USGS
science for a changing world

2019 Minerals Yearbook

WOLLASTONITE [ADVANCE RELEASE]

U.S. Department of the Interior
U.S. Geological Survey

March 2024

Wollastonite

By Kenneth C. Curry

Wollastonite was mined by two companies in New York during 2019. 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 estimated to be less than 10,000 metric tons (t), essentially unchanged compared with exports in 2018. U.S. imports of wollastonite were estimated to be no more than 1,000 t, essentially unchanged compared with imports in 2018. Worldwide sales of refined wollastonite products were estimated to be in the range of 860,000 to 910,000 t, a slight increase from sales in 2018.

Wollastonite, a calcium metasilicate ($CaSiO_3$), has a theoretical composition of 51.7% silicon dioxide (SiO_2) and 48.3% calcium oxide (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 production data for wollastonite were derived from voluntary responses to the USGS canvass of the two domestic producers; both producers responded to the survey. Production and sales of wollastonite in the United States decreased in 2019, but production and sales data were withheld to avoid disclosing company proprietary data.

In 2019, NYCO Minerals Inc. (a subsidiary of Imerys, S.A., France) operated a mine and 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, NY, plant where the diopside and garnet were removed using high-intensity magnetic separators. The Vanderbilt deposit contains calcite, diopside, and wollastonite. The ore was processed at the company's Balmat, NY, plant.

Consumption

The USGS does not collect consumption data for wollastonite, but consumption in 2019 was estimated to be essentially unchanged compared with 2018. 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 was estimated to have decreased 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, 2019). Consumption of wollastonite for metallurgical applications was likely unchanged from that in 2018 because shipments of steel in the United States in 2019 were essentially unchanged from those in 2018 (American Iron and Steel Institute, 2020). New privately owned housing unit starts increased by 3.2% in 2019, 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, 2020).

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 flatting 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 2019, prices for domestically produced wollastonite were estimated to be between $320 to $360 per metric ton, an increase from those in 2018. Price data for globally produced wollastonite were unavailable.

Foreign Trade

Comprehensive trade data were not available for wollastonite because it is imported and exported under a generic Harmonized Tariff Schedule of the United States code that includes multiple mineral commodities. In 2019, imports and exports were

estimated to have remained steady. Less than 10,000 t of wollastonite was estimated to have been exported and less than 1,000 t was estimated to have been imported.

World Review

Wollastonite was produced in only a few countries, and many of the countries that produced wollastonite did not publish official production data. In 2019, global sales of refined wollastonite were thought to be in the range of 860,000 to 910,000 t, a slight increase from those in 2018. China produced an estimated 890,000 t of refined wollastonite in 2019, a slight increase from an estimated 870,000 t in 2018. India ranked second in production with an estimated 170,000 t of refined wollastonite in 2019, a 15% increase from a reported 148,000 t in 2018 (Indian Bureau of Mines, 2019, 2020), followed by Mexico with 101,000 t in 2019 and 83,600 t in 2018 (Instituto Nacional de Estadística y Geografía, undated), Canada with an estimated 20,000 t in 2019 and 15,000 t in 2018, and Finland with an estimated 11,000 t in 2019 and 10,000 t in 2018 (B. Vasily, President, Canadian Wollastonite, oral commun., September 17, 2019).

Small quantities of wollastonite (approximately 6,000 t combined) 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 output estimates.

Outlook

Economic activity in construction and manufacturing in the United States and the world are major influences on the performance of the wollastonite industry. As economies expand, it is expected that wollastonite sales will increase, but if economies have negative growth, then wollastonite consumption is also expected to be negatively affected.

References Cited

American Iron and Steel Institute, 2020, December steel shipments up 4.6 percent from previous month: Washington, DC, American Iron and Steel Institute, February 10. (Accessed April 21, 2020, at https://www.steel.org/news/2020/02/december-steel-shipments-up-4-point-6-percent-from-previous-month.)

Feytis, Alexandra, 2009, Wollastonite's pins and needles: Industrial Minerals, no. 506, November, p. 26–35.

Indian Bureau of Mines, 2019, Monthly statistics of mineral production—2018: Nagpur, India, Indian Bureau of Mines. (Accessed April 21, 2020, at http://ibm.nic.in/index.php?c=pages&m=index&id=1112.)

Indian Bureau of Mines, 2020, Monthly statistics of mineral production—2019: Nagpur, India, Indian Bureau of Mines. (Accessed April 21, 2020, at http://ibm.nic.in/index.php?c=pages&m=index&id=1440.)

Instituto Nacional de Estadística y Geografía, [undated], Producción minerometalúrgica por principales productos, Volumen, Minerales no metálicos, Wollastonita: Aguascalientes, Mexico, Instituto Nacional de Estadística y Geografía, [unpaginated]. (Accessed April 21, 2020, via http://www.inegi.org.mx/sistemas/bie/default.aspx.) [In Spanish.]

J.D. Power and Associates, 2019, December sales will fall as auto industry sets record for transaction prices, incentive spending: Costa Mesa, CA, J.D. Power and Associates press release, December 23. (Accessed April 21, 2020, at https://www.jdpower.com/business/press-releases/jd-power-lmc-automotive-forecast-december-2019.)

Roskill Information Services Ltd., 1996, The economics of wollastonite (6th ed.): London, United Kingdom, Roskill Information Services Ltd., 131 p.

U.S. Census Bureau, 2020, New residential construction—Historical data: Washington, DC, U.S. Census Bureau. (Accessed April 21, 2020, via 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 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.