

# InFlow™ Onsite Demonstration

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## Drilling Mud Particle Size Distribution

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Company: Demo

Location: Demo

Customer: Demo

Date: 2012

Sales Representative: Demo

## 1. Introduction

### 1.1 Background Information and Research

A portable InFlow™ analysis system was sent for the purpose of an onsite demonstration. Below are the details regarding the testing carried out.

### 1.2 Objective

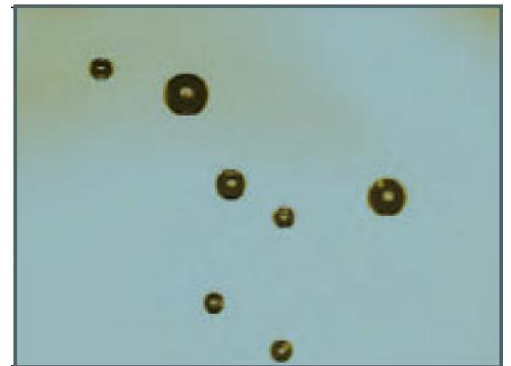
The purpose of the onsite demonstration with the InFlow™ was to further demonstrate the system's capabilities in measuring a real time on-line particle size distribution of drilling mud.

## 2. How It Works

This portion of the report elaborates on how the InFlow™ and CantyVisionClient™ software interact and determine a droplet or particle size and shape.

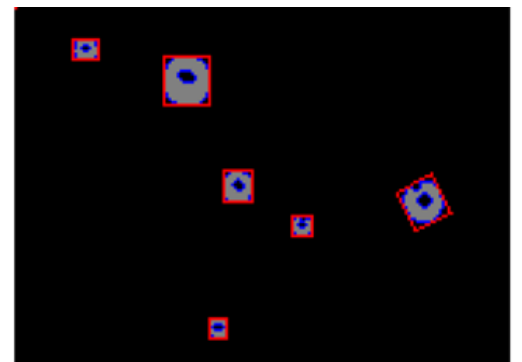
### 2.1 Image Collection:

Particles are sent through the flow cell body and back-lit with a high output CANTY Light. The particle images are collected in real time by the CCD camera. The image is then digitally transmitted to a PC with CantyVisionClient™ software for analysis.



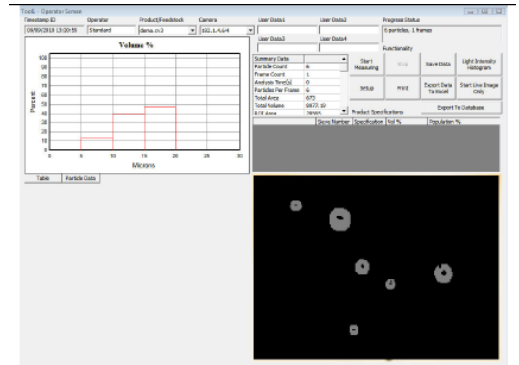
### 2.2 Binary Images:

The image is then broken down into individual pixels. The intensity difference between the particles and the background allows CantyVisionClient™ software to determine the perimeter of the particle, as well as the major axis, minor axis, area, and other characteristics about the particles dimensions.



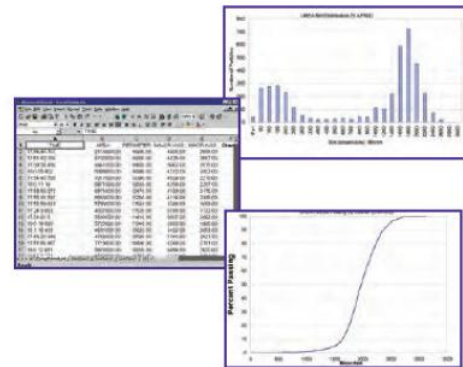
### 2.3 Analysis:

Once the software determines the particles size and shape, the software can perform further analysis on the individual particles. The analysis includes particle filters to enable users to determine when particles are dissimilar or nonconforming to the entire distribution of particles.



### 2.4 Output

Once the software has analyzed the particles the information can be stored and/or output to a variety of locations. This includes PC databases, 4-20 mA current loop, OPC and more!



### 3. Results

#### 3.1 Mud Sample

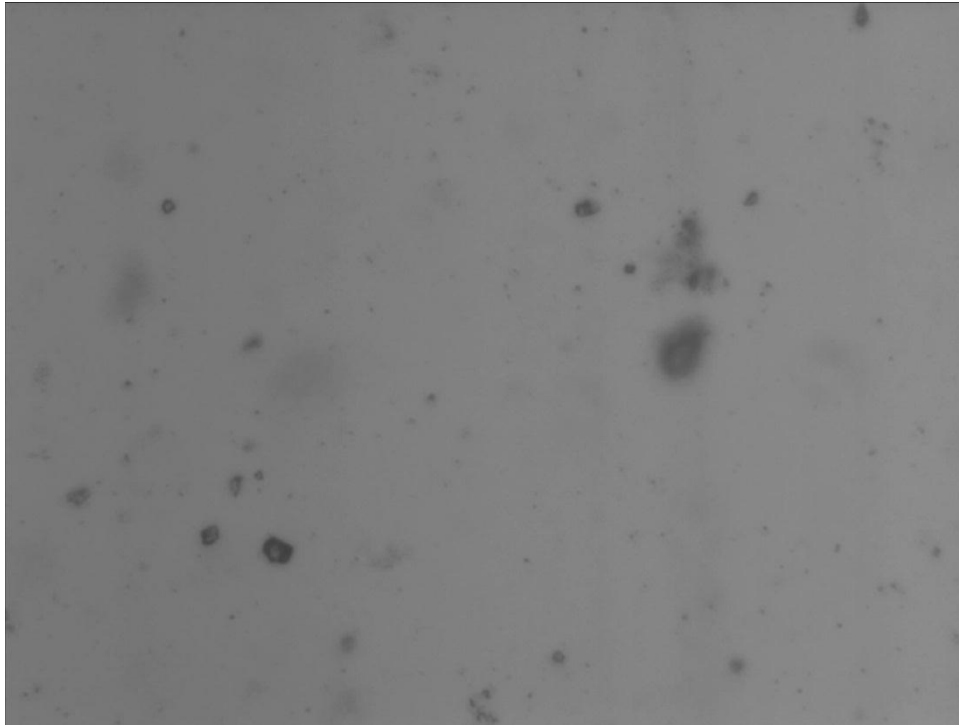
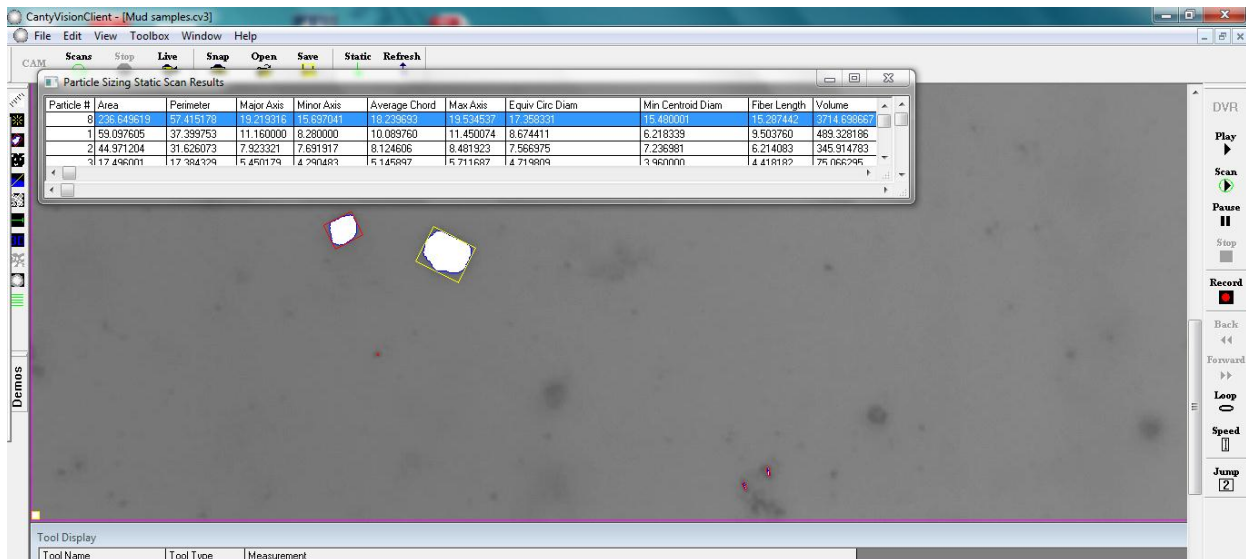


Figure 1 Live image of mud sample (Dilution ratio: 5ml mud to 4L water)



The screenshot shows the CantyVisionClient software interface. The main window displays a digitized image of the mud sample with two particles highlighted by red and yellow bounding boxes. A 'Particle Sizing Static Scan Results' window is overlaid on the image, displaying a table of measurement data for three particles.

Particle #	Area	Perimeter	Major Axis	Minor Axis	Average Chord	Max Axis	Equiv Circ Diam	Min Centroid Diam	Fiber Length	Volume
0	236.645619	57.415178	19.219316	15.697041	18.239693	19.534537	17.358331	15.480001	15.207442	3714.698667
1	59.097605	37.399753	11.160000	8.280000	10.089760	11.450074	8.674411	6.218339	9.503760	489.328186
2	44.971204	31.626073	7.923321	7.691917	8.124606	8.481923	7.566975	7.236981	6.214083	345.914783
3	17.446001	17.884329	4.450179	4.294881	4.146887	4.711687	4.716889	3.460000	4.418187	76.066246

The software interface includes a menu bar (File, Edit, View, Toolbox, Window, Help), a toolbar with buttons for Scans, Stop, Live, Snap, Open, Save, Static, and Refresh, and a control panel on the right with buttons for Play, Scan, Pause, Stop, Record, Back, Forward, Loop, Speed, and Jump [2]. A 'Tool Display' window at the bottom shows columns for Tool Name, Tool Type, and Measurement.

Figure 2 Software Interface (Digitised Image)

Figures 1 and 2 on the previous page display a snapshot scan of particles before and after digitization. Dimensions can be seen in the table (Area, Perimeter, Major, and Minor Axis) included at the top of Figure 2. Size for highlighted particle (yellow box) is the highlighted row in the table.

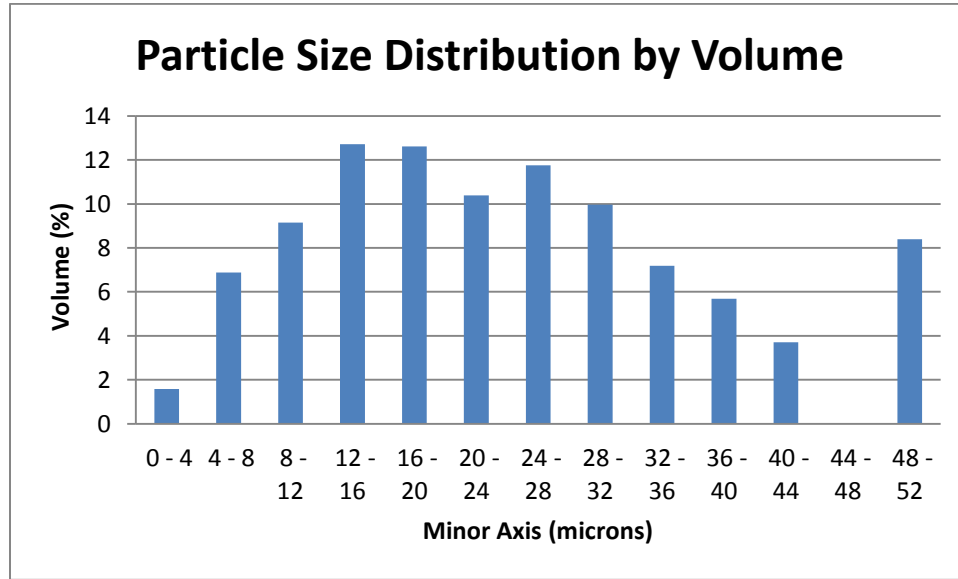


Figure 3 Particle Size Distribution by Volume

The above graph represents the detection and analysis of 3500 particles. The data can also be plotted based on major axis, average chord length, equivalent circular diameter etc.

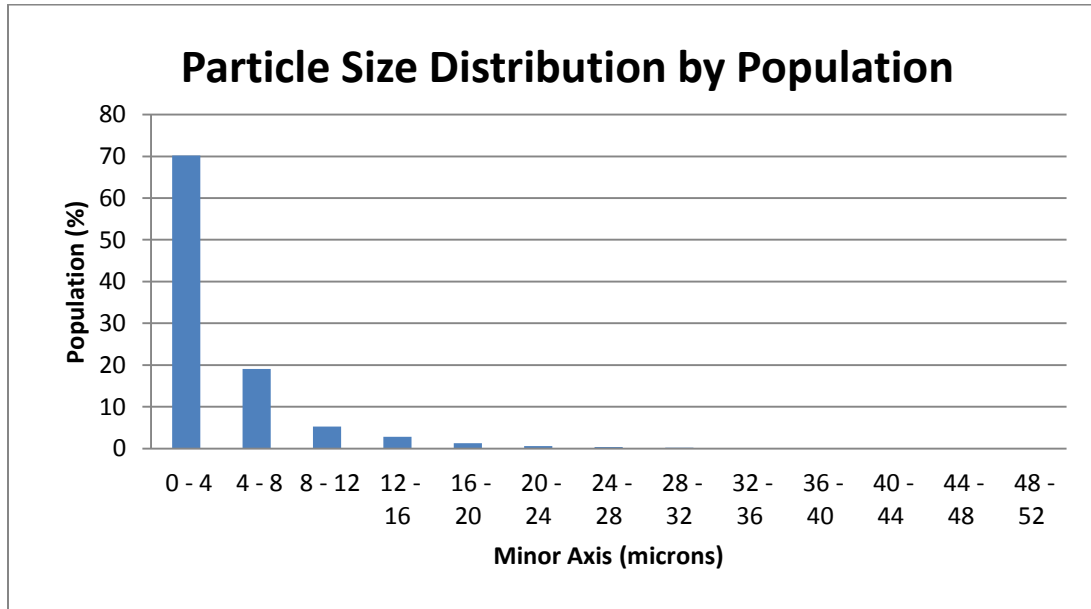


Figure 4 Particle Size Distribution by Volume

Data can also be plotted based on user defined bin sizes.

#### 4. Conclusion

Vision technology enables the sorting and classifying of particles based on a number of shape parameters, resulting in delivering a true size representation of the particulate of interest, as demonstrated by the Canty InFlow™ system. The vision based technique gives the operator an unparalleled insight into the process, which allows the user to better understand what is happening and the effect of any changes made. Both the portable inflow and inline inflow systems are optically identical allowing for consistency between results at line and in line.

## 5. Technical Set-Up

<b>Test Setup:</b>	
<b>System Description:</b>	Portable InFlow
<b>Model #:</b>	VD 4912-456
<b>Software Version</b>	CVC 19
<b>Test Setup Notes:</b>	
<ul style="list-style-type: none"> <li>- Sample Diluted</li> <li>- Reservoir under agitation,</li> <li>- Gravity feed from top to bottom</li> </ul>	

Setup			
<b>Weight or Concentration:</b>	Mud Sample	<b>Pixel Scale Factor</b>	0.36 microns per pixel
<b>Shutter Speed:</b>	20 $\mu$ s	<b>Aperture</b>	n/a
<b>Gain:</b>	0	<b>Light Filters</b>	Normalized Lighting
<b>Light Intensity:</b>	27V DC	<b>Light Source</b>	HYL80
<b>Gap:</b>	600 $\mu$ m	<b>Collimated LP</b>	n/a
<b>Flow Rate:</b>	n/a	<b>Light Guide</b>	9" Quartz