

Salt

Particle size and shape analysis of salt

Application

Salt (NaCl, KCl) is used mainly in the chemical industry (85%), but also in the production of food, washing powder, for de-icing and as organic and inorganic **fertilizer** which can be either liquid or granular. It can be recovered in different ways, either by mining from underground or open deposits (dry mining, rock salt) or by extracting it from sea water (wet mining).



Demands of quality assurance

Quality control has to be carried out on the mined raw product, during production and on outgoing goods. Some companies use particle measurement systems in the quality lab, some use them at-line or on-line, during the production process. A basic requirement for most applications is that the salt grains/granules have a **defined particle size distribution**. As salt products are mostly specified by sieve analysis, the results of an alternative measurement system have to match the respective sieve results.

Shape measurement is also an issue: It is required for the quality control of some types of salt which must consist of cubic or elongated particles and for the detection of aggregates (caking)

Solution

The CAMSIZER® can easily replace the size analysis by sieving (Fig. 1). Narrow as well as broad size distributions can be measured fast, with excellent reproducibility and even fully automatically if desired. The CAMSIZER can analyse all sizes without any readjustments.

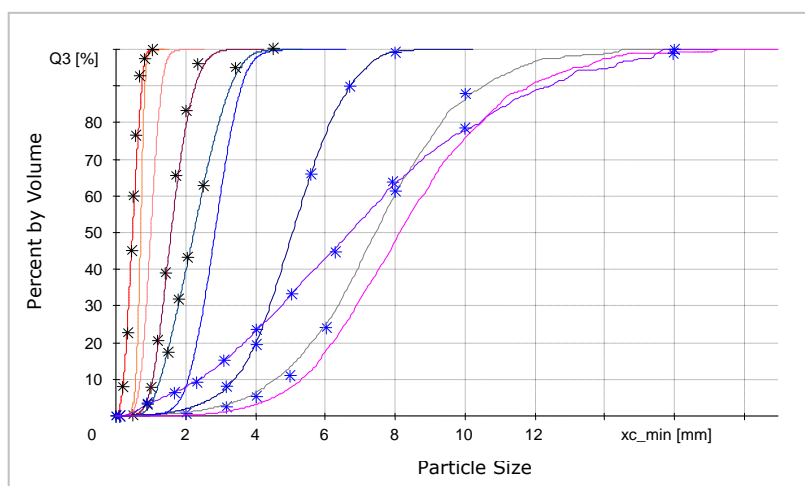


Fig. 1
Comparison of sieving results
and CAMSIZER
measurements.
Curves: CAMSIZER
Asterisks: sieving results

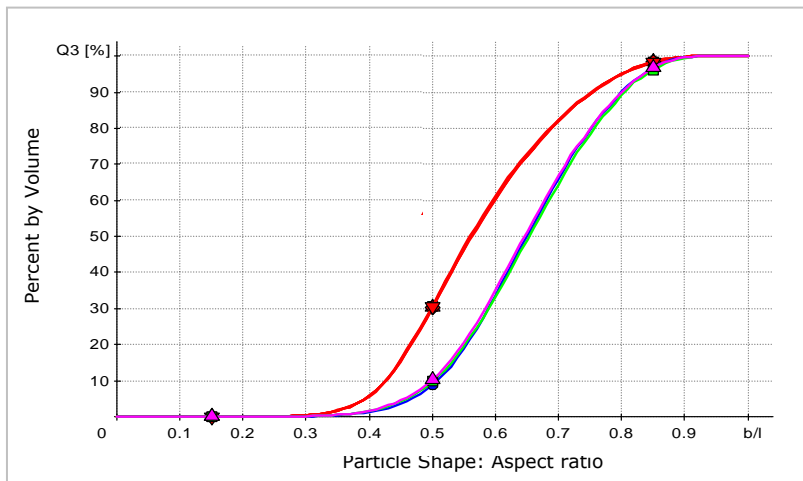


Fig. 2
 The CAMSIZER can distinguish different crystal shapes for example by measurement of the aspect ratios (particle width divided by length). The reproducibility is excellent, the graph shows 4 repeated measurements of the same sample (red), and 3 measurements of a different batch (green, blue, violet).

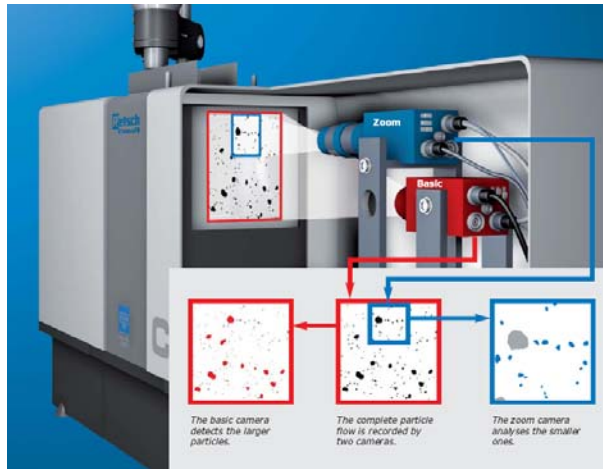
CAMSIZER® - Benefits at a glance

- Patented two camera system: measurement of broad particles distributions in one analysis, without readjustment (30µm - 30mm,)
- Reduction of sample analysis time, costs and workload
- Perfect matching of sieve results, i.e. identical product specifications
- More information on each sample (i.e. size and shape, higher resolution etc.)
- Higher resolution of the size distribution => more precise adjustment of the process parameters => higher output (less recycling)
- Results are available in higher frequency and faster - also in the night time => less junk/cull and time effort
- Results saved in 1,000 sizes classes => ability to simulate any sieve stack configuration
- The CAMSIZER software allows for export of an EXCEL readable file to provide the results of the at-line and lab analysis to the quality computer system (LIMS).
- More frequent and better calibration
- Similar and accurate results in absolute size at different locations in the plant or group



Fig. 3
 Online CAMSIZER®

Measuring Principle



The patented measuring setup of the CAMSIZER – two digital cameras as an adaptive measuring unit – improves and optimises particle analysis by digital image processing. Therefore, it is possible to measure a wide range of particles from 30 μm to 30 mm with extreme accuracy, **without having to switch measuring ranges or make adjustments.** The sample is fed in from the feed channel so that all particles fall through the measurement field. During the measurement procedure the two digital cameras (CCD) perform different tasks. The basic camera (CCD-B) records large

particles, the zoom camera (CCD-Z) records the small ones. The contact-free optical measurement is carried out in real time and simultaneously obtains all the required information about particle size and particle shape. A modularly configurable online version of the instrument has been developed to allow automated measurements to be conducted continuously.

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