Preventing Segregation in Products
Material Flow Solutions, Inc.

Segregation of particulate matter can be caused by several mechanisms. Fine particles sift down through a matrix of coarse particles. Differences in frictional properties of particle surfaces result in variation in repose angles and velocities down piles and chutes, causing separation of particles during pile formation. Fine particles are carried by air currents and deposited in the bin wherever the air currents reduce sufficiently for fine particles to drop out of the flow stream. In each case, components separate due to differences in particle scale properties. Understanding the relationship between particle scale properties and segregation potential leads to development of models which relate the properties to segregation behavior. In order to develop these models, we must be able to measure the component segregation patterns and magnitudes caused by typical process behavior. These segregation measurements can be coupled with modeling to describe process segregation behavior and particle scale laws relating segregation driving forces to segregation magnitudes. Approaching a segregation problem from this viewpoint enables accurate prediction of segregation behavior with limited data. This approach will also be scalable to nearly all unit operations.

At Material Flow Solutions, Inc. we evaluate the potential of a material mixture to segregate using a proprietary light-spectral method – and we do it more quickly than with traditional sift-and-count methods. In as little as 20 minutes, the *SPECTester* reports the data of which primary (and secondary) segregation mechanism is present with your material in your process. This information – coupled with moisture content, surface tensions, particle size, particle shape, bulk strength, repose angles, and particle roughness data – is input into analysis software specifically developed to model segregation of powder, granular, and fine-cut fibrous products. Knowing the segregation mechanism specific to your material, and how that material reacts within your specialized process parameters – we make custom recommendations for product modification to eliminate, or greatly reduce, segregation. Eliminating segregation puts an operating plant back on-line, eliminating costly waste.

PRACTICAL APPLICATIONS of *segregation prediction and prevention* include, but are not limited to:

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