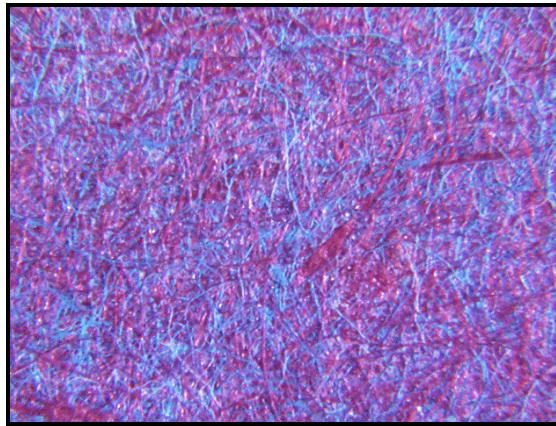




**CLEMEX**  
Image Analysis Report

# 180



Paper Hand Sheet Characterization

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## Sample Description

One sample of paper hand sheet.

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## Purpose of Analysis

Demonstrate the ability of the image analyzer to discriminate and measure the percentage of red and blue fibers.

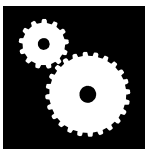
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## Equipment Used

<b>Image Analysis System:</b>	Clemex Vision Software (640)
<b>Macro stand:</b>	Kaiser RS3
<b>Camera:</b>	JVC KY-F55B
<b>Zoom:</b>	Computar zoom lens 18 108/2.5

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## Procedures



The procedures described here were performed using a macro stand equipped with a color camera and a zoom lens. The calibration factor was 0.0151 mm/pixel. Ten fields were analyzed. Each field measured 88.66 mm<sup>2</sup>.

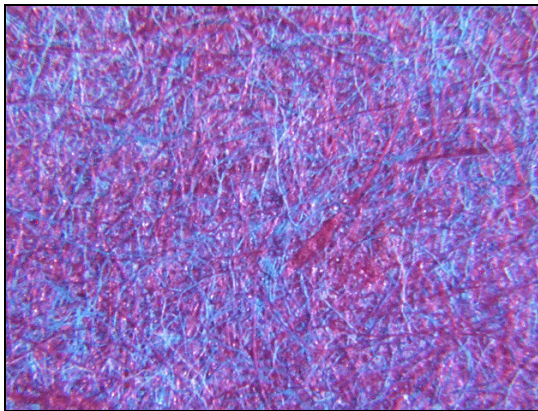
Figure 1 shows the original image.

Figure 2 shows the binarization by *Color Thresholding* performed on the original image. Red fibers were binarized in green and blue fibers were binarized in yellow.

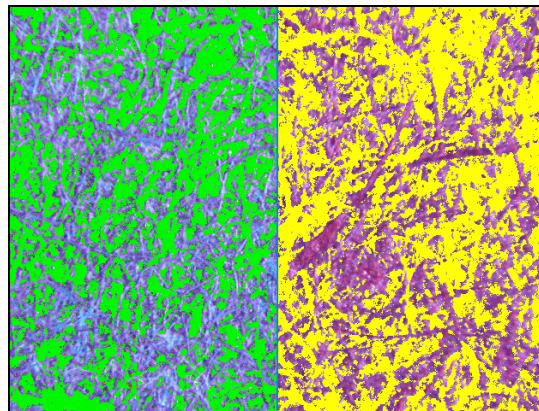
The two bitplanes (green and yellow) were combined using *Boolean* instructions to isolate little holes. These holes were isolated in the purple bitplane. Figure 3 shows the three resulting bitplanes.

The area percentage of each bitplane is shown in Figure 4.

The most significant image modifications and final results are as follows:

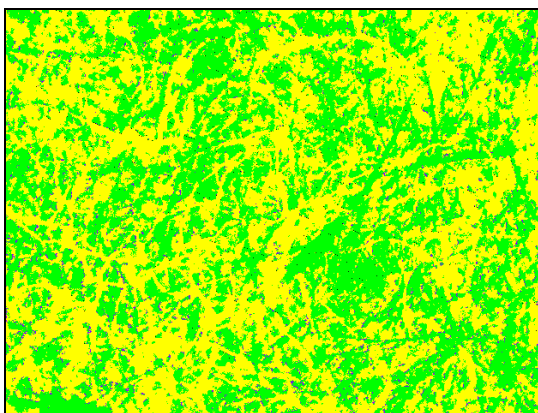


**Figure 1:** Original image.

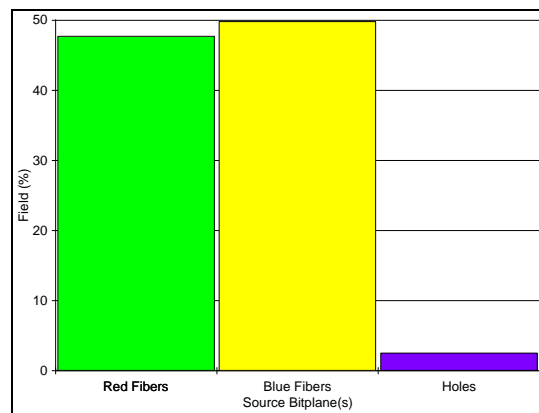


**Figure 2a:** Binarization by *Color Thresholding* of the red fibers (in green).

**Figure 2b:** Binarization by *Color Thresholding* of the blue fibers (in yellow).



**Figure 3:** Resulting bitplanes before measurement.



**Figure 4:** Area percentage of each bitplane.

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## Results Summary

	<b>Area Percentage (%)</b>
<b>Red Fibers</b>	47.65
<b>Blue Fibers</b>	49.77
<b>Holes</b>	2.58

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## Discussion



The image analysis system can discriminate the two colors to produce an area percentage measurement.

The *Color Threshold* limits that discriminate blue from red fibers could be set slightly differently. However, they must stay the same from one image analysis routine to the other to obtain results that can be compared. Similarly, light intensity must remain constant from one analysis session to the next.