

## Measurement Method

Change of phase of light  
 $\Delta = 2t + \frac{\lambda}{2}$  (must equal a whole number of  $\lambda$  for a bright fringe or

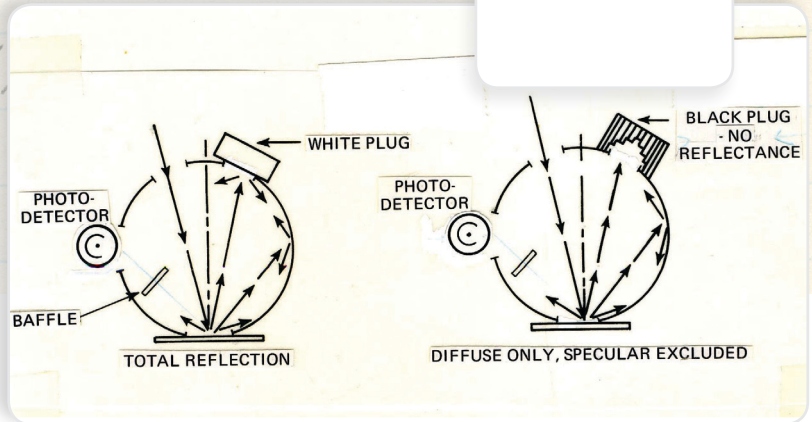
$$n\lambda = 2t + \frac{\lambda}{2}$$

$$t = \frac{n\lambda}{2} - \frac{\lambda}{4} = \frac{\lambda}{2} \left( n - \frac{1}{2} \right)$$

substituting

$$D^2 = 2s \left[ \frac{\lambda}{2} \left( n - \frac{1}{2} \right) \right]$$

MM 5102.00



## Measuring Ground Coffee

with ColorFlex® EZ Coffee

There are several quality parameters for coffee but the color of ground coffee has long been an important determinant of quality as the degree of roast directly affects the flavor and appearance of the brewed coffee beverage.

A HunterLab ColorFlex® EZ Coffee is used to measure ground coffee through the bottom of a clear plastic dish. It is a CIE-conforming mini-bench spectrophotometer optimized for measuring the color of all materials in agreement with visual observation with a special firmware for the color measurement of ground coffee. It can be operated as a stand-alone coffee color meter or attached to EasyMatch QC software.

### THE APPLICATION

Ground coffee is reasonably uniform across the surface but as a particulate, must be measured in a container. While ground coffee can be measured port-down with the ground coffee raked even with the lip of the dish, measuring port-up through the clear bottom of a plastic dish is less operator-dependent in terms of sample preparation.

*Note: If inter-instrument agreement is a concern when measuring ground coffee, all the instruments used for these measurements MUST be the same model to minimize measurement differences.*

### Recommended Color Scale

For coffee products there are three specialized single number indices in popular use:



**SCAA/G** - the Agtron number for the Gourmet Coffee Scale adopted by the Specialty Coffee Association of America [www.scaa.org](http://www.scaa.org). This scale is based on a series of SCAA visual color standards used to rate the color of ground coffee.

**SCAA/C** - the Agtron number for the Commercial Coffee Scale adopted by the Specialty Coffee Association of America based on the SCAA/G scale.

**HCCI** - the Hunter Coffee Color Index based on reflectance at 640 nm, a common metric for many coffee roasters.

As an additional option, CIE L\*, a\*, b\* D65/10 is also available as a complete color descriptor for coffee and other products.



ColorFlex® EZ Coffee



MEASUREMENT METHOD

for ColorFlex EZ Coffee (sensor only)

- 1. Go to Main Menu/STANDARDIZE to standardize the instrument in reflectance.
- 2. Standardize the instrument using the black glass and calibrated white tile standards that come with the instrument.
- 3. Go to Main Menu/Read/Select Setup #1 "Coffee Roast".

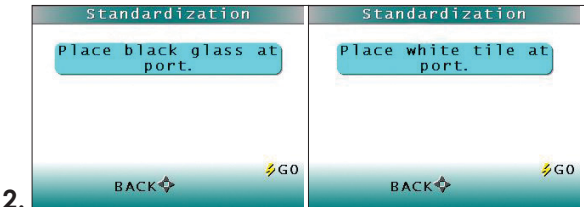
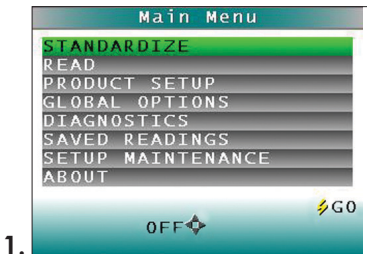
**Note:** A product setup is a set of operating parameters that define the operation of the system for a specific product. The Coffee Roast setup has three pre-defined views – one for SCAA/Agtron # for the Gourmet Coffee Score, a second for the Commercial Coffee Score and a third for the HCCI Hunter Coffee Color Index. Other views can be configured to report CIE L\*, a\*, b\* D65/10 and other color values if needed.

- 4. Place the Coffee Tile at the port and read the color. It should read closely to the Values-Read-At-Factory on the back of the tile.

**Note:** If the Coffee Tile does not read closely to factory values, clean the tile with isopropyl alcohol (IPA) and a tissue. Then re-read the tile.

- 5. Fill the bottom of the 100 mm diameter plastic dish to near the top. Tap once on a hard surface and place at port. Take a reading and report the measured values.

**Note:** Ground coffee is typically prepared by grinding roasted beans to a medium grind per SCAA recommendations. The coffee should be fresh ground from beans each time as oxidation can influence the ground coffee color. Temperature is also a variable but by the time beans pulled from the roaster have been ground and taken to the instrument for measurement, the temperature should be close to ambient.



## MEASUREMENT METHOD

### for ColorFlex EZ Coffee used with EasyMatch QC Software

**Note:** When the ColorFlex EZ Coffee sensor is used with EasyMatch QC software loaded on a PC, all actions are taken in EasyMatch.

1. Go to Help/About to verify that you have EasyMatch QC version 4.82 or higher.
2. Go to Sensor/Install-Configure to install the ColorFlex EZ Coffee sensor with the software.
3. Select Sensor/Standardize to standardize the instrument using the black glass and calibrated white tile standards that come with the instrument.
4. Place your mouse over the Color Data Table/ Right Click/Configure to configure all parameters for coffee color measurement.

Under "Indices" find the SCAA/G (SCAA/Agtron Gourmet Color Scale) and HCCI (Hunter Coffee Color Index) metrics found under Indices. Just push them over into "Selected Items" on the left.

If you need full color values, you may also select CIE L\*, a\*, b\* in "Scales" for D65/10 Illuminant/Observer.

Other typical parameters chosen would be to deselect "Tolerances" and increase "Font Size" to 14.

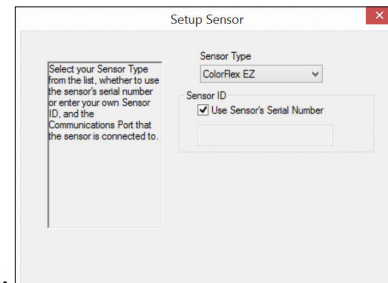
5. This is what a typical color data display might look like.

Proceed to measure your PQ Coffee Tile and compare your measured values to the Values-Read-at-Factory on the back of the tile.

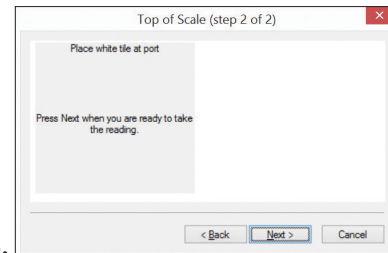
If in close agreement, proceed to measure your ground coffee sample through the bottom of the plastic dish.



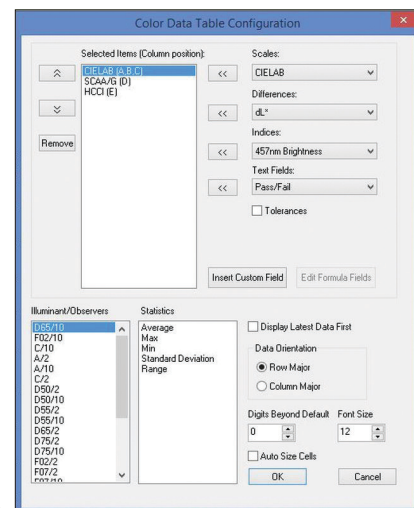
1.



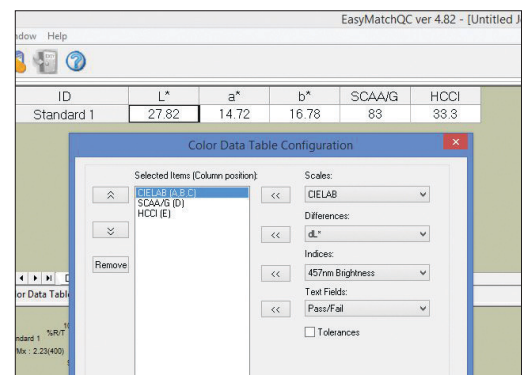
2.



3.



4.



5.

## ABOUT HUNTERLAB

HunterLab, the first name in color measurement, provides ruggedly dependable, consistently accurate, and cost effective color measurement solutions. With over 6 decades of experience in more than 65 countries, HunterLab applies leading edge technology to measure and communicate color simply and effectively. The company offers both diffuse/8° and a complete line of true 45°/0° optical geometry instruments in portable, bench-top and production in-line configurations. HunterLab, the world's true measure of color.

© Hunterlab 2015



***More Information about  
Measurement Methods at***

*[hunterlab.com](http://hunterlab.com)*

**Hunter Associates Laboratory Inc.,**  
11491 Sunset Hills Road, Reston, VA 20190-5280 USA  
[support@hunterlab.com](mailto:support@hunterlab.com)  
[www.hunterlab.com](http://www.hunterlab.com)

