



2009 Minerals Yearbook

WOLLASTONITE

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Wollastonite was mined by two companies in the United States in 2009. U.S. production data collected by the U.S. Geological Survey (USGS) are withheld to avoid revealing company proprietary data, but the U.S. production rate was reported in the trade literature to be about 65,000 metric tons per year (t/yr). There was a decline in production and sales because of poor market conditions worldwide. Exports of wollastonite were estimated to be in the range of 22,000 to 25,000 metric tons (t), a decline from those of 2008. Imports of wollastonite were estimated to be less than 4,000 t. World sales of refined wollastonite products were estimated to be in the range of 430,000 to 470,000 t in 2009 compared with 480,000 to 520,000 t in 2008.

Production

In 2009, domestic wollastonite production decreased from that of 2008. Data collected by the USGS are withheld to avoid disclosing proprietary information, but U.S. wollastonite production rate was reported in the trade literature to be about 65,000 t/yr in 2009 (Ellen, 2009; Feytis, 2009; Industrial Minerals, 2009b).

Wollastonite has been mined commercially in California and New York. The California deposits, which are in Inyo, Kern, and Riverside Counties, were mined between 1930 and 1970. These operations were limited in size, producing only a few thousand metric tons each year for ceramics, decorative stone, paint, and mineral wool production before closing.

Wollastonite deposits in New York have been mined for more than 50 years. Two companies mined wollastonite in 2009—NYCO Minerals, Inc. (NYCO) [a subsidiary of Resource Capital Fund IV L.P. (RCF), Denver, CO], which operated a mine in Essex County, and R.T. Vanderbilt Co., Inc., through its Gouverneur Minerals Division, which operated a mine in Lewis County. The NYCO deposit contains diopside, garnet, and wollastonite. Parts of the deposit contain up to 60% wollastonite. The ore was processed at the Willsboro, NY, plant, where the garnet was removed by using high-intensity magnetic separators. NYCO also chemically modified the surfaces of some of its wollastonite products to improve their performance. R.T. Vanderbilt's deposit consists primarily of wollastonite as well as minor amounts of calcite and prehnite and trace amounts of diopside. The ore was processed at the company's St. Lawrence County plant, where it was milled and air classified. R.T. Vanderbilt also produced surface-treated products.

NYCO, which operates a wollastonite mine and mill in Lewis County, proposed a possible land swap with the State. The company would access 101 hectares of wollastonite reserves located in the Jay Mountain Wilderness, next to the current mine site. In return, NYCO would acquire and donate environmentally important land to New York's Forest Preserve

system. The land swap would require a State constitutional amendment (Knight, 2009).

NYCO reported that sales declined about 40% in early 2009 compared with those of the same period in 2008. The slumping automotive industry was the primary reason for the decline although the decline in construction activity also affected sales. NYCO indicated that production at its Lewis Mine was about 45,000 t in 2009 (Feytis, 2009; Industrial Minerals, 2009b).

R.T. Vanderbilt Co., Inc. announced staff reductions at its Balmat mill in Fowler, NY. The global economic recession resulted in lower sales of wollastonite, prompting the company to reduce expenses through staff reductions. The mill in Fowler processes about 20,000 t/yr of wollastonite (Ellen, 2009).

Consumption

The USGS does not collect end-use data on wollastonite. However, based on company press releases, general overview articles, U.S. manufacturing trends, and consumption estimates published by Industrial Minerals (1999), plastics and rubber applications were estimated to account for 25% to 35% of U.S. sales in 2009, followed by ceramics with 20% to 25%; paint, 10% to 15%; metallurgical applications, 10% to 15%; friction products, 10% to 15%; and miscellaneous, 10% to 15%. Ceramic applications probably account for 30% to 40% of wollastonite sales worldwide, followed by polymers (plastics and rubber) with 30% to 35% of sales, and paint with 10% to 15% of sales (Kendall, 2001; Robinson, 2006). The remaining sales were for construction, friction products, and metallurgical applications.

The distribution of sales among markets was not thought to have changed significantly in 2009 from that of 2008 because nearly all of the markets served by wollastonite were affected by the global recession.

In ceramics, wollastonite decreases shrinkage and gas evolution during firing, increases green and fired strength, maintains brightness during firing, permits fast firing, and reduces crazing, cracking, and glaze defects. In metallurgical applications, wollastonite serves as a flux for welding, a source for calcium oxide, a slag conditioner, and to protect the surface of molten metal during the continuous casting of steel. As an additive in paint, it improves the durability of the paint film, acts as a pH buffer, improves its resistance to weathering, reduces gloss, reduces pigment consumption, and acts as a flattening and suspending agent. In plastics, wollastonite 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 improves flexural and tensile strength (Roskill Information Services Ltd., 1996, p. 58–59, 78–81, 104–107, 119, 123–128).

Prices

Quoted prices for domestically produced acicular wollastonite, ex-works, were \$200 per metric ton for 200-mesh, \$191 per ton for 325-mesh, and \$444 for high-aspect-ratio wollastonite. Prices for wollastonite from China, free on board, in bulk, were \$80 to \$90 per ton for 200-mesh and \$90 to \$100 per ton for 325-mesh (Industrial Minerals, 2009c). Hawley (2009) indicated that wollastonite sold for plastics applications was \$661 to \$1,984 per ton, and prices for ceramic grades of wollastonite were \$220 to \$496 per ton from a major U.S. producer. Quoted prices should be used only as a guideline because actual prices depend on the terms of the contract between the seller and the buyer.

Foreign Trade

Comprehensive trade data were not available for wollastonite. U.S. exports were estimated to be 30,000 to 40,000 t in 2008 (Hawley, 2009). Based on declines in sales resulting from the global economic recession, exports were likely in the range of 22,000 t to 25,000 t in 2009. Wollastonite was exported by ship to Australia, Brazil, Colombia, the Dominican Republic, Germany, Hong Kong, the Netherlands, the Republic of Korea, Singapore, and the United Kingdom (United Business Media Global Trade, undated). Additional amounts probably were transported by truck or train to Canada.

U.S. imports were estimated to be less than 4,000 t in 2009. Imports transported by ship were received from Canada, Finland, and India. Canada was reported to be the leading source of wollastonite imported into the United States by ship, followed by India and Finland (United Business Media Global Trade, undated). Shipments of wollastonite from Canada were transshipments or misidentified because no wollastonite production was reported there. Small additional amounts may have been shipped from Canada and Mexico by rail or truck.

World Review

World production of crude wollastonite ore probably declined 10% to 15% in 2009 because of the global recession. The decline in global production would have been greater, but the economies of China, India, and a few other Asian countries grew slightly. This enabled producers in China and India, which account for about 70% of the world wollastonite production, to experience only slight declines in production compared with production in 2008. Estimated crude ore production was in the range of 520,000 to 540,000 t in 2009 compared with 600,000 t in 2008. Sales of refined wollastonite products probably were in the range of 430,000 to 470,000 t in 2009 compared with 480,000 to 520,000 t in 2008.

In 2009, wollastonite production in China was estimated to be 290,000 to 300,000 t, and production in India was probably 105,000 to 110,000 t based on 2008 data published by Feytis (2009). The United States ranked third in wollastonite

production (about 65,000 t). Production in Mexico was estimated to have declined slightly to 40,000 t in 2009 based on published data for 2008 (Feytis, 2009; Ministry of the Economy [Mexico], 2009, p. 137). Following Mexico in ranking were Finland (15,600 t in 2008), Spain (9,500 t in 2008), and Namibia (55 t in 2008) (Brown and others, 2010, p. 105). Small amounts of wollastonite may have been produced in other countries. Data for 2009 were not available for most countries.

Canada.—Canadian Wollastonite Co. continued work on development of its deposit in eastern Ontario, but plans to build a pilot plant, with a capacity of 15,000 t/yr of wollastonite and 10,000 t/yr of byproduct diopside, on the site were delayed owing to the decline in wollastonite markets. Ore was shipped to a flotation facility for further testing (Industrial Minerals, 2009a, d).

India.—Domestic demand for wollastonite continued to increase in India, although at a slower growth rate than in 2008. Wolkem India Ltd., the leading world producer of wollastonite, was able to sustain production despite the slowdown in demand in India and the decline in India's export markets (Feytis, 2009).

Spain.—Compania Mineral Ilustracion (owned by Crimidesa Group) continued to increase its production and sales through 2008. Production was 20,000 t in 2008. The company was a relative newcomer to the wollastonite industry, beginning in 2003. The deposit was near Aldea del Obispo, Salamanca and contained an estimated 26 million metric tons of resources. With slightly higher iron content than wollastonite from some deposits, Compania Mineral sold wollastonite for ceramics and casting applications in Western Europe but was beginning to focus some of its sales on container glass, which was not a typical market for wollastonite (Feytis, 2009).

Outlook

Demand for and production of wollastonite declined in 2008 because the global recession resulted in a downturn in the industries that used wollastonite. The U.S. manufacturing industries remained at reduced operating levels, resulting in reduced demand for wollastonite for such applications as powder coatings for consumer appliances, surface conditioners for steel casting, ingredients for manufacturing technical ceramic bodies, and reinforcements for plastics products. Commercial and residential construction did not rebound in 2009, resulting in a continued low demand for wollastonite for architectural paints, caulks, ceramic tile glazes and bodies, roof coatings, sanitaryware, sealants, stucco, and wallboard. Use of wollastonite in structural clay products, such as brick and quarry tile, likely declined because of the continued slow construction markets. The automotive industry also did not recover significantly from the declines in 2008 and its reduced output affected sales of wollastonite for the manufacture of such items as friction products and wollastonite-reinforced plastic automotive components.

Industrial output and construction both appeared to be increasing slightly and hinted at the beginnings of an economic recovery in many of the world economies. Economic growth was expected to be greatest in countries with developing and emerging economies, averaging 6% in 2010 and about 8% in 2011. The economies of other countries were expected to

increase at a slower pace, averaging 2% in 2010 and 2.5% in 2011 (Funk, 2010; International Monetary Fund, 2010). As a result, wollastonite production in the United States may increase slightly in 2010. Faster economic growth in Asian markets is likely to result in increased production in China and India in 2010.

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