

Consulting  
Silo design and retrofits  
Troubleshooting  
Powder testing

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**SCHWEDES + SCHULZE**  
S C H Ü T T G U T T E C H N I K

## About us

"Schwedes + Schulze Schüttguttechnik" is a consultant company with powder testing facilities. We work on tasks in the fields of silo technology, powder characterization, and bulk solids handling.

A main part of our work is silo design for flow, i.e. the design of silos and other bulk handling equipment in order to attain reliable operation. Reliable operation means that problems as listed below will not occur:

- flow obstructions like arching and piping,
- stagnant zones,
- wide residence time distribution,
- segregation,
- unsteady flow and flooding,
- problems according to insufficient interaction of silos, feeders, and conveying and dosage systems.

A second important part of our work is the measurement of flow properties of powders and bulk solids, e.g. flowability, internal friction, compressibility, consolidation or caking during storage at rest, sensitivity to attrition, influence of temperature or humidity, etc. These tests are important, for example, for comparative testing, product optimization (e.g. optimum percentage and type of flow agent, influence of variations of the production process), quality control.

## Philosophy

The philosophy of "Schwedes + Schulze Schüttguttechnik" is to solve practical problems in the field of bulk solids handling (silo design, measurement of flow properties) on the basis of the mechanical properties of the bulk solid under consideration. Only this way reliable solutions can be achieved.

Even at the measurement of flow properties we concentrate on well-defined, physical quantities, which can only be measured with appropriate shear testers.

## Experience

In the past we have tested more than one thousand different powders and bulk solids. Thus, we have an extensive experience which helps us to work effectively on future problems. Some examples of materials tested in the past are: FGD gypsum, fly ash, filter dust, coal dust, lignite, sugar, carbon black, fertilizer, animal food and components, metal powder, clay, iron ore, various crystalline and powdery products, wood chippings, plastic granules, shredded waste, glass meal, cement, chalk, food products like fatty instant soup powder, and sewage sludge.

Although we have the experience from all materials tested in the past, most problems which have to be solved require qualified testing of the materials under consideration in order to obtain a reliable solution. Alone the name of a bulk solid is no sufficient characterization of its flow behaviour, since usually products with the same name, but of different origin show differences e.g. in particle size, particle shape, and humidity, and thus in their flow properties.

## The services we offer

- Silo design for flow: Determination of the silo geometry (slope of hopper walls, outlet size, wall materials, inserts, feeders, discharge aids) which will avoid flow problems like arching, piping, irregular flow, flooding, segregation, or product degradation.
- On-site analysis of existing silos and related equipment, e.g., in case of problems with segregation or poor flow, and elaboration of concepts for reconstruction (retrofits) or optimization.
- Troubleshooting.
- Measurement of flow properties of powders and bulk solids with shear testers (e.g. Ring Shear Tester, Jenike Shear Tester, uniaxial compression test) for silo design, comparative tests etc.
- Measurement of the stress ratio at uniaxial compression (Lambdameter), wall friction coefficient and bulk density for silo design for strength, e.g. according to EN 1991-4.
- Development and optimization of feeders, dosing and conveying equipment, etc. which have to be suited to special boundary conditions (e.g. uniform withdrawal and feeding of bulk solid, mixing).
- Seminars and courses (e.g., on-site).



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