

## Determination of apparent density complying with international standards

For powders and granules the apparent (bulk) density can be determined by the ratio of the mass to a given volume. For the determination, the substance is put into a receiver of known dimensions and weight.

The volume taken by the product includes intermediate and hollow spaces. The apparent density depends on the form of the particles, the composition of the substance and the method of storage. Rounded, compact particles will be closer together during the pouring than edged, splintery particles.



Apparatus for determination of bulk density SMG 697

In contrast to classic fluids, the density of free flowing powders depends strongly on the influences of external mechanical forces. Due to the friability of powders and granulates, as well as their flow or caking properties, the varying geometry of particles of which it is composed, and the unavoidable compaction resulting from pouring into a container for measurement, the apparent density determined generally will differ from that of the product in its original container or package. Therefore the acquired results depend on the procedure.

As the apparent density is an important physical and quality ensuring indication the determination should be reproducible. The International Standard ISO 697 und ISO 60 describe the procedure of the determination of apparent density and the tools required.

The International Standard ISO 697 distinguishes two types for the determination of apparent bulk density. The basically differ in the size of the receivers used. The instruments for the determination of apparent density imply a lockable funnel of fixed dimensions, a receiver and a stand that holds them together in a defined position. The funnel is then filled with the sample of powder or granule then opened. The sample then flows into the receiver with the known volume and the apparent density is obtained by weighing the receiver.

The method for the reproducible determination of apparent or bulk density in accordance with International Standard DIN/ISO 697 can be applied to all free flowing powders or granules. In case of powders containing lumps, the method is applicable only if these can be disintegrated readily without breaking down the particles of the powder.

The determination of the apparent or bulk density in compliance with ISO 60 can be used for powders, granules or short-fibrous materials.

Powtec Maschinen und Engineering GmbH, Remscheid / Germany, produces devices, which are complying with the standards described above. Type SMG 697 fulfils the conditions indicated in ISO 697 and is delivered with a 500 ml receiver. The apparatus Type SMG 53 466 has a 100 ml receiver according to ISO 60 and DIN 53 466. Both measuring apparatus are manufactured out of stainless steel completely. In addition to laboratory use, these units are designed to be utilized within the production environment as well. The certificate of calibration enables the customer to take over the machine into the QS control of test methods according to ISO 9000.