Putting the ground in calcium carbonate

22 May 2009

Ground calcium carbonate is the most widely used additive in mineral coating applications. IM examines the process route of Indian producer 20 Microns

India-based 20 Microns Ltd began life in 1988 and set up its first ground calcium carbonate (GCC) operation in Waghodia, Gujarat, in 1998. 20 Microns followed its Waghodia facility with several other operating mines and additional capacity expansions, and now claims to be India's largest diversified producer of industrial minerals.

The company's portfolio includes more than 15 industrial minerals, including barytes, dry and wet GCC grades, hydrous kaolin, mica and silica. Typically these mineral grades are sold into markets for animal feed, ceramics, coatings, plastics, rubber, and others.

Calcium carbonate products, which are sourced from 20 Microns' mines in Pindwara, Rajasthan, and Tirunelveli, Tamil Nadu, generate around 50% of the company's revenue. 20 Microns also operates a dolomitic calcite mine in Chotta Udepur, Gujarat.

Mining

The company operates a number of pits in its calcium carbonate deposits which are evaluated by the mining engineer, who designs a mining plan for each pit. When selecting a deposit to be mined, 20 Microns examines the size of the deposit, variations and the purity of the calcium carbonate, the whiteness of the material, the nature of any impurities that are present, and the amount of overburden to be removed during the mine's life.

Once the planning is completed, mining takes place in an open-pit manner; typical of calcium carbonate operations worldwide. Depending on the hardness of the material and the structure of the deposit, minor explosives are used to perform blasting. In cases where the material is easy to extract, the mining takes place using scrapers.

When the material has been extracted, 20 Microns uses a hand-sorting selection technique at the mines, where inferior quality grades are removed and the high quality material is reduced to smaller lumps. These lumps are then transported to respective plants for processing, usually via trucks or by railway for long distance transfers.

GCC market utilisation in Asia for 21m. tonnes in 2007
(%)

Processing

20 Microns processes GCC at several locations, including the Vadadala and Waghodia plants in Gujarat, west India; the Alwar, Swaroopgani and Udaipur plants in Rajasthan (north-west India); and the Hosur and Tirunelveli plants in Tamil Nadu (south India).

The nationwide presence of 20 Microns' GCC plants allows the company to supply region specific customers from the nearest plant – providing better service with competitive transportation costs.

20 Microns specialises in the production of ultra-fine GCC grades, the processing of which produces unusually superior properties in whiteness and brightness. Ultra-fine GCC grades are commonly used as functional fillers or as pigments for paper, paint and plastic products.

GCC production of 21m. tonnes in Asia for 2007 by country (%)

Dry GCC

During the processing of GCC, which is typically conducted via a ball mill and classifying system, it is important to configure the particle size, brightness, density, particle shape and surface treatment of the product.

The classifying operation is central to the processing route for producing ultra-fine grades. The processing of dry GCC grades involves feeding the material from a silo into the ball mill, where preliminary fine-sizing is achieved.

The material is discharged from the ball mill and then pneumatically conveyed to the classifier, which works via air classification, to produce ultra-fine material. Any remaining coarse material is fed back into the ball mill for fine-sizing. Once the GCC has been processed into ultra-fine grades, these are transported to the storage silo where they are bagged according to customer requirements.

Wet GCC

Atil Parikh, joint managing director of 20 Microns, told IM that the company uses traditional methods for producing wet GCC at present, but that it is currently developing a modern method which will be used at its new plant in Daman.

The traditional processing route for wet GCC begins with the crushing of dry calcium carbonate lumps in a jaw crusher to reduce material to the desired size. This raw material is stored in silos connected to the wet grinding mill.

The material is mixed with chemicals and water in the grinding mill to reduce particle size further, producing a slurry mixture which is screened to remove impurities. Once the material has been screened, it is bleached to improve overall brightness and colour.

After bleaching, the material is transferred to a filter press to attain the desired solid content slurry, and then run through high pressure pumps into the storage silos. Depending on end user

requirements, the GCC can be delivered in slurry form, or alternatively dried, pulverised and classified into a powder.

Exports & markets

20 Microns generally exports its ultra-fine dry GCC grades from the Mumbai Nhava Sheva port to neighbouring countries such as Bangladesh, Nepal, and Sri Lanka; however the company also supplies customers further afield in countries such as Mauritius, Nigeria, United Arab Emirates and Tanzania.

GCC lumps tend to be transported by trucks from the mines or ports to processing sites, which are spread throughout India. The company is well connected and has implemented infrastructure which ensures that the distance from a GCC mine to a processing facility is never more than 100km.

The market situation for Indian and Asian filler producers at present appears to be very positive. The global downturn has yet to dampen India's growth, while demand for filler products – particularly in paints – looks set to grow by an additional 1m. tpa by 2013.

Indeed, 20 Microns recently announced plans to significantly expand its GCC business, realised through the formation of a new Malaysian subsidiary, 20 Microns Sdn. Bdh., which will focus on GCC production.

In addition to this, 20 Microns plans to build a new wet GCC operation in Daman, west India, that will target 10,000 tpa during the first production phase (*see IM May '09, p.15*).

20 Microns' Indian GCC mines and processing sites