

## Lab Test Report

13 June 2007

### Sample Identity-

#1 Fresh ground beans – “French Roast”

### Purpose:

This report details the modified testing done on fresh ground coffee to overcome the tendency for the particles to agglomerate due to the oil within the beans.

### Lab Setup:

A dual feed tray set up was used along with an enhanced vibration mode that Canty employs where very small particles tend to agglomerate due to hydration or electron forces. This method creates a dispersed layer with increased agitation to keep particles separated for analysis.

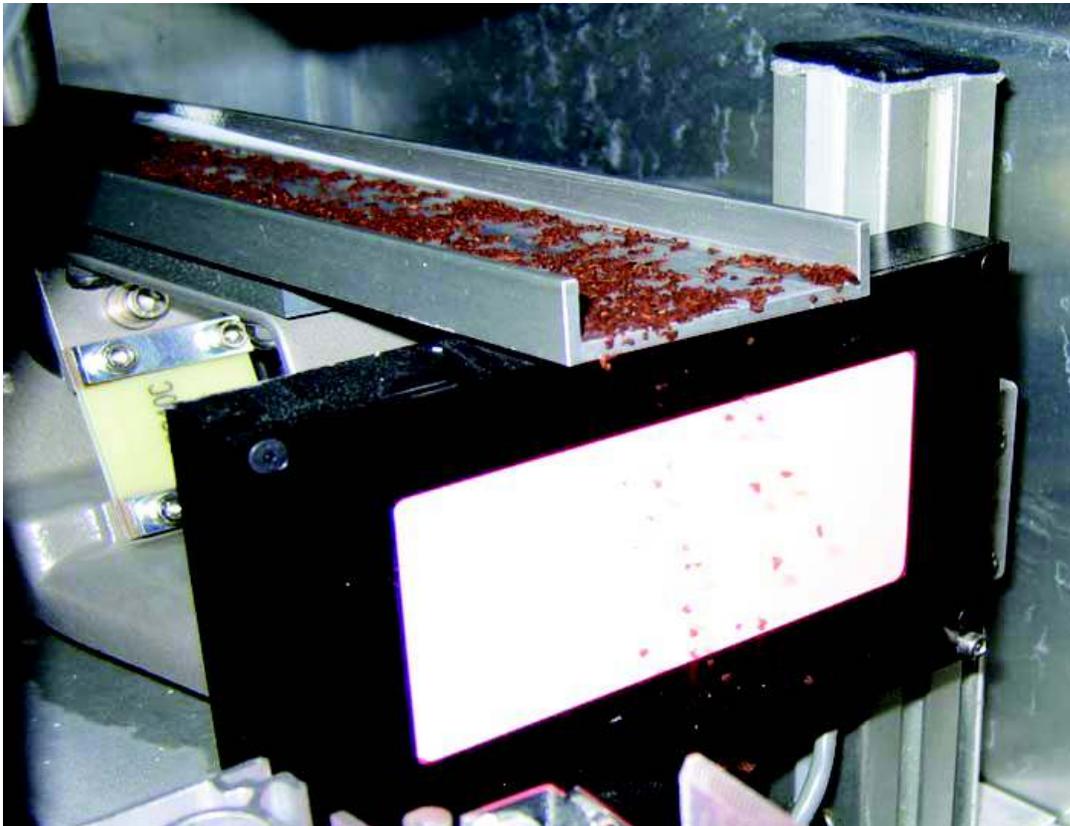


Figure 1 - Close-up of Canty SolidSizer while running coffee sample.

## Calibration:

The SolidSizer sensor optical magnification can be adjusted over a wide range. For this application, magnification was adjusted to permit detection of the smallest particles. A pixel scale factor of 20.3044 micron per pixel was used for all sample material. The resulting process image field of view is 32.893 mm horizontal by 24.771 mm vertical with the solid particles appearing dark with a bright background.

## Results:

Figure 2 shows a typical process image captured for the coffee sample in the SolidSizer TS. Figure 3 illustrates how CautyVision software analyzes this frame to provide instantaneous measurements of each particle. The Cauty Software separates the particles from the background and measures the Area, Perimeter, Major Axis, and Minor Axis for each detected particle. The table included in this screen image lists the dimensions of all particles detected. The image also contains a selected individual particle, which is identified by a yellow box surrounding it. The dimensions of this particular particle are shown on the first row of the table. This data (area, perimeter, major axis and minor axis) is written to a text file during each run time and evaluated using a Microsoft Excel template. From these data measurements, plots can be created using either major or minor axis as a size basis. Minor axis has been selected for this report to allow direct comparison to sieve screen data. In addition to statistical manipulation using Excel, outputs are available using 4-20 mA, OPC, and Modbus configurations. Figure 4 shows a plot indicating the size distribution of the sample analyzed.



Figure 1 - Typical Process Image from the SolidSizer TS System camera

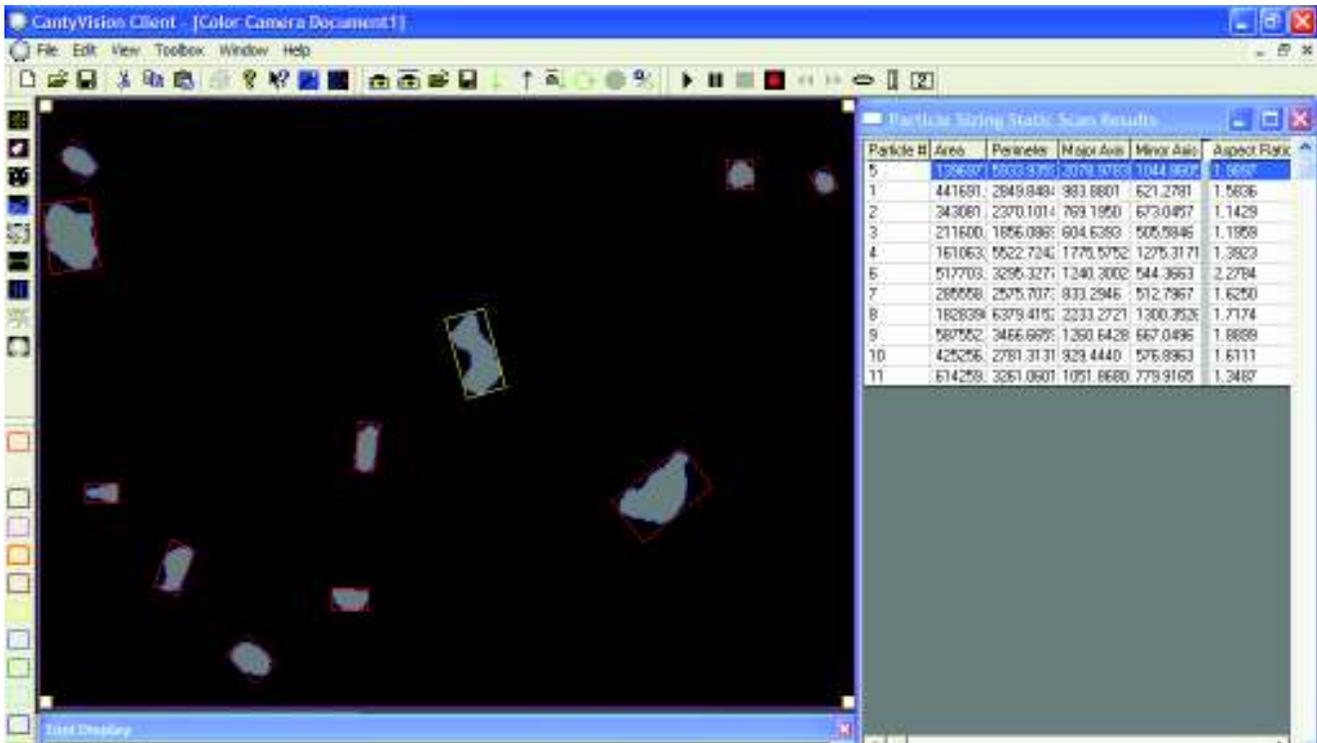


Figure 1 - Test Scan of Figure 4 by CantyVisionClient Software detects 11 particles

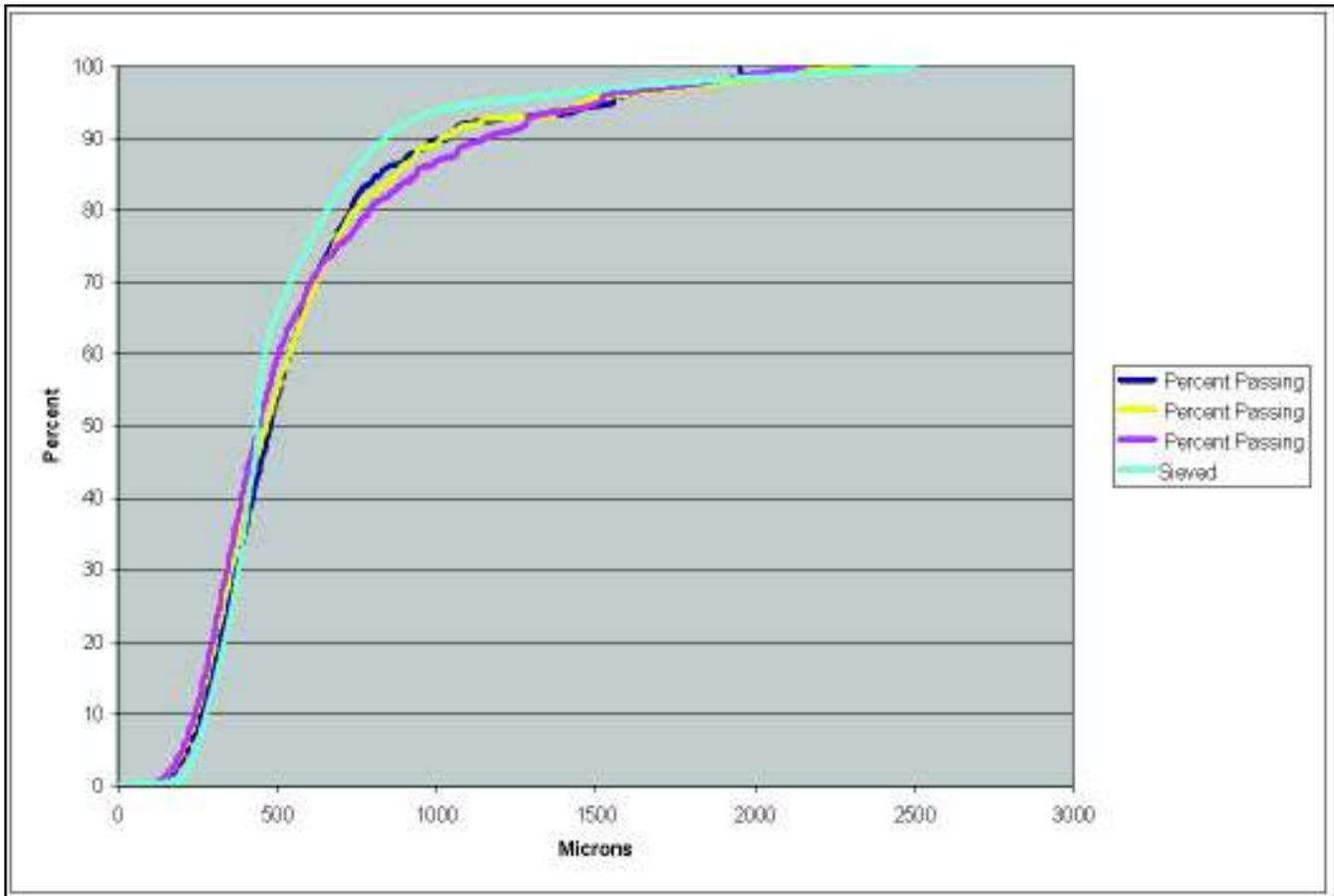


Figure 1 - Volume Percent Passing – Showing three individual runs on the Canty SolidSizer TS and the results of sieving the material.

## **Discussion:**

**PARTICLE CHARACTERIZATION** – The information in this report is just a sample of the data the system can provide. Canty Vision supplies the user with the basic particle features that are available only to a vision system, but also provides the user with the capability to customize the system with filters to assist in achieving the most meaningful information with respect to the product or process. The particular data presented here shows how the system is able to do particle shape and size, but can also do average color and color deviation across single particles as well defect detection

This instrument can function in several capacities;

1. Process Control
2. Quality Control
3. Process repair or improvement

It is usual for an instrument to provide a measure of process control, however with visual assessment of the product available on line and the many product characteristics that can be measured by a single image, it is also possible to do quality control and assess process deficiencies from the captured process images or video.

The size distributions provided using the Canty Solidsizer are both accurate and repeatable. The volume distributions can be directly related to sieve weights to prove the accuracy of the system. Several runs using the same sample proves the repeatability and reliability of the Solidsizer. The measurements taken are achieved in 1-2 minutes time for each sample. The same measurements can be made on a continuous basis online using the Canty Weatherproof Solidsizer. These measurements can be constantly output using 4-20 mA, OPC, and Modbus for accurate continuous process control.

The handling of the product have made for a significant improvement in the analysis. The tendency for particles to stick together appears to have been overcome. The three runs presented in the graph are very consistent with each other and are also very consistent with the sieve measurement. The product feed mechanism does not contact or in any way hinder the optical measurement of the product, and thus any oils that are in contact with the grinds do not come into contact with any measuring surfaces which allows the operation to be continuous.

## **Conclusions:**

CantyVision technology proves itself as an effective and accurate way to measure particle size in the lab and online environment. Volumetric distributions allow for a direct comparison to sieve measurement. The immediate data availability allows for optimum process control and minimizes time needed for lab analysis.

To learn more about Canty Particle Sizing [click here](#).