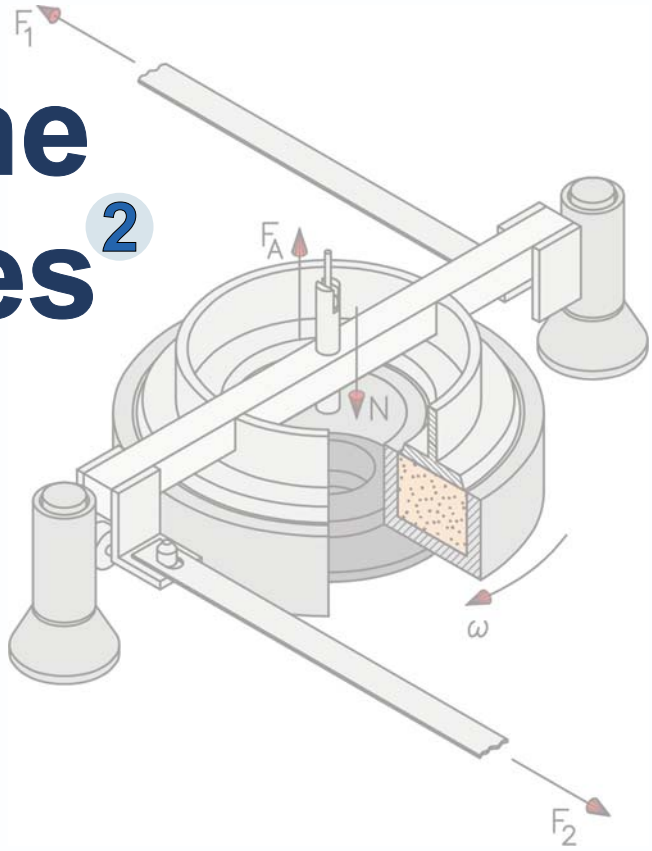
It is easy to measure the flow properties of powders.

Time-saving, reliable and on a scientific base.



Shear cell (Ring shear tester RST-01.pc)

1 Easy, because our computer-controlled Ring Shear Testers are able to perform the measurement of flowability and other flow properties as well as the evaluation of the measurement automatically: Fill the shear cell and place it on the tester, enter the test conditions, start the test and receive the results at the end.

2 Flow properties are physically defined, device-independent characteristic values. They include, above all, the compressive strength of the bulk solid, but also the flowability, bulk density and internal friction. The increase in the strength of the bulk solid with storage time (time consolidation, "caking") is also an important characteristic value relevant to practice.

3 Time-saving, because an operating time of only about 5 minutes is required for a flowability measurement. The actual measurement and evaluation including the presentation of the results takes place automatically and takes about 10 to 15 minutes (depending on the product).

4 Reliable, as our computer-controlled Ring Shear Testers show very good reproducibility and operator independence compared to other flow property testers.

5 Based on science, because shear testers are the standard testers in bulk solids technology and have been investigated in numerous scientific studies. The measurement results are reliable physical quantities allowing quantitaive application, e.g., for the the design of silos, hoppers, and other powder-related equipment. About 25% of our Ring Shear Testers are used in science and 75% in industry.

Dr. Dietmar Schulze
Powder testers & software

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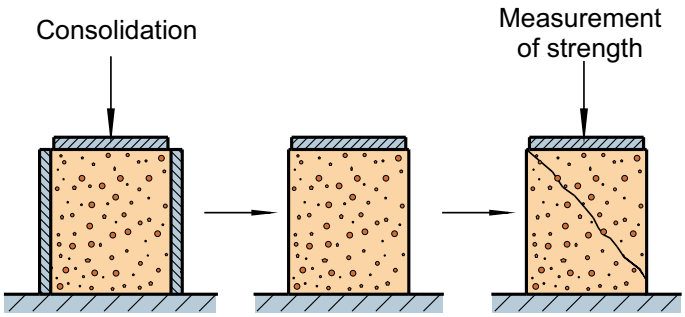
Flow properties testing - quick, simple, and accurate?

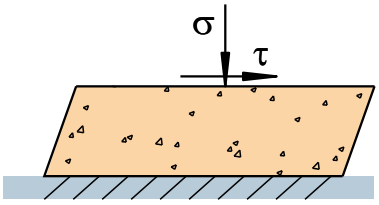
Dr. Dietmar Schulze
Powder testers & software

The flowability and other flow properties are measured in order to be able to make statements about the behavior of the powder or bulk solid in a specific application. The essential question is, "Does it flow or does it not flow?"

To measure flowability, the consolidation of the powder, which takes place in a container or silo, for example, is simulated. In principle, this could be done with a compression test, as shown on the right. To measure, the powder is first consolidated, and then the strength is measured.



Explanation of compressive strength



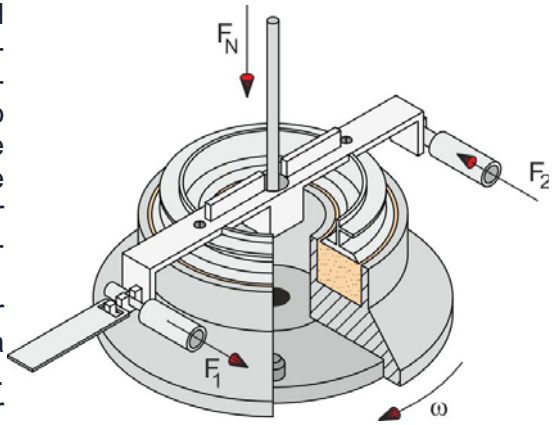
Specimen subjected to normal stress, σ, and shear deformation

Due to some disadvantages and the limited range of application of the uniaxial compression test shown above, shear testers such as our Ring Shear Testers have gained acceptance. The principle of a shear tester is simple: Here, too, the specimen is first consolidated, but not only by uniaxial compression as above, but by applying a vertical load (normal stress, σ) and simultaneous shear deformation, which generates a shear stress, τ, in the specimen (see left). Similar to the compression test, the strength of the specimen is measured in the second step by causing the consolidated specimen to flow (fracture) by an applied shear deformation.

Measurement with a shear tester not only yields the compressive strength described above, but also the flowability, internal friction and bulk density, which are important for comparative measurements, product optimization and quality control. The increase in strength during long-term storage can also be measured (time consolidation, tendency to form lumps, "caking"). These quantities are physically defined and are not tester properties. Since the conditions of the measurement are defined (e.g. constant stresses), even small differences in flow behavior can be detected, which is often not possible with so-called "simple testers".

The image to the right shows the principle of the shear cells in our Ring Shear Testers. The sand-colored powder specimen is located in a ring-shaped bottom ring and is loaded with a lid from above (force F_N). Here, the sample is subjected to a shear deformation in that the shear cell rotates slowly (direction of rotation ω) while the cover is held in place with tie rods (forces F_1 and F_2).

A special wall friction shear cell allows the friction between powder and wall materials to be measured.



Shear cell (Ring Shear Tester RST-XS.s)

Ring Shear Tester RST-XS.s

Our Ring Shear Testers (e.g. RST-XS.s, picture on the left) measure automatically and evaluate the measurement automatically. After filling the powder sample into the shear cell and starting the RST-CONTROL 95 measuring program on the connected PC, the measurement typically takes 10 to 15 minutes (depending on the powder). After that, the results of the measurement only need to be saved, printed or exported to other applications.

Enjoy easy operation and accurate results.