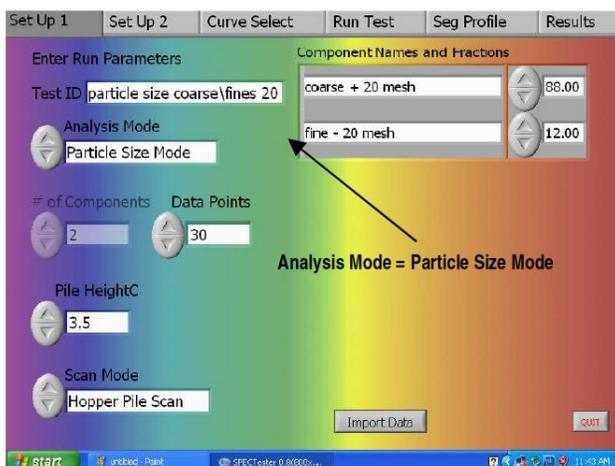# Using the SPECTester to Quantify Segregation by Particle Size

The SPECTester is designed to easily and quickly evaluate and quantify the segregation occurring in a product mixture containing up to six unique components. However, by utilizing a few simple additional steps, the tester can analyze a product made up of variously-sized particles of the same material: in other words, segregation due to particle size. The additional steps include:

• Riffle the material to obtain a representative sample – you will need about 2.5 L of material to assure sufficient sample remaining for the SPECTester analysis.

• Take a portion of this sample and sieve it to create two components (coarse and fine).

• Measure the PSD of the coarse and fine and determine the Minimum particle size, D10, D50, D90, and Maximum particle size.

• Using the final sieved sample, determine the % concentration by mass of the coarse and fine particles.

The fines and coarse obtained during this sieving process will be the pure components used in the component trays during the SPECTester's analysis. The material from the riffling step is re-combined and thoroughly mixed to fill the feeder hopper.
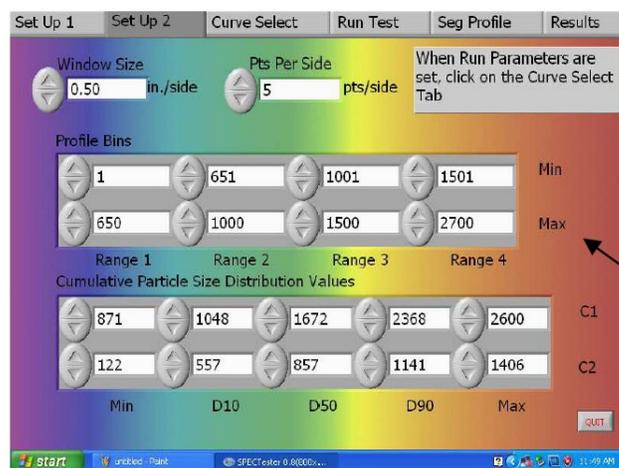
You will need a few additional pieces of industry-standard information.

• Cumulative PSD values (Min, D10, D50, D90 and Max)

• Profile bin values

In Component Mode operation, the bottom portion of SetUp2 screen is inactive. In Particle Size Mode, the profile bin values, as well as the cumulative PSD values (Min, D10, D50, D90 and Max) values, must be added.
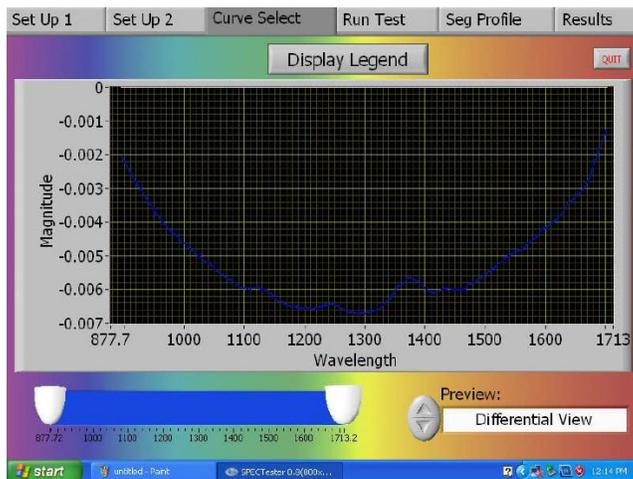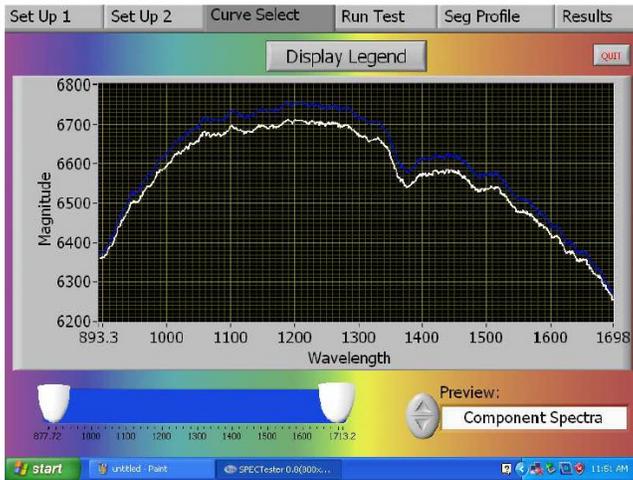
With either component spectra or differential view spectra, the concentration of fines and coarse are computed just as any other pure components in a mixture. The SPECTester uses these fines and coarse concentrations along with the particle size data to estimate the particle size of any particle size bin specified in the Profile Bin values entered in SetUp2 screen. For example, four particle size bins were used: PS Bin One (1-650), PS Bin Two (651-1000), PS Bin Three (1001-

1500) and PS Bin Four (1501-2700). The concentration of each of these sized bins will be plotted as a function of dimensionless radius. You do not have to span the entire PS range with the bin sizes that are entered in setup2 screen.

Component Spectra Preview:

In component spectra mode, the spectral signatures of the fines and coarse are similar. The difference in the spectral signature (as seen by the SPECTester) is due to the difference in intensity of hue resulting from particle size difference. The finer material scatters light more, and will therefore have the more intense spectral signature. Note that the peaks and valleys of the two spectral signatures remain the same.

Differential View Preview:

In differential view mode, the spectral signatures of fines and coarse are dissimilar because the spectral intensity curves are subtracted one from another. The major component spectral intensity curve will be set equal to zero and the other component will be subtracted from that value to give the differential view spectra. In this example case, the coarse particles (major component – white line) show zero intensity and the fines (blue line) are subtracted to give the differential spectra below.

The choice of preview mode is for User's convenience. The resulting segregation profile is essentially the same for either preview mode.