BOLERO Lite

Volume & Frizz analysis

Features

FAST ANALYSIS

Image your sample, and get your hair volume and hair frizz analysis in seconds
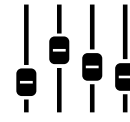
PLUG & PLAY

No special installation is needed - easy cabling and the system is ready to go

FOLDABLE SETUP

The system can be easily stored and deployed thanks to its foldable design

AUTO-CALIBRATED

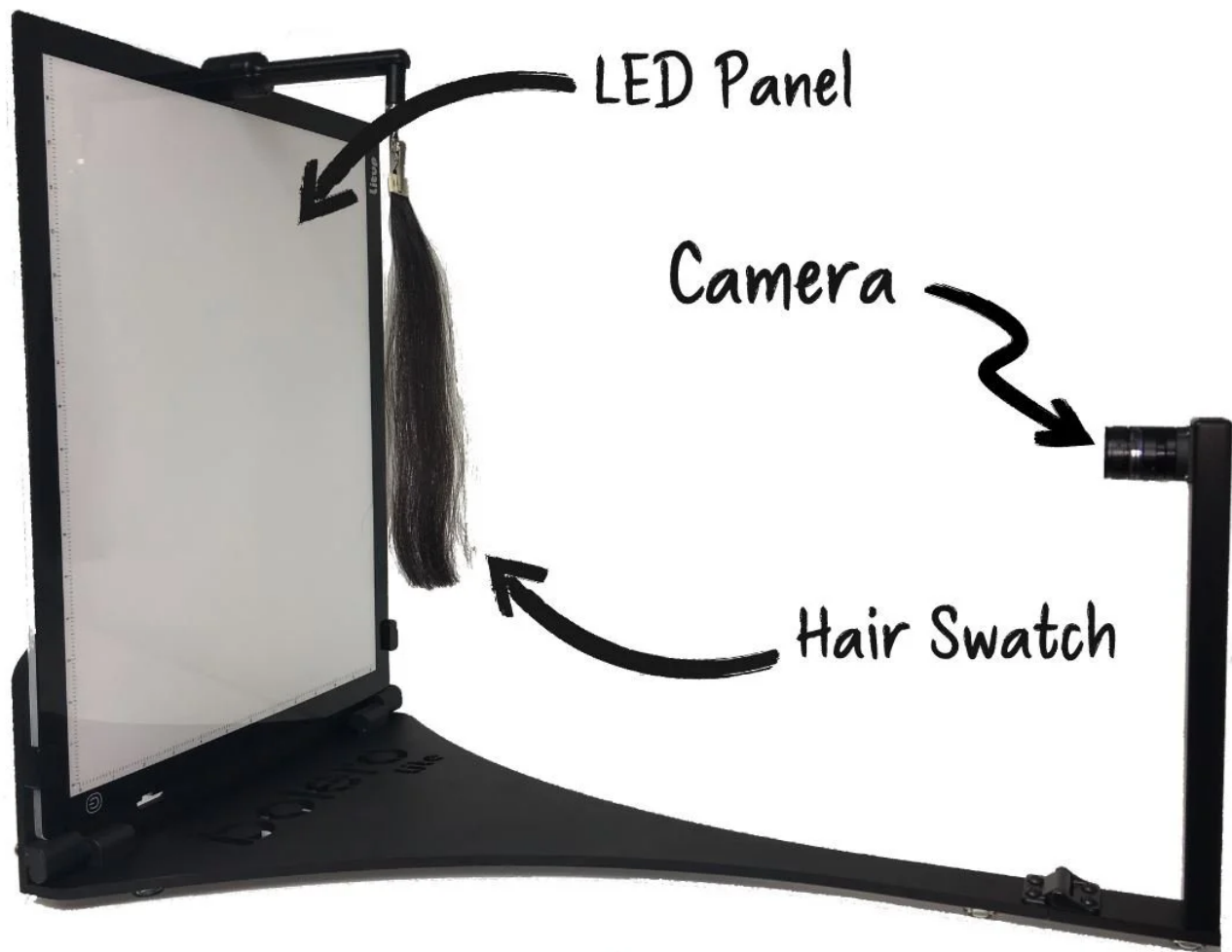An automatic calibration is done every time the software is launched

GET A QUOTE

Overview

Hair swatches are not easy to analyze due to their composition from a multitude of individual fibers whose boundaries are not well defined. Light transmission analysis techniques are a solution to analyze hair swatches' geometry and have been widely used in the cosmetic industry to address the needs regarding volume measurements and frizz analysis.

BOLERO Lite is an imaging system dedicated to quickly and efficiently discriminate fly-away/frizz fibers from the bulk of hair swatches on a 2D image using light transmission variations to evaluate hair density. This cosmetic testing equipment is designed to ensure portability, efficiency, and precision in the measurements for an optimal user experience.

A user-friendly software allows the user to acquire the measurement in one click. A complete analysis of the hair swatch of the hair is delivered in seconds. Numerical data and images can be quickly compared and exported for reports, presentations or post processing.
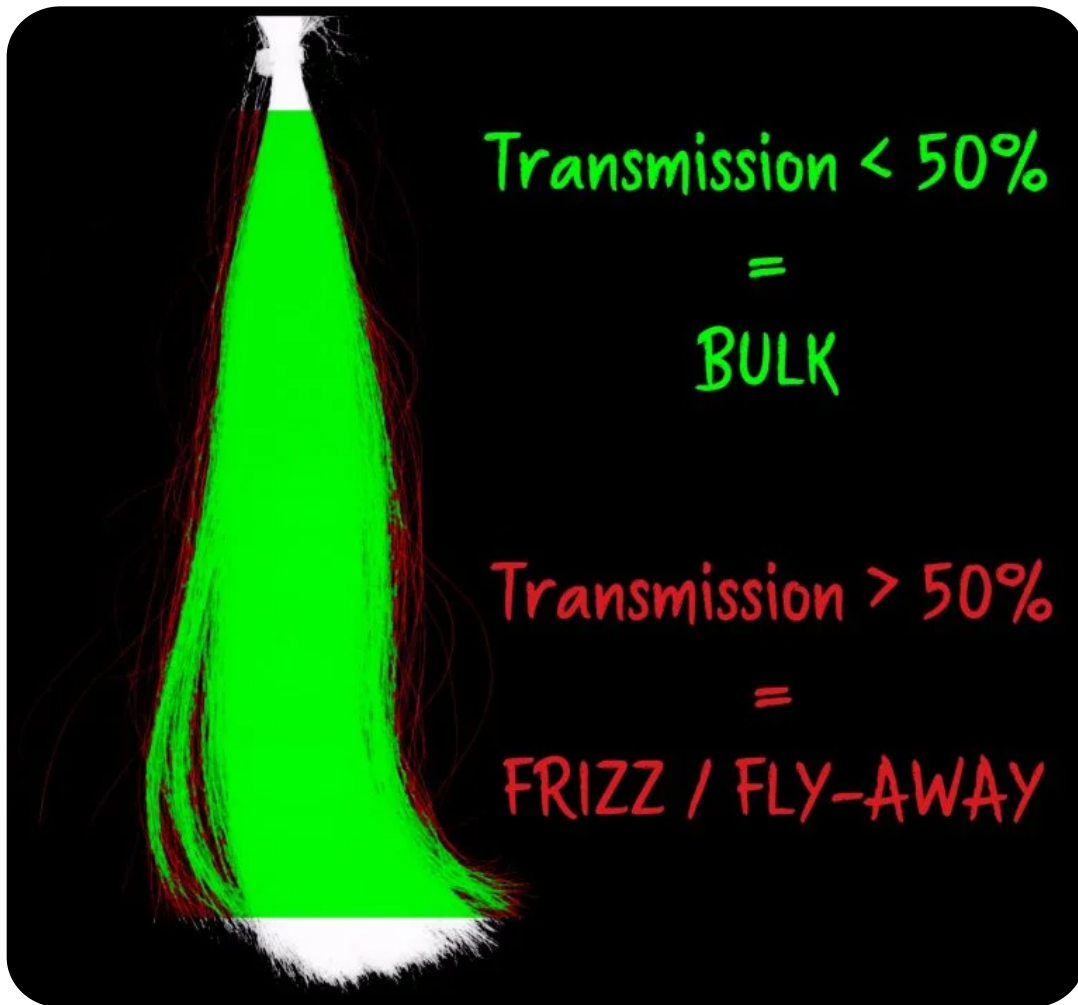
Principle

Using uniform back-light illumination, we can measure the transmission of the light through the hair swatch with a standard black and white image of the sample. For each pixel of the image, we measure the light transmitted.

If the transmission :

- is inferior to a defined threshold, this corresponds to a high-density area and we can define the pixel as part of the **bulk**
- is higher than the defined threshold, this is a low-density area and we can define the pixel as part of the **fly-away / frizz**

In BOLERO, we use a threshold of 50%.

Once this separation between the bulk and the frizz / fly-away fibers is done, we can compute the ratio between those 2 components composing the hair fiber, to determine the increase or decrease in frizz.

We can also look exclusively at the volume taken by the bulk and/or the frizz fibers to assess the efficiency behind a volumizing product.

Specifications

GENERAL SPECIFICATIONS	
Camera	Monochrome 8 bits
Resolution	2,592 x 1,944 pixels
Illumination	LED panel
Software	BOLERO - Windows 10
Measurement time	< 1 second

GENERAL SPECIFICATIONS	
Calibration	Factory calibrated
Size	15" x 27" x 20 " (375mm x 700mm x 500mm)
Size (folded)	15" x 27" x 3.5 " (375mm x 700mm x 90mm)
Power	110/200 VAC, 50/60 Hz

DATA	
Data saved	Raw images Processed images
Data export	Excel

HAIR SAMPLE SPECIFICATIONS	
Hair swatch length/weight	From 5 to 30 cm - 20 grams
Hair swatch color	Any

Resources

Application note - Humidity protection

APPLICATION NOTE

BOLERO LITE

Frizz control and humidity protection assessment

OBJECTIVE

Humidity has always had negative effect on hair styling, with the apparition of frizz, unwanted curls, entangled hair fibers, etc. Hair products that aim at containing those undesirable effects usually do so by protecting the hair shaft against moisture.

The BOLERO Lite - using a light transmission technique - is able to separate the bulk of the hair swatch from the frizz. Using the timelapse feature, it can measure those components over several hours as well as analyse other geometrical parameters, like the length of the hair swatch.

PROCEDURE

LED Panel

Hair swatch

Humidity Box

Camera

To assess the efficacy of the humidity protection product, we have used 2 flat-ironed ethnic hair swatches

1. Swatch 1 is untreated (control)
2. Swatch 2 is treated with a humidity protection balm
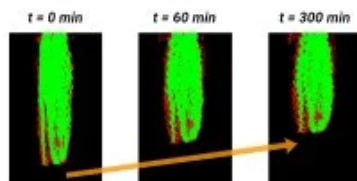
Flat-ironing

The hair swatches are then placed in a transparent humidity box at 90% RH on the Bolero Lite set-up, between the camera and the LED background as shown on the picture.

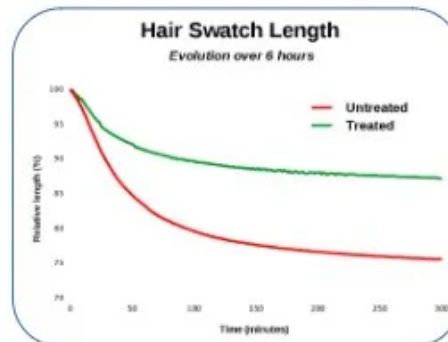The time-lapse feature allow the recording of images every minute for 5 hours

RESULTS

Over the course of five hours, the system was able to save and process 300 images for a single sample. On the images below, you can see the processed images at three different times.

The bulk of the hair swatch (green area) has been separated from the frizz / fly-away (red area)

t = 0 min   t = 60 min   t = 300 min

Hair Swatch Length
Evolution over 6 hours

— Untreated
— Treated

If we plot the hair swatch length over time and compare our two samples (treated and untreated), we can see that :

1. for the untreated swatch, the length decreased by 25%
2. for the treated swatch, the length decreased by 12%

The balm was partially protecting the hair from ambient humidity, as hair tends to frizz and curl upon itself when moist. Additional analysis, including frizz or volume anlysis could be done using a similar setup with the BOLERO Lite.