MATERIAL FLOW
EQUIPMENT

The SPECTester

Innovative Segregation Tester

We Believe in ...

Most manufactured products today are mixtures of several components. Generally, the individual ingredients in a mixture separate (segregate) during processing, resulting in an inconsistent final product. No matter the root cause of this segregation found in today's industrial processes, the end result is often a box of Lucky Charms® with too many (or too few) marshmallow hearts—or an Advil® caplet with too much (or too little) ibuprofen content—or a box of Tide® with too much (or not enough) color-safe bleach particles. Each results in customer dissatisfaction and, ultimately, a loss of company revenue.

Satisfied Customers

Typical Industries and Applications

Quality Control

Measure the segregation potential of drug mixtures as well as its individual components. With the small percentage of API in most pharmaceutical products, even minor variations in concentration can be disastrous. The data can indicate if there needs to be a change made in the process fill-operations and/or an alteration to the particle size of a key excipient to eliminate the segregation problem.

Process Control

Simulate process parameters while evaluating the segregation potential of both the -final product and its individual ingredients. The segregation pattern can reveal how the ingredients' interaction with other components in the mixture affects the overall product as it travels through the processing equipment.

Research and Development

Eliminate guesswork in process design by determining mixture segregation during development. Determine sifting or air entrainment segregation. With this information, a manufacturer can resolve the optimal production process for a new product without resorting to costly pilot plant construction.

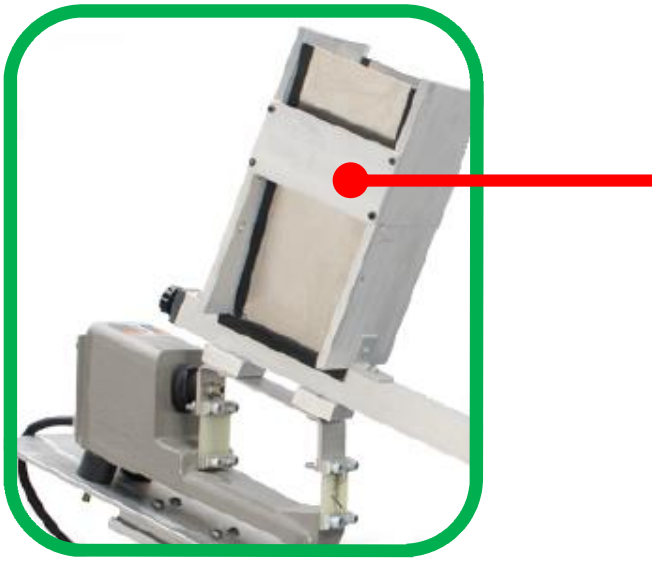
Segregation Analysis

Evaluate a mixture and determine which ingredients are primarily responsible for segregation and how their interaction with the entire mixture affects the

Identifies Both Primary and Secondary Segregation Mechanisms

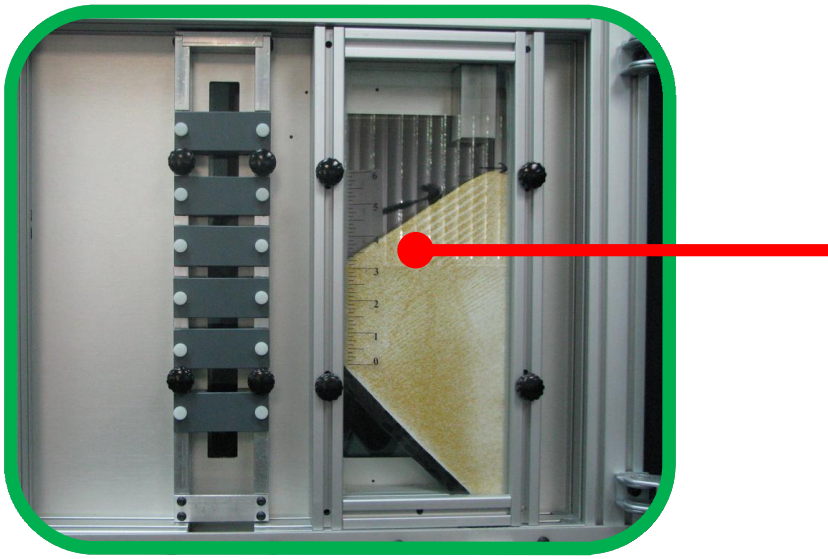
The SPECTester is capable of Measuring segregation by:

- Particle size
- Sifting
- Fluidization
- Angle of repose
- Chemical component
- Air entrainment



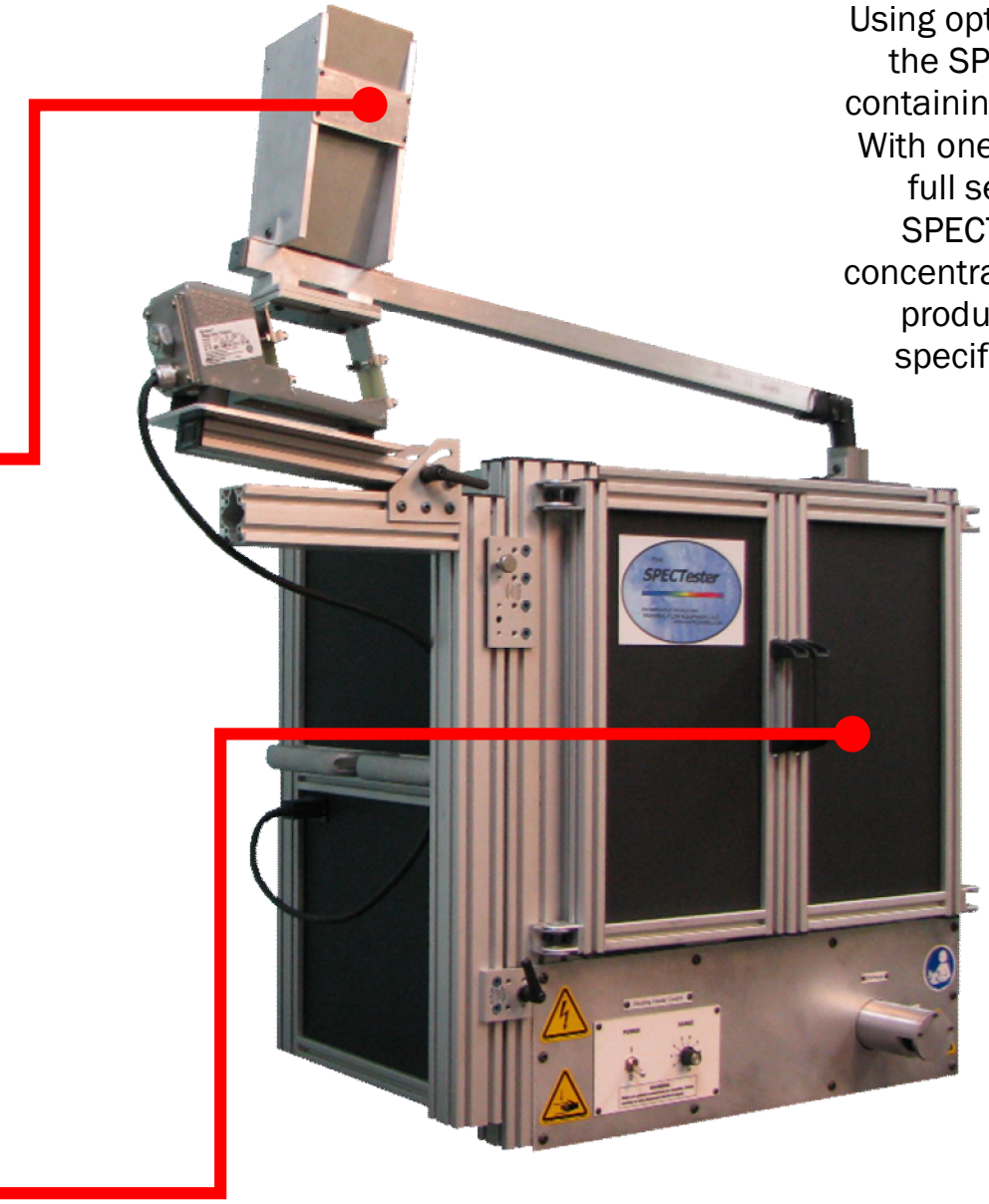
During SPECTester operation, the material mixture is poured into the fill hopper. The mixture is transferred to the analyzer via the material chute using the control switch panel to activate the variable-speed, vibrating feeder.

Before filling the SPECTester with the material mixture, samples of the mixture's individual components are placed in the component trays (behind the left door) so that their specific spectral reflectance light-print can be acquired. The adjustable feeder arm can be raised or lowered to simulate actual process drop-height. This makes the test results scalable to the actual production parameters.



SPECTester front doors reveal the drop chute, testing area, and component trays.

The SPECTester Solution



Using optimal spectroscopic technology, the SPECTester measures samples containing up to six unique components. With one touch, the instrument reports full segregation information. The SPECTester identifies component concentrations, particle size differences, product uniformity, and up to four specific segregation mechanisms.

SPECTester Features

- Fully automated operation – includes plug-and-play preprogrammed computer
- Touch screen/keypad control
- 50 segregation sample points measured across the sample bed
- Includes uniformity index for sample and segregation variance data
- Data can be exported to Excel® for manipulation
- CE compliant
- Two models - one with VIS light detection and one with NIR detection
- Small-volume Hopper option for reduced sample amounts

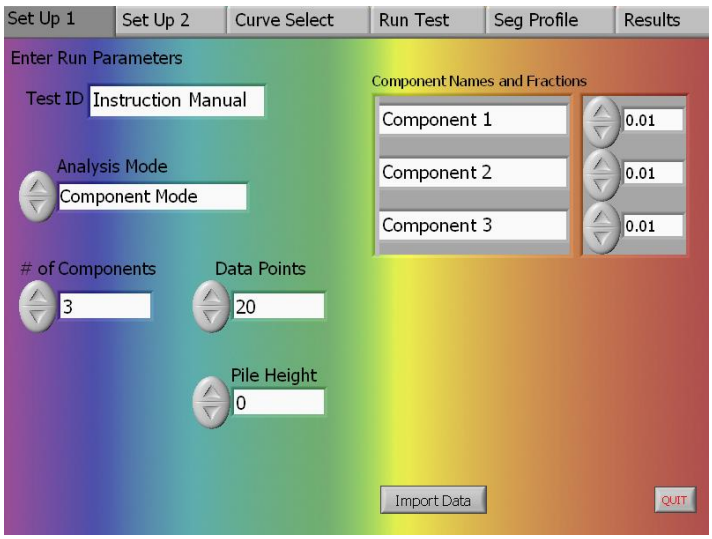
Example Analysis—6 Simple Steps

Material Flow Equipment, LLC has developed a novel tester that measures segregation pattern and magnitude for powder and granular materials using spectroscopic techniques. We call it the *SPECTester*.

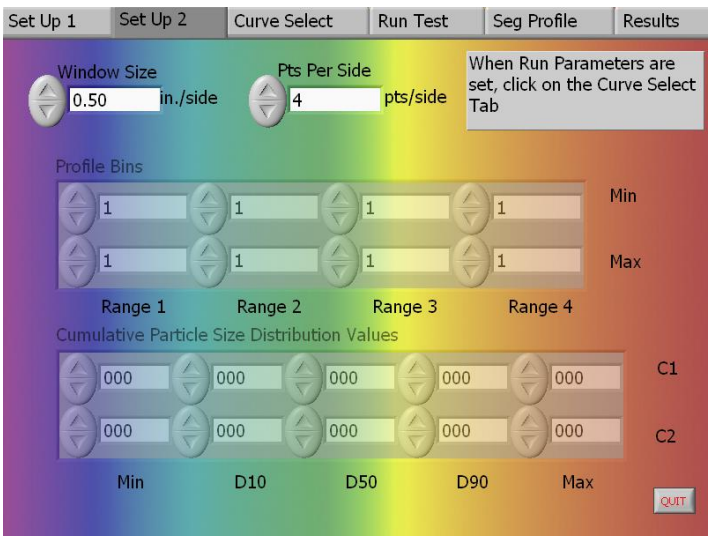
Just as every individual carries a unique thumbprint, every particle emits a unique light spectra signature. The *SPECTester* identifies the light spectra signature of each component in the mixture. It then reads the light spectra signature of the entire mixture sample, identifying the presence, pattern and concentration of the individual components throughout the mixture. The presence of various components in unexpected locations or amounts within the mixture identifies the problem:

SEGREGATION

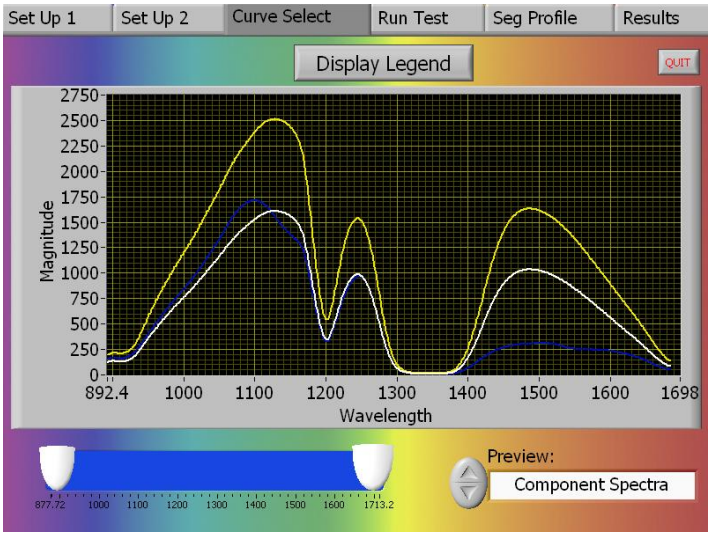
The pattern data identifies the cause, or mechanism, of that segregation. The concentration data identifies the magnitude of that segregation. Using state-of-the-art spectroscopic technology, the innovative *SPECTester* measures samples containing up to six unique components.



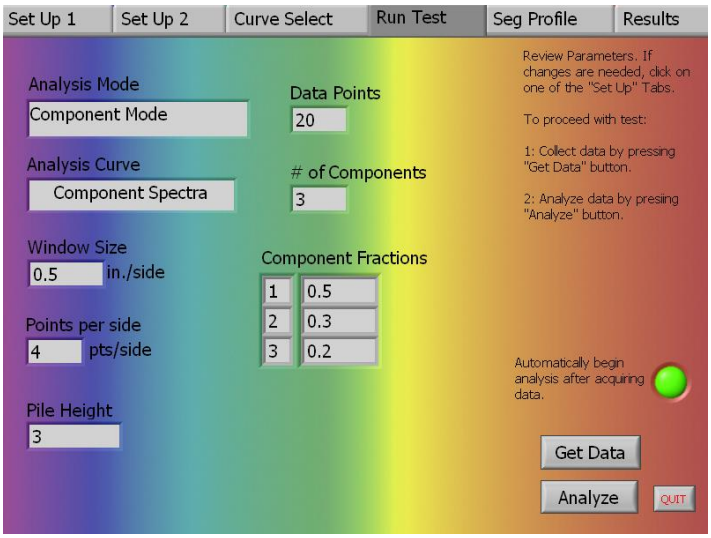
Step 1.
Enter the ID for your test, choose an analysis mode, enter the number of components, choose a number of data points to be measured, enter the pile height information found on the filled test hopper to the left, name the components and enter the expected concentration for each component.



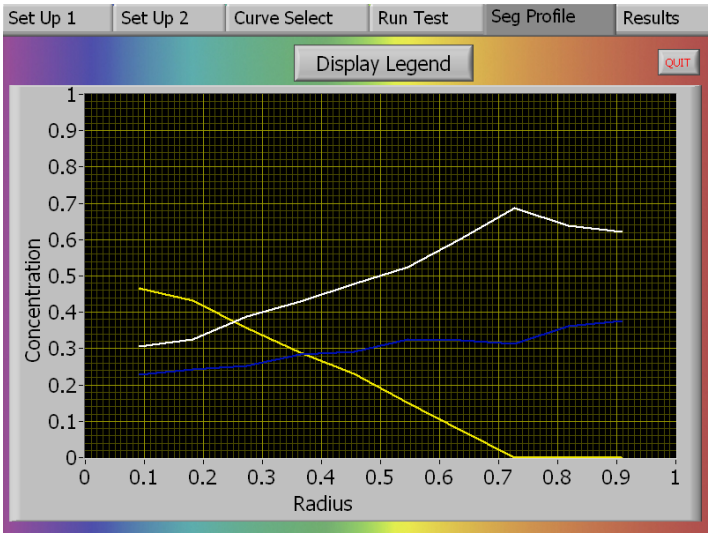
Step 2.
Select the size of the windows for each measurement along the pile, choose the number of points per side for each window (4 equates to a 4x4 matrix for a total of 16 points within each window which will be averaged by the instrument to form a single point on the segregation graph).



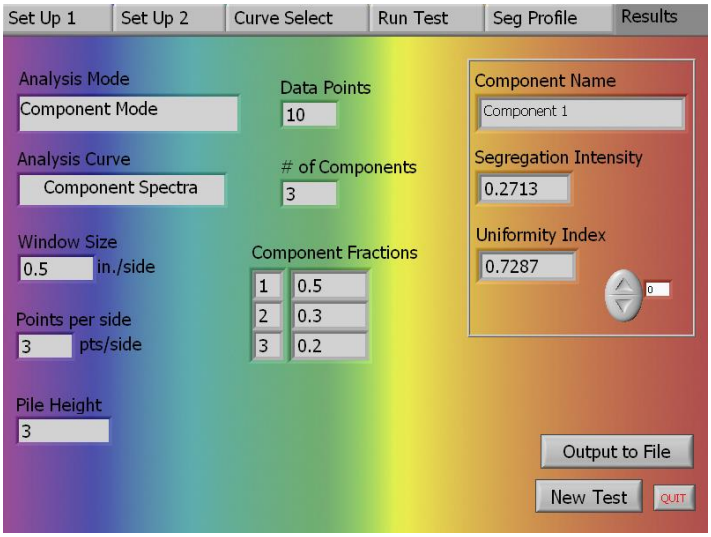
Step 3.
View the light spectra signature of each component. In this step you can adjust the spectra length , choose a preview mode (component, 1st derivative, 2nd derivative, differential modes), and click the “display legend” button to correlate the colored lines with your specific components. When you are satisfied, Click the “Run Test” tab.



Step 4.
Before running your test, review all parameters which you have entered to assure accurate test results.



Step 5.
View the segregation pattern for you blend. Again, you can click the “display legend” button to correlate the colored lines with your specific components. When you are satisfied, Click the “Results” tab.



Step 6.
View the segregation intensity as well as the uniformity index value for each component in the blend. The page defaults to the first component entered. Use the toggle button to view these numbers for each component. Either: run another test, output your test data to a file, or end your testing. Remember to turn off the machine completely to preserve light source life.

Export Data to Excel or Print a PDF Report

Specific Machine Features

- FAST – 10 to 30 minutes to run an analysis.
- Measures a mixture of up to 6 unique components
- Identifies primary segregation mechanism out of 4 specific mechanisms
- Identifies segregation by particle size, sifting, fluidization, angle of repose, chemical component and air entrainment
- Provides data about component concentration, particle size differences, product uniformity
- Identifies process design parameters and quality control issues
- Results scalable to process conditions – mimics actual process conditions
- 50 segregation points measured within a sample
- Provides uniformity index for sample, and segregation variance data
- Provides written and graphical segregation data reports
- Fully automated, reports the magnitude and pattern of the material mixture segregation—includes preprogrammed computer for plug-and-play operation
- Data can be exported in Excel format or as a PDF report
- Certified CE Compliant

Specifications

Physical

Height:	32 in.
Width:	38 in.
Depth:	18 in.
Weight:	58 kg (130 lbs)

Electrical

Voltage:	100-240 VAC
Frequency:	50 to 60 Hz
	CE compliant

Environmental

Temperature:	10 to 45°C	(50 to 112°F), operating
	-10 to 55°C	(14 to 131°F), non operating

Manufactured and Distributed by

Material Flow Equipment, LLC
5921 N County Road 225
Gainesville, FL 32609 USA
http://www.matflowsol.com
Email: kjohanson@matflowsol.com
Phone: 352-379-8879 Fax: 352-379-8878