WOLLASTONITE
By Kenneth C. Curry

Wollastonite was mined by two companies in New York State during 2018. 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 2017. U.S. imports of wollastonite were estimated to be no more than 1,000 t, essentially unchanged compared with imports in 2017. Worldwide sales of refined wollastonite products were likely in the range of 825,000 to 875,000 t, essentially unchanged from those of 2017.

Wollastonite, a calcium metasilicate (CaSiO₃), has a theoretical composition of 51.7% silicon dioxide (SiO₂) 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 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 2018, but production and sales data were withheld to avoid disclosing company proprietary data.

In 2018, 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 by using high-intensity magnetic separators. The Vanderbilt deposit contains calcite, diopside, and wollastonite. The ore was processed at the company’s Balmat plant. NYCO discontinued its planned expansion after evaluating the results of an exploratory drilling program (Odato, 2018).

Consumption

The USGS does not collect consumption data for wollastonite, but consumption was estimated to have decreased in 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 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, 2018). Consumption of wollastonite for metallurgical applications likely increased because the output of steel in the United States increased by 4.8% in 2018 (American Iron and Steel Institute, 2019). New privately owned housing units started increased 3.9% in 2018, 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, 2019).

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 2018, prices for domestically produced wollastonite were estimated to be between $300 to $320 per metric ton (U.S. Census Bureau, 2019).
metric ton, essentially unchanged from those in 2017. 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 U.S. Census Bureau Harmonized Tariff Schedule code that includes multiple mineral commodities. In 2018, imports and exports were estimated to have remained steady. It was estimated that less than 10,000 t of wollastonite was exported and less than 1,000 t was imported.

World Review

Wollastonite was produced in only a few countries, and the countries that produced wollastonite may not have published official production data. In 2018, global sales of refined wollastonite were thought to be in the range of 850,000 to 900,000 t, essentially unchanged from those in 2017. U.S. production data were withheld to avoid disclosing company proprietary data. Data for China were revised based on a new data source, which significantly increased estimated production compared to the previous data source (Ministry of Natural Resources, 2018, p. 54–55). China produced an estimated 870,000 t of refined wollastonite in 2018, a slight increase from a revised estimate of 850,000 t in 2017. India ranked second in production with 148,000 t of refined wollastonite in 2018 and 156,000 t in 2017 (Indian Bureau of Mines, 2018, 2019), followed by Mexico with 83,000 t in 2018 and 87,000 t in 2017 (Instituto Nacional de Estadística y Geografía, unpaginated). 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 estimates of output.

Outlook

According to the International Monetary Fund (2019), the U.S. economy is expected to grow by 2.5% in 2019 and by 1.8% in 2020, indicating that U.S. wollastonite production may increase. Domestic industrial output and housing starts were higher in 2018 than in 2017, and the expected economic growth indicates that this may continue. Thus, sales of wollastonite could rise in 2019 and 2020 for construction-related products, friction products, plastics, and rubber (Board of Governors of the Federal Reserve System, 2019; U.S. Census Bureau, 2019).

The International Monetary Fund (2019) projects that the global economy is likely to grow by 3.5% in 2019 and by 3.6% in 2020. China, India, and Mexico are likely to experience growth of more than 2% in 2019 and 2020. Therefore, global production and sales of wollastonite may increase in 2019 and 2020.

References Cited


GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications


Other

American Ceramic Society.

Ceramic Industry, monthly.

Paint and Coatings Industry, monthly.

Wollastonite. Ch. in Industrial Minerals and Rocks (7th ed.).