Quicklime is an indispensable raw material for the environmental, chemical and construction materials industry. Chemically, quicklime is calcium oxide which is produced by burning lime at temperatures of 1000 °C under release of carbon dioxide. Every German uses an average 5 kg of lime and dolomite each day.

Processing a 350 million years old raw material

Limestone treatment produces different granulations of raw lime by washing and classifying. Particle sizes above 22 mm are burnt to lime, the rest is used as sand and split. “An important part of quality control is particle size determination by sieving. The particle size distribution of split which is used as an aggregate for concrete is an essential quality criterion”, explains Frank Buchmueller, the laboratory manager at the Steeden plant. “For the sieves we rely on well proven RETSCH quality. Their sieves are not only extremely durable but also very easy to clean.”

The chemical composition of the raw material is very important, as limestone not only consist of the major component calcium carbonate but also contains some impurities such as iron, silicon and magnesium. Even very small amounts of these components can considerably affect the burning process, therefore it is essential to provide consistent quality control during the complete production process. Only then it is guaranteed that customers get the consistent high quality they expect.

Schaefer Kalk in Steeden moves 600,000 tons of limestone each year. Up to 400,000 t of limestone products are made by quarrying, washing and classifying.

The production program of Schaefer Kalk ranges from limestone, calcium oxide and calcium hydroxide to ready-to-use lime water of high chemical purity with exactly defined physical properties. Mortar which conforms to standards and is easy to process, specialized fillers and pigments with defined grading complete the product range. An up-to-date quality management guarantees compliance with all relevant quality standards.

www.schaefer-kalk.de
"We use an XRF spectrometer to analyze the chemical composition. We work with pellets, therefore a high fineness and a consistent particle size distribution of the samples are important preconditions for reproducible analysis results. For fine size reduction we use RETSCH’s Ultra Centrifugal Mills ZM 1 and ZM 200", explains Frank Buchmüller. "We have been using the ZM 1 for more than 20 years now. With the ZM 200 RETSCH again introduced a mill into the market which not only fulfills the requirements of grinding limestone but which has also some very convincing new functionalities."

The limestone which is larger than 22 mm is burnt in four automatically controlled top loader kilns. The lime thus generated reacts differently according to the different solid fuels used in the kilns, i.e. it reacts with water to calcium hydroxide, releasing heat. Depending on how fast this chemical transformation is taking place, the product is called soft, medium or hard burnt lime. After that the lime is ground with different mills to a fineness of $d_{95} = 90 \mu m$, stored in silos and is delivered from there to the customers by train.

The standard DIN EN 459 stipulates the reactivity of lime. To make the measuring results taken from the intermediate products correlate with those of the pulverized material, the particle size distributions have to be as similar as possible. "This can be easily achieved with the Ultra Centrifugal Mill ZM 200 which can be operated with different ring sieves to produce different grind sizes."

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(Frank Buchmueller, Schaefer Kalk)