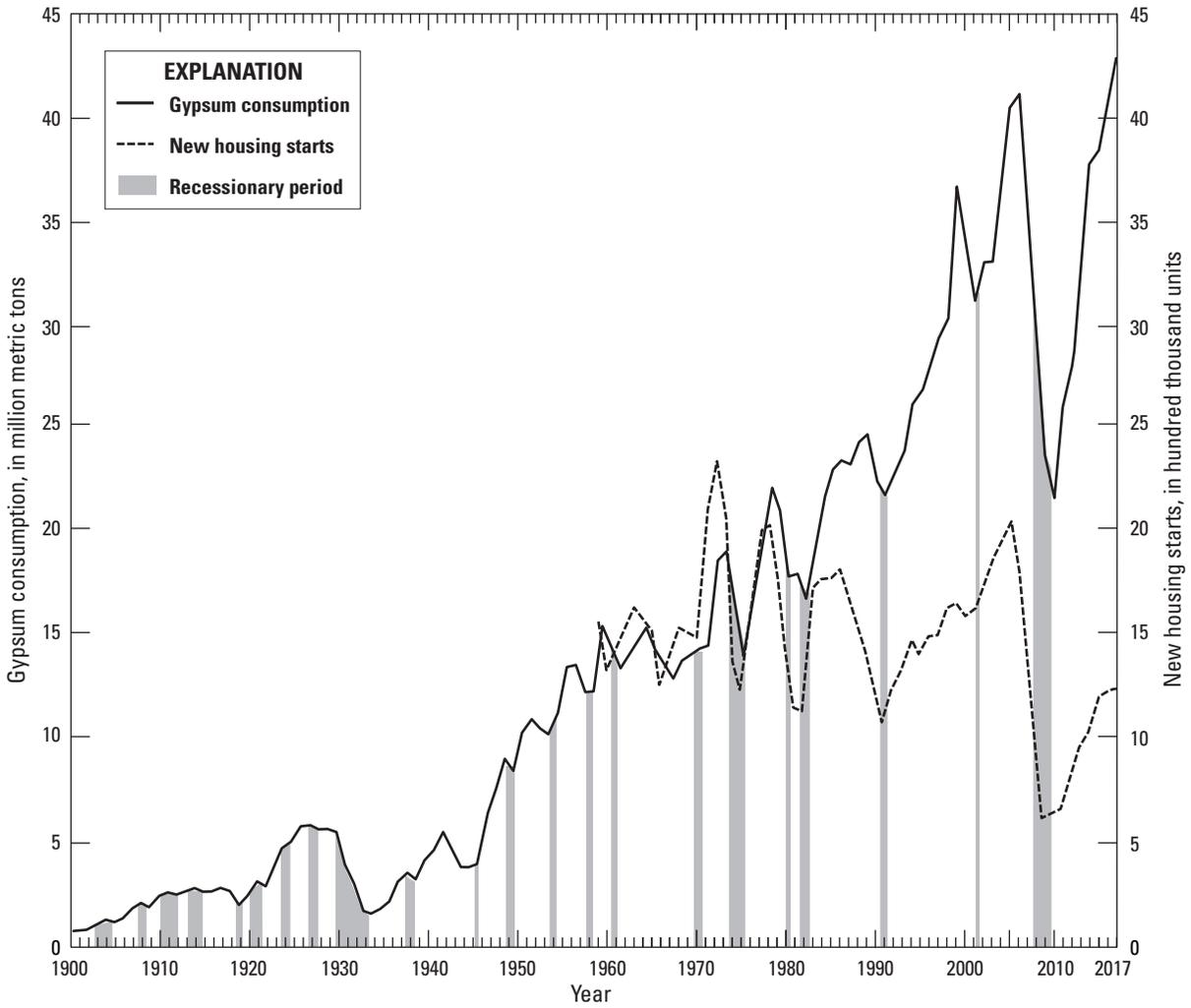
<sup>4</sup>Prior years number did include estimated synthetic.

<sup>5</sup>Includes anhydrite.

<sup>6</sup>Production is based on fiscal year, with a starting date of March 21 of the year shown.

<sup>7</sup>Less than ½ unit.

<sup>8</sup>Does not include byproduct gypsum.



**Figure 1.** U.S. gypsum consumption and economic recessions from 1900 through 2017 and new residential building permits beginning in 1959.