

NETZSCH

Proven Excellence.



Try and Succeed

Business Unit
GRINDING & DISPERSING

TRY AND SUCCEED

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Trial and Error – is a common phrase in the English language meaning to learn from attempts and failures. We would change the term a bit: Trial and Success - to carry out experiments and draw the correct conclusions from the results. Aside from the necessary prior theoretical considerations, this is still a very common method of process optimization, not only in the field of mechanical process engineering.

Our customers expect us to provide a product that meets their specifications with as little material loss as possible and at a reasonable cost. So that a solid offer for contract processing can be submitted, tests that build on one another are necessary. In the first step, a feasibility study is carried out on a very small laboratory scale. An initial assessment can be made with a small quantity of approx. 10 - 50 kg, in rare cases even less. In addition to narrowing down the possible machine technology, important test results and analysis of particle size distribution, throughput and processing energy are already obtained. In a second step, these findings are usually validated with a larger quantity of material over a run time of several hours. Thus, the processing price quoted in EUR/kg is very reliable and therefore a solid basis for both the client and us.

In contract grinding, as in trials, it is important to weigh the amount of material correctly to ensure

the quality of the product and for optimum use of the grinding energy applied. On the basis of ISO 500001 certification, the measurement points for energy measurement are checked annually. All scales used are also calibrated at frequent intervals. The laser diffraction equipment is serviced twice a year.

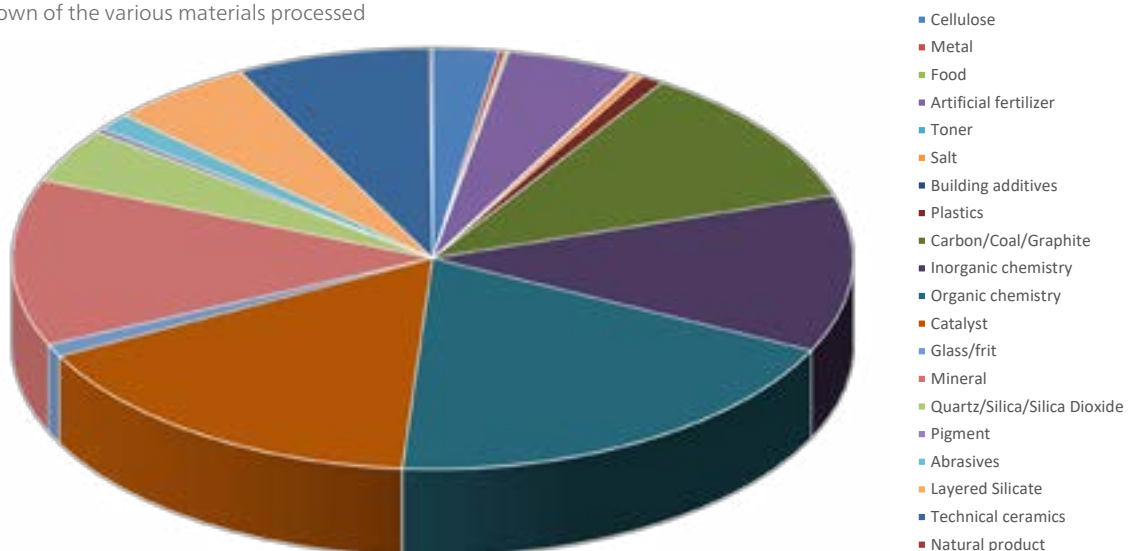
A team of qualified employees and a pool of numerous tests and many years of experience with over 500 different products provide additional reliability in the plausibility assessment.

The particle size distribution is the most important criterion in the field of contract processing. Depending on the material, application and fineness, different analysis systems are used. The ideal is to use the same analytics as used by the customer for quality assurance.

In industrial applications, particle size distribution measurements are frequently carried out with laser diffraction instruments. Depending on the manufacturer and the selected parameter sets, considerable differences can be detected in the measured particle size distribution in one and the same product. Therefore, a very effective tool is to ask for a reference sample and use it to determine the particle size distribution. All powders produced in the test can be compared and the

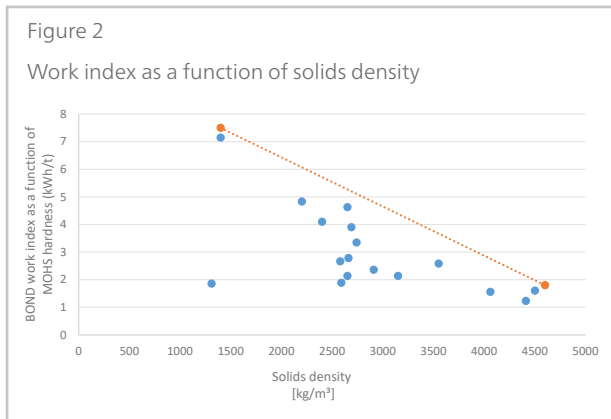
Figure 1

Breakdown of the various materials processed



machine parameters changed in such a way that it is possible to work precisely towards the reference sample.

Whereas optimization in terms of throughput was in the foreground in the past, we now take a more holistic view. From the yield, packaging, cleaning and storage to energy considerations, all points individually and in total are becoming increasingly important. In order to make an initial assessment, it is helpful to consider the maximum required comminution energy. A simple method is to use the evaluation of the grindability indices according to BOND. In the field of ore and mineral processing, this method has been a popular benchmark for decades. Although these have been determined for comminution by means of bead mills, they are transferable, to a limited extent, to impact grinding. The correlations are not directly apparent; if the grindability index is related to the MOHS hardness, the values sort themselves via the solids density and a maximum limit line for grindability results.



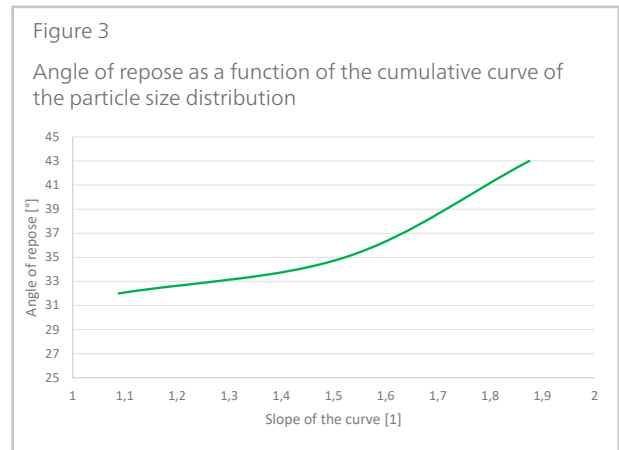
Rheological flow properties or deposit formation, in the machines or plant components, only become apparent during processing and can either be specifically influenced or controlled through selection of the machine technology.

Very hard ceramic or metallic products generally have a higher hardness than the hardest steel and are well above 60 HRC. An assessment of the product hardness helps to find the optimal machine lining. A selection of different plastics and ceramic materials allows us to protect the machines in such a way that very low contamination levels can be achieved. For very hard materials, values in the range of <1 ppm can be maintained.

With increasing machine size, the dead space volume increases and, with it, the absolute proportion of material loss. Loss rates in the range of 1-3% are common. With the small machine sizes, there is no alternative to our pilot plant for the processing of very high-quality and expensive materials.

Product properties such as thermal conductivity, electrical resistivity, rheological flow properties or chemical reactivity are strongly determined by the specific surface area of the powder particle size distribution. Of course, the geometric properties of the particles also play a major role. Asymmetric, cubic grains behave differently than round, potato-shaped particles.

A very effective way to evaluate specific properties is to look at the slope of the curve of a measured particle size distribution. Most of these properties, such as angle of repose, color, electrical resistivity, bulk density or other parameters are very strongly determined by the specific surface area of the powders. Desired properties can thus be set or optimized in a targeted manner via the particle size distribution.



SUMMARY

Trials are a valuable tool in the preparatory work for a contract order with larger quantities. Optimization of product properties can be supported by targeted test parameters.

Our pilot plants, with their small machine sizes for processing very high-quality and expensive materials, are an unequalled option for contract processing.

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Under the management of Erich NETZSCH B.V. & Co. Holding KG, the company consists of the three business units Analyzing & Testing, Grinding & Dispersing and Pumps & Systems, which are geared towards specific industries and products. A worldwide sales and service network has guaranteed customer proximity and competent service since 1873.

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