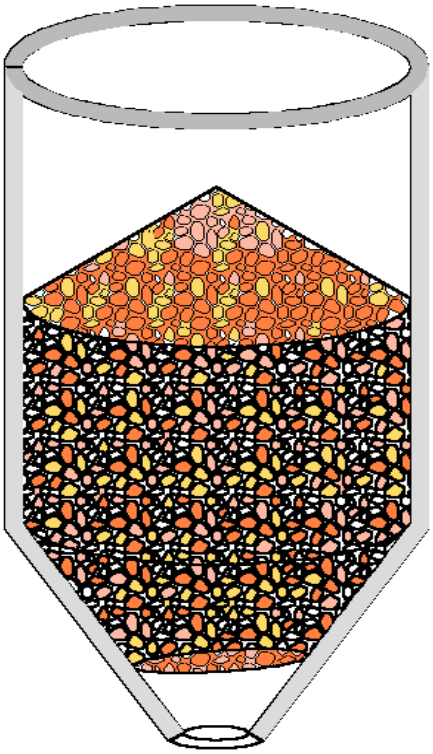
Density

Material Flow Solutions, Inc.



Bulk Density. In characterizing bulk material, the bulk density is the weight of the particles divided by the combined volume of the particles and the interstitial voids surrounding the particles. It is a function of the stress level and strain history of the material. We measure density using uniaxial compression of a loosely packed bulk material. It is a function of the temperature, as well as moisture content and particle size, of the bulk material. It is used, along with the permeability characteristics of the bulk material, to determine the limiting rates of particulate materials. Bulk density values are also used to determine the ability of a given powder to store entrained air. Two distinct density values (representing the minimum and maximum bin densities in a processing system) are useful in characterizing the behavior of the bulk material. The first density value is the density of the hopper outlet (FDI, feed density index). It is the density at low solids contact pressures and describes the material leaving the process equipment. It is used to compute mass flow rates from volumetric flow rates. The second density value is the average density of the bulk material within the process equipment (BDI, bin density index). It is measured at higher solids contact pressures and is used to quantify the mass of material stored within the process equipment.

The ratio of the FDI and BDI is used to predict undesirable behavior of specific bulk materials. Pre-knowledge of such potential undesirable material behavior allows engineers and formulators to design for worst-case scenarios and ultimately saves company revenue by avoiding costly process down-time.

PRACTICAL APPLICATIONS of ***Bulk Density***, FDI and BDI include, but are not limited to:

- Predicting flow rate from equipment
- Estimating de-aeration times
- Predicting segregation prevention
- Predicting of fluidized behavior
- Estimating process capacity
- Predicting equipment loads

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