



# 2012 Minerals Yearbook

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## WOLLASTONITE

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Wollastonite was mined by two companies in the United States in 2012. U.S. production data collected by the U.S. Geological Survey (USGS) are withheld to avoid disclosing company proprietary data. In 2012, the leading U.S. wollastonite producer was sold. Exports of wollastonite were estimated to be less than 10,000 metric tons (t), but were thought to be slightly greater than those of 2011. Imports of wollastonite were estimated to be less than 4,500 t in 2012. Worldwide sales of refined wollastonite products were estimated to be in the range of 500,000 to 540,000 t in 2012 compared with 480,000 to 520,000 t in 2011.

Wollastonite, a calcium metasilicate ( $\text{CaSiO}_3$ ), has an ideal composition of 51.7% silicon dioxide and 48.3% calcium oxide but can also contain trace to minor amounts of aluminum, iron, magnesium, manganese, potassium, sodium, or strontium substituting for calcium. Wollastonite occurs in the form of prismatic crystals that break into tabular-to-acicular fragments. It is usually white but also may be gray, cream, brown, pale-green, or red depending on the impurities and grain size. Wollastonite is used primarily in automobile brakes, ceramics, metallurgical processing, paint, and plastics. Some of the properties that make it so useful are high brightness and whiteness, low moisture and oil absorption, low volatile content, and the acicular nature of some wollastonite.

## Production

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.

Wollastonite deposits in New York have been mined for more than 50 years. Two companies mined wollastonite in 2012. NYCO Minerals, Inc. (a subsidiary of S&B Industrial Minerals S.A., Athens, Greece) operated a mine in Essex County. R.T. Vanderbilt Co., Inc. (through its Gouverneur Mineral Division) 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 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 with 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.

S&B Industrial Minerals acquired Rolling Rock Minerals Inc., a U.S. investment firm based in Denver, CO. Rolling Rock Minerals was the parent company for NYCO, Minera Roca

Rodando S. de R.L. de C.V., and The American Tripoli Co. NYCO indicated that the purchase by S&B would not affect the operation of its wollastonite facilities in New York and Mexico. The purchase was made by S&B to allow it to diversify its product portfolio and increase its presence in value-added markets (NYCO Minerals, Inc., 2012).

## Consumption

The USGS does not collect apparent consumption or end-use data on wollastonite. Based on company press releases, general overview articles, U.S. manufacturing trends, and previously published consumption estimates, the U.S. end-use distribution for wollastonite was probably about the same as that of 2011. Plastics and rubber applications were estimated to account for 30% to 35% of U.S. sales, followed by ceramics with 20% to 25%; metallurgical applications, 10% to 20%; paint, 10% to 15%; friction products, 10% to 15%; and miscellaneous, 10% to 15%.

Ceramic applications probably accounted 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. The remaining sales were for construction, friction products, and metallurgical applications.

Some increases in domestic wollastonite consumption in 2012 probably occurred in friction material, metallurgical, plastics, and rubber markets, based on increased industrial output of those manufacturing sectors in the United States. Commercial and residential construction, where wollastonite may be used in products such as adhesives, caulks, ceramics, paints, stucco, and roof coatings, increased in 2012 so sales of wollastonite into those markets likely were slightly greater than those of 2011. In 2012, market distribution for wollastonite in Europe probably was similar to that in the United States, although increases in those markets probably were slight because of the lingering economic instability in the region. In Asia and South America, where economic growth has been stronger, increased wollastonite consumption was likely more uniform across all markets.

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 \$231 to \$265 per metric ton for 200-mesh, \$242 to \$276 per ton for 325-mesh, and \$489 per ton for acicular 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, 2012b). 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 because it is included under generic U.S. Census Bureau Harmonized Tariff Schedule (HTS) code 2530.90.8060 (mineral substances not elsewhere specified or included). Some wollastonite also may be exported under HTS code 2521.00.0000 (limestone flux; limestone and other calcareous stone). U.S. exports were estimated to have increased from those of 2011 but were still likely be less than 10,000 t. Documented exports were in the range of 2,580 t in 2012, a slight increase from 2,490 t in 2011. These exports were transported by ship to Japan, the Republic of Korea, Belgium, Italy, Singapore, China, Germany, Brazil, Colombia, the Dominican Republic, the United Kingdom, South Africa, Spain, and Hong Kong, in decreasing order by tonnage (United Business Media Global Trade, undated). Additional quantities probably were transported by truck or train to Canada.

U.S. imports were estimated to be slightly more than in 2011 but were still less than 4,500 t in 2012. Documented imports were 3,930 t, a 58% increase from 2,490 t in 2011. Imports transported by ship were received from Canada, Mexico, India, Finland, Spain, China, the Netherlands, and Belgium, in decreasing order by tonnage (United Business Media Global Trade, undated). Wollastonite imported from Belgium and Canada was transshipped because no producers of wollastonite were active in these countries in 2012. Additional quantities of wollastonite also may have been imported by rail or truck from Canada and Mexico.

### World Review

Many countries do not report wollastonite production and production for other countries is reported with a 2- to 3-year lag time. Therefore, data in this section are estimated unless otherwise noted.

World production of crude wollastonite ore probably increased by 2% to 4% in 2012 compared with that of 2011. Although economic conditions remained unstable in much of Europe, the United States economy showed signs of recovery

and the Asian economy remained fairly strong. Estimated crude ore production increased and was in the range of 600,000 to 630,000 t in 2012 compared with 580,000 to 610,000 t in 2011. Sales of refined wollastonite products probably were in the range of 500,000 to 540,000 t in 2012, an increase from 480,000 to 520,000 t in 2011.

In 2012, China was the leading producer of wollastonite with 300,000 t production of ore concentrate. India ranked second with 150,000 t of refined wollastonite production, followed by the United States (production withheld), Mexico with 55,200 t, Finland with 11,500 t, Spain with 4,000 t, and South Africa with 2,400 t. Small quantities of wollastonite may have been produced in other countries.

Canadian Wollastonite, a privately held company, received approval from the Ontario Municipal Board for its St. Lawrence wollastonite project in eastern Ontario. With the approval, the company began blasting and crushing ore for making dry processed products, which will be shipped in 2013. Markets targeted by the company for its dry processed products are animal and plant nutrition, cement production, soil abatement, and wastewater treatment (Industrial Minerals, 2012a; Patel, 2012).

### Outlook

Wollastonite consumption has increased since the 2008–09 economic recession. NYCO, the leading U.S. producer, indicated that while not operating at full capacity, production had recovered to prerecession levels achieved in 2008 (Patel, 2012). U.S. manufacturing increased in several industry sectors that manufactured products containing wollastonite. These included such markets as adhesives, coatings, and paints; automobiles (friction products and plastic and rubber components); consumer appliances (powder coatings); and plastics and rubber (reinforcing component) (U.S. Census Bureau, 2013b). Total U.S. industrial production increased 2.4% from December 2011 to December 2012 (Board of Governors of the Federal Reserve, 2013, p. 8). Residential housing starts increased by 28% and the value of commercial and residential construction put in place increased by 9% in 2012 compared with those of 2011 (U.S. Census Bureau, 2013a, c). These increases suggested that in 2013, wollastonite producers may experience additional recovery of sales to construction-related markets, such as in caulks, ceramic tile glazes and bodies, paints, roof coatings, sanitaryware, sealants, structural clay products (brick and quarry tile), stucco, and wallboard.

Coupled with the International Monetary Fund (2013, p. 2) prediction for U.S. economic growth of 2.0% and global economic growth of 3.5% in 2013, U.S. and world production and sales of wollastonite may increase by several percentages in 2013.

### References Cited

- Board of Governors of the Federal Reserve, 2013, Industrial production and capacity utilization—G.17: Federal Reserve Statistical Release, January 16, 19 p. (Accessed February 12, 2013, at <http://www.federalreserve.gov/releases/g17/Current/>.)
- Industrial Minerals, 2012a, Canadian Wollastonite receives final approval for St. Lawrence: Industrial Minerals, September 18. (Accessed February 12, 2013, via <http://www.indmin.com>.)

Industrial Minerals, 2012b, Prices: Industrial Minerals, no. 543, December, p. 79.

International Monetary Fund, 2013, World economic outlook—Gradual upturn in global growth during 2013: Washington, DC, International Monetary Fund. (Accessed February 12, 2013, at <http://www.imf.org/external/pubs/ft/weo/2013/update/01/index.htm>.)

NYCO Minerals Inc., 2012, NYCO Wollastonite...one mineral, a world of applications: Willsboro, NY, NYCO Minerals Inc. press release, September 18, 1 p. (Accessed February 12, 2013, at [http://www.nycominerals.com/nyco\\_today\\_files/NYCO\\_Joins\\_S\\_B\\_Industrial\\_Minerals\\_S\\_A\\_on\\_September\\_18\\_2012\\_for\\_Website.pdf](http://www.nycominerals.com/nyco_today_files/NYCO_Joins_S_B_Industrial_Minerals_S_A_on_September_18_2012_for_Website.pdf).)

Patel, Kasia, 2012, Wollastonite—Slow and steady: Industrial Minerals, no. 541, October, p. 53–55.

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

United Business Media Global Trade, [undated], PIERS: United Business Media Global Trade, April. (Accessed February 26, 2013, via <http://www.piers.com/index.cfm?page=login&p=ipers>.)

U.S. Census Bureau, 2013a, Construction spending: Washington, DC, U.S. Census Bureau. (Accessed February 12, 2013, via <http://www.census.gov/construction/c30/totpage.html>.)

U.S. Census Bureau, 2013b, Manufacturers' shipments, inventories, & orders: Washington, DC, U.S. Census Bureau, February 4. (Accessed February 12, 2013, via <http://www.census.gov/manufacturing/m3/>.)

U.S. Census Bureau, 2013c, New residential construction: Washington, DC, U.S. Census Bureau. (Accessed February 12, 2013, via [http://www.census.gov/construction/nrc/historical\\_data/](http://www.census.gov/construction/nrc/historical_data/).)

## 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 01–002, 2001.

### Other

American Ceramic Society.  
Ceramic Industry, monthly.  
Paint and Coatings Industry, monthly.  
Wollastonite. Energy, Mines and Resources Canada Summary Report No. 18, p. 1993.