CLEMEX

Air Bubble Analysis

Image Analysis Report **386**

Sample Description

Images (Tif) showing air bubbles in water were submitted for analysis.

Purpose of Analysis

Demonstrate the ability of the Clemex Vision image analyzer to detect all bubbles separately and to measure their size (Diameter, Perimeter, Area, and Aspect Ratio).

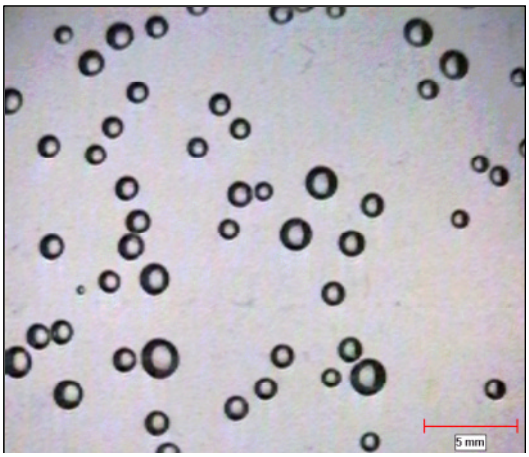

Figure 1: *Original image. Calibration factor used = 0.038 mm/pixel.*

Procedure

Three gray filters (Median, Smooth, Delineate) were applied to the original image in order to minimize the noise and to enhance the contrast between bubbles and background. Bubbles were binarized in red using Gray Thresholding. The red bitplane was filled and artifacts removed. Bubbles that were sectioned by the field of view were eliminated. Touching objects were transferred into a green bitplane using a filter based on Sphericity. Green objects were disconnected using the Separate tool. All objects were grouped back into the red bitplane and measured.

Equipment

Image Analysis System:	Clemex Vision SE
Camera:	Sony Camcorder from Client
Lighting:	Incandescent, 250W with diffuser
Objective:	0.038 mm / pixel

Procedure (continued)

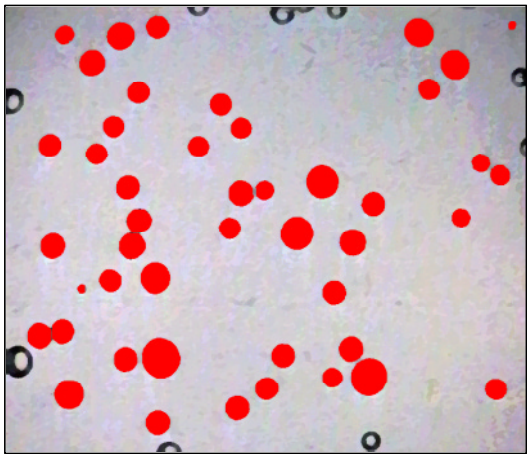

Figure 2**:** *Final measured bubbles overlaid against the modified gray image.*

Results Summary

Results are cumulated for automated statistics and graph generation. Final results are printed directly from Clemex Vision. Raw data are linked to their respective object and can be exported in Excel format.

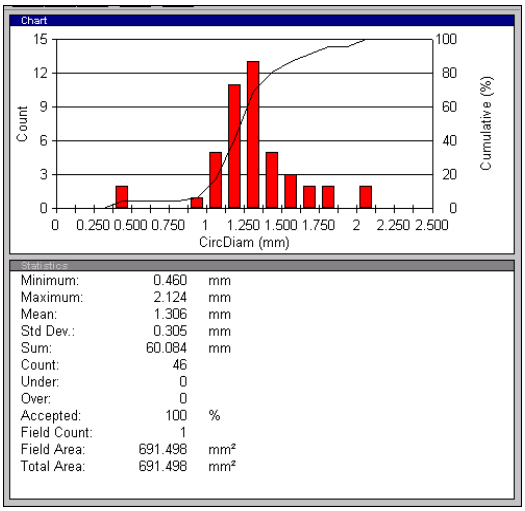

Figure 3: *Cumulative graph and statistics showing the diameter distribution.*

It is possible to binarize, separate, and measure the bubbles. No difficulties were encountered achieving this analysis.