Measuring Bulk Material Properties to Control Segregation

Material Flow Solutions, Inc.

There are several mechanisms which cause varying segregation patterns in material mixtures. The four primary causes of product segregation are: sifting, angle of repose, air entrainment, and impact fluidization. Solving a mixture segregation problem requires knowledge of the root cause of that segregation. This is especially true when approaching the problem from a product design perspective. The specific flow properties of material mixtures, as well as the individual properties of the unique components in a mixture, play a significant role in product segregation. Therefore, the first step toward designing a mixture which will not segregate is to *measure the material flow properties* of that mixture. The key properties to be measured are: unconfined yield strength, bulk density and permeability, wall friction angle, and particle size, porosity and shape. These tests characterize the components of the mixture for flowability and particle interaction – key knowledge which is used in designing materials to behave in a prescribed manner. The segregation potential of the material mixture must also be evaluated.

At Material Flow Solutions we provide both the material flow property testing and the design experience to solve many flow problems facing producers of fine powders and granules. Using the *SPECTester*, we measure the concentration of key components in a material mixture, the segregation pattern formed as material is fed into a process, and the density variation of the mixture as material enters the packaging phase of production. With this information, we offer engineered product design solutions based on sound scientific practice. We have assisted our customers in reducing segregation in existing systems from 50% out-of-spec material down to 0.2% out-of-spec material.

PRACTICAL APPLICATIONS of *measuring material flow properties* include, but are not limited to:

* Maintaining product quality in processes
* Creating quality product design
* Designing custom product to meet specific behavior parameters
* Achieving/maintaining consumer acceptability
* Increasing the bottom line