



# 2017 Minerals Yearbook

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## WOLLASTONITE [ADVANCE RELEASE]

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# WOLLASTONITE

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Wollastonite was mined by two companies in New York State during 2017. Domestic production and sales data collected by the U.S. Geological Survey (USGS) were withheld to avoid disclosing company proprietary data. U.S. exports of wollastonite were thought to have remained steady, with exports estimated to be less than 10,000 metric tons (t). U.S. imports of wollastonite were thought to have decreased, with imports estimated to be no more than 1,000 t, compared with no more than 2,000 t in 2016. Worldwide sales of refined wollastonite products were likely in the range of 825,000 to 875,000 t, slightly higher than in 2016.

Wollastonite, a calcium metasilicate ( $\text{CaSiO}_3$ ), has a theoretical composition of 51.7% silicon dioxide ( $\text{SiO}_2$ ) and 48.3% calcium oxide ( $\text{CaO}$ ) but may contain trace to minor amounts of aluminum, iron, magnesium, manganese, potassium, sodium, or strontium. It occurs as prismatic crystals that cleave into massive-to-acicular fragments. It is usually white but also may be gray, brown, or red depending on its composition. Wollastonite forms when either impure limestones are metamorphosed (subjected to heat and pressure) or silica-bearing fluids are introduced into calcareous sediments during the metamorphic processes. In both cases, calcite reacts with silica to produce wollastonite and carbon dioxide.

Deposits of wollastonite have been found in Arizona, California, Idaho, Nevada, New Mexico, New York, and Utah. These deposits are typically skarns containing wollastonite as the major mineral.

## Production

Domestic data for wollastonite were derived from voluntary responses to the USGS canvass of the two domestic producers; a response was received from both producers. Production and sales of wollastonite in the United States were estimated to have increased in 2017, but production and sales data were withheld to avoid disclosing company proprietary data.

In 2017, NYCO Minerals Inc. (a subsidiary of Imerys, S.A., France) operated a mine and a processing plant in Essex County, NY, and Vanderbilt Minerals, LLC (a subsidiary of R.T. Vanderbilt Holding Co., Inc.) operated a mine and mill in Lewis County, NY. The NYCO deposit contains diopside, garnet, and wollastonite. The ore was processed at the company's Willsboro plant where the diopside and garnet were removed using high-intensity magnetic separators. The Vanderbilt deposit in Lewis County contains calcite, diopside, and wollastonite. The ore was processed at the company's Balmat plant. During 2017, NYCO continued to evaluate results from an exploratory drilling program conducted in Essex County. No timetable was announced for when mining would begin (Karlin, 2017).

## Consumption

The USGS does not collect consumption data for wollastonite, but consumption was estimated to have increased in 2017. Ceramics (frits, sanitaryware, and tile), friction products (primarily brake linings), metallurgical applications (flux and conditioner), paint (architectural and industrial paints), plastics and rubber markets (thermoplastic and thermoset resins and elastomer compounds), and miscellaneous uses (including adhesives, concrete, glass, and sealants) accounted for wollastonite sales in the United States.

Industrial production of plastics and rubber increased slightly. Fabrication of motor vehicles and parts (which contain wollastonite in friction products and plastic and rubber components) decreased slightly (J.D. Power and Associates, 2017). Consumption of wollastonite for metallurgical applications likely increased because the output of the primary iron and steel industry in the United States increased slightly. Total construction spending in 2017 increased by 3.8% above that of 2016, indicating that wollastonite sales may have increased in these markets for the manufacture of products such as adhesives, caulks, ceramics, paints, stucco, and roof coatings (U.S. Census Bureau, 2018a, p. 1).

In ceramics, wollastonite decreases shrinkage and gas evolution during firing; increases green and fired strength; permits fast firing; and reduces crazing, cracking, and glaze defects. As a filler in paint, it reinforces the paint film, acts as a pH buffer, improves resistance to weathering, reduces pigment consumption, and acts as a flattening and suspending agent. In metallurgical applications, wollastonite serves as a flux for welding, a source for calcium oxide, a slag conditioner, and a protective agent for the surface of molten metal during the continuous casting of steel. In plastics, it improves tensile and flexural strength, reduces resin consumption, and improves thermal and dimensional stability at elevated temperatures. Surface treatments are used to improve the adhesion between the wollastonite and the polymers to which it is added. As a substitute for asbestos in floor tiles, friction products, insulating board and panels, paint, plastics, and roofing products, wollastonite is resistant to chemical attack, inert, stable at high temperatures, and acts as reinforcement (Roskill Information Services Ltd., 1996, p. 58–59, 78–81, 104–107, 119, 123–128; Feytis, 2009).

## Prices

At yearend 2017, reported prices for domestically produced acicular wollastonite, ex-works, were \$210 to \$240 per metric ton for 200-mesh, \$220 to \$250 per metric ton for 325-mesh,

and \$440 to \$445 per metric ton for wollastonite with an aspect ratio of 15:1 to 20:1. Prices for wollastonite from China, free on board, in bulk, were \$80 to \$100 per metric ton for 200-mesh and \$90 to \$105 per metric ton for 325-mesh (Industrial Minerals, 2017). Domestic prices decreased from those of 2016, but prices for wollastonite from China remained the same. Quoted prices should be used only as a guideline because actual prices depend on the terms of the contract between seller and buyer.

## Foreign Trade

Comprehensive trade data were not available for wollastonite because it is imported and exported under a generic U.S. Census Bureau Harmonized Tariff Schedule code that includes multiple mineral commodities. In 2017, exports were estimated to have remained steady, but imports decreased slightly. It was estimated that less than 10,000 t of wollastonite was exported and less than 1,000 t was imported (Trade Mining LLC, 2018).

## World Review

Wollastonite was produced in only a few countries, and the countries that produced wollastonite may not have published official production data. In 2017, global sales of refined wollastonite were thought to be in the range of 825,000 to 875,000 t, a slight increase from those in 2016. China produced an estimated 500,000 t of refined wollastonite in 2017, unchanged from that produced in 2016. India ranked second in production with 160,000 t of refined wollastonite in 2017 and 170,000 t in 2016 (Indian Bureau of Mines, 2017, 2018), followed by Mexico with 88,000 t in 2017 and 64,000 t in 2016 (Instituto Nacional de Estadística y Geografía, undated), Finland with an estimated 10,000 t in each year, and Canada with 10,000 t in 2017 and an estimated 11,000 t in 2016 (B. Vasily, President, Canadian Wollastonite, oral commun., April 9, 2018).

U.S. production data were withheld to avoid disclosing company proprietary data. Small quantities of wollastonite (approximately 6,000 t or less) also were produced in Namibia, South Africa, Spain, and possibly other countries; however, output was not officially reported, and the available information was inadequate to make reliable estimates of output.

## Outlook

According to the International Monetary Fund (2018), the U.S. economy is expected to grow by 2.7% in 2018 and 2.5% in 2019, suggesting that U.S. wollastonite production may increase. Domestic industrial output and housing starts were higher in 2017 than in 2016, implying that sales of wollastonite could rise for construction-related products (such as adhesives, caulks, ceramic tile glazes and bodies, paints, roof coatings, sanitaryware, sealants, stucco, and wallboard), friction products, plastics, and rubber (Board of Governors of the Federal Reserve System, 2018; U.S. Census Bureau, 2018b).

The International Monetary Fund (2018) also projected that the global economy is likely to grow by 3.9% in 2018 and 2019. Europe, China, India, and Mexico are likely to experience growth of more than 2% in both 2018 and 2019. Therefore, global production and sales of wollastonite are likely to increase in 2018 and 2019.

## References Cited

- Board of Governors of the Federal Reserve System, 2018, Data download program—Industrial production and capacity utilization (G.17): Washington, DC, Board of Governors of the Federal Reserve System, March 23. (Accessed April 5, 2018, via <https://www.federalreserve.gov>.)
- Feytis, Alexandra, 2009, Wollastonite's pins and needles: *Industrial Minerals*, no. 506, November, p. 26–35.
- Indian Bureau of Mines, 2017, Monthly statistics of mineral production—2016: Nagpur, India, Indian Bureau of Mines. (Accessed April 5, 2018, at <http://ibm.nic.in/index.php?c=pages&m=index&id=557>.)
- Indian Bureau of Mines, 2018, Monthly statistics of mineral production—2017: Nagpur, India, Indian Bureau of Mines. (Accessed April 5, 2018, at <http://ibm.nic.in/index.php?c=pages&m=index&id=707>.)
- Industrial Minerals, 2017, IM's December price movements: *Industrial Minerals*, December 22. (Accessed February 5, 2018, via <http://www.indmin.com>.)
- Instituto Nacional de Estadística y Geografía, [undated], Producción minerometalúrgica por principales productos, Volumen, Minerales no metálicos, Wollastonita [Mining and metallurgical production by main products, Volume, Nonmetallic minerals, Wollastonite]: Aguascalientes, Mexico, Instituto Nacional de Estadística y Geografía, [unpaged]. (Accessed April 6, 2018, via <http://www.inegi.org.mx/>.)
- International Monetary Fund, 2018, World economic outlook update—Brighter prospects, optimistic markets, challenges ahead: Washington, DC, International Monetary Fund, January, 8 p. (Accessed April 5, 2018, via <http://www.imf.org/>.)
- J.D. Power and Associates, 2017, New vehicle retail sales pace in December expected to slow; annual sales to dip below 14 million: Westlake Village, CA, J.D. Power and Associates press release, December 22. (Accessed March 6, 2018, at <http://www.jdpower.com/press-releases/jd-power-and-lmc-automotive-forecast-december-2017>.)
- Karlin, Rick, 2017, Little progress in Adirondack mining plan: *Times Union* [Albany, NY], August 25. (Accessed February 26, 2018, at <https://www.timesunion.com/news/article/After-referendum-Adirondack-mining-progress-is-11959708.php>.)
- Roskill Information Services Ltd., 1996, *The economics of wollastonite* (6th ed.): London, United Kingdom, Roskill Information Services Ltd., 131 p.
- Trade Mining, LLC, 2018, Trade mining—Import trade data: Dearborn, MI, Trade Mining, LLC. (Accessed April 5, 2018, via <https://www.trademining.com/index.jsp>.)
- U.S. Census Bureau, 2018a, Monthly construction spending, December 2017: U.S. Census Bureau press release, February 1, 6 p. (Accessed March 6, 2018, at <https://www.census.gov/construction/c30/pdf/pr201712.pdf>.)
- U.S. Census Bureau, 2018b, New residential construction—Historical data: Washington, DC, U.S. Census Bureau. (Accessed March 8, 2018, via [http://www.census.gov/construction/nrc/historical\\_data/index.html](http://www.census.gov/construction/nrc/historical_data/index.html).)

## GENERAL SOURCES OF INFORMATION

### U.S. Geological Survey Publications

- Historical Statistics for Mineral and Material Commodities in the United States. Data Series 140.
- Pigments and Fillers. Ch. in *United States Mineral Resources*, Professional Paper 820, 1973.
- Wollastonite—A Versatile Industrial Mineral. Fact Sheet FS-002-01, 2001.

### Other

- American Ceramic Society.
- Ceramic Industry, monthly.
- Paint and Coatings Industry, monthly.
- Wollastonite. Ch. in *Industrial Minerals and Rocks* (7th ed.). Society for Mining, Metallurgy, and Exploration, Inc., 2006.
- Wollastonite. Energy, Mines, and Resources, Canada Summary Report No. 18, 1993.