

Aeros®

Supplemental Manual for EasyMatch® QC



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Preface

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Caution: If the equipment is used in a manner not specified by the HunterLab, the overall safety may be impaired. The instrument is for indoor use only and not suitable for a wet location.



Caution: There is a potential of a UV Light hazard in using this instrument. Please avoid looking directly at the light. The frequency of this flashing light is in the range of sensitivity for those prone to epileptic seizures.

For your safety when using the Aeros you should pay attention to the following types of statements in this User's Manual:

- General safety instruction that should be observed at all times while operating the instrument.
- Specific safety instruction critical to the type of instrument operation being explained in the manual where the caution appears.
- Use of this equipment in a manner not specified by the manufacturer may impair the protection afforded by the equipment.
- Danger of electric shock if liquids are spilled and fire if volatile or flammable liquids are spilled. Use care when measuring liquid samples.

Legal Disclaimers: Instrumental – Visual Evaluation

The HunterLab Aeros Colorimetric Spectrophotometer is designed for precision color and appearance measurement. It measures numerical color and related data in absolute and relative terms. HunterLab cannot guarantee the accuracy, completeness, efficacy, and timeliness of the data due to inherent uncertainties in instrumental readings, variations in sample presentation, and potential inconsistencies in human color perception. It is strongly advised that each user verify the instrumental data with meticulous visual evaluation.

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Setting Up the Aeros

The Aeros is a continuous, automated, non-contact color measurement instrument with height detection and color compensation. For use in laboratory environments, the Aeros uses LED illumination technology to measure samples and monitor color on a rotating tray. Pour, place and measure single or multiple samples on the tray, with easy cleanup and maintenance.

Aeros makes real-time color measurements of products with irregular shapes, and in industries as diverse as paint, food, building products and industrial minerals. This instrument is designed to work as a stand-alone unit with an easy-to-read display or connected to EasyMatch QC software on a personal computer.



Figure 1. Front of Aeros

Standard Accessories

- Calibration Box with calibrated white tile, black glass and green diagnostics tile
- Certificate of Traceability
- Power Supply
- Aeros Quick Start Guide
- 12-in and 6-in Sample Dishes
- USB Flash Drive



Figure 2. Calibration Box

Selecting a Space for the Aeros

The following illustrates a successful installation. Set up the HunterLab Aeros in a laboratory setting with controlled, consistent temperature and humidity. It is recommended that access to the rear connectors be maintained. The selected workspace should be free of drafts and characterized by proper room lighting. Place the spectrophotometer on a stable and vibration-isolated surface to minimize vibrations that could affect measurements. Input power from the utility company must be 'perfect' power, i.e., constant voltage, current and frequency without harmonics.

Laboratory Environment – The HunterLab Aeros Spectrophotometer is a high-precision laboratory instrument. Laboratory grade environments are required and should be maintained to ensure precise and accurate measurements. This includes environmental factors and conditions such as temperature humidity, atmospheric pressure, and cleanliness. The environment should be free of contaminants such as airborne dust and/or particulate matter and aerosols to avoid contamination of the precision equipment.

Samples

Implement protocols for handling and preparing samples to minimize contamination to the inside of the instrument.

Personnel

Train laboratory personnel on clean practices, including wearing appropriate attire, using cleanroom-like protocols and being mindful of their actions to prevent contamination.

Power Required

Voltage: 100-240 VAC, 3.75A, 47/63 Hz; Single Phase; 60 VA maximum.

Installation Category (Over Voltage): II

Safety

- Do not view the instrument LED's directly as it may be damaging to the eyes.
- Do not submerge the instrument in water.
- Do not take the instrument apart as there are 'no user serviceable parts' in the instrument.
- Do not disassemble the instrument and attempt to clean the optical components.
- Do not open the instrument or remove any covers except using the instructions given in this User's Manual or under the direction of HunterLab Technical Support.

Note: Failure to comply with these conditions and protocols set forth in this document may adversely affect the instrument performance.

For more information, please refer to **SPECIFICATIONS**.

Cleaning the Aeros

Clean the outside surfaces of the Aeros using a soft cloth. Do not spray liquids directly on the instrument. Care should be taken to avoid degradation of optical surfaces. Refer to **MAINTENANCE** for more detail.

Getting Started

Unpack your Box

Place the Aeros on the bench. Remove wrappings and cable ties. Inspect for damage and notify the carrier and HunterLab immediately if any is discovered.

Retain the packaging in case of needing to return the instrument return to HunterLab.

Power Jack

The instrument is supplied with a 24 VDC (3.75A) power supply. The power supply is plugged into the back of the instrument as shown along with the Ethernet port and the USB port.

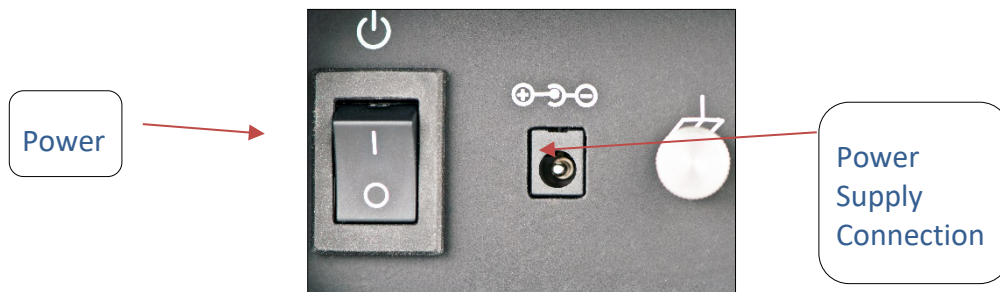


Figure 3. Rear View with Connectors

CAUTION: Use only the power supply included with this instrument or a replacement obtained from HunterLab. Be certain that the power supply is in good condition before connecting it. The Aeros is grounded using the grounding portion of this power supply. Only plug this supply into a properly grounded power outlet. Do not use an inappropriate adapter to plug the instrument into an ungrounded outlet or electric shock may occur. More information on the wiring of the power supply can be found in the Aeros Specifications section of this manual.

Power Switch

To turn the instrument on, press the rocker switch on the back of the instrument.

Front and Rear USB Connectors

There are two USB connectors on the Aeros. The one in the front is typically used for exporting jobs and workspaces, backing up the instrument and updating software. The USB port on the back of the instrument is typically used to connect a printer or a keyboard to the Aeros.

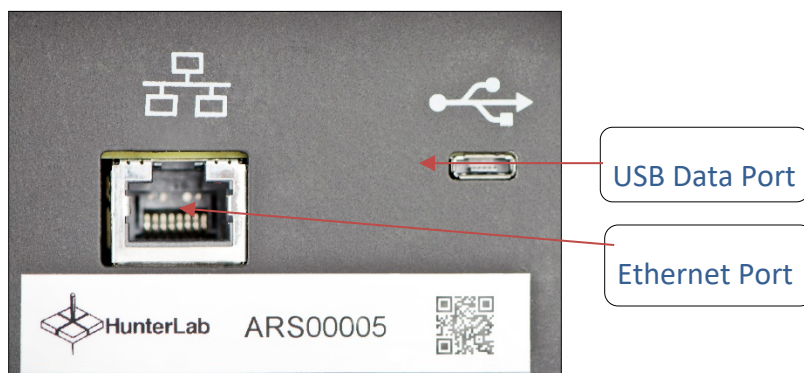


Figure 4. USB Port on Rear of Instrument

Ethernet Port

This port is used to connect the Aeros to:

- Computer or to a network with the purpose of sending data (ASCII) to a server.
- Connect with EasyMatch QC and EasyMatch ER Validation and Compliance
- Remote Support
- Network printer.

Note: Use of this equipment in a manner not specified by the manufacturer may impair the protection afforded by the equipment. Danger of electric shock if liquids are spilled and fire if volatile or flammable liquids are spilled. Use care when measuring liquid samples.

Aeros Installation

Note: The Aeros should be lifted from under the base plate, near the center of the unit. It should not be carried by grasping any part of the plastic housing.

The Aeros is simple to set up and attach to your computer. The following instructions guide you through the initial installation of your Aeros system.

1. Place the Aeros on a flat working surface where the measurements will be made. Place the computer near the sensor.
2. Ensure that the on/off switch on the back of the sensor is set to off.
3. Connect the power cord to the sensor and plug it into a power outlet.

inappropriate adapter to plug the instrument into an ungrounded outlet or electric shock may occur. More information on the wiring of the power cord can be found in the Aeros Specifications section of this chapter.

Note. Since the Aeros uses an ethernet cable to communicate with the computer, select the highest number COM Port No. offered.

Aeros Options and Sample Devices

For the latest information, please refer to support.hunterlab.com and Aeros.

Aeros Installation with EasyMatch QC

Install EasyMatch® QC Software

Complete the following steps:

1. Log into the system using an account that has **ADMINISTRATOR** privileges for the PC — network or local.
2. Insert the installation CD into the CD-ROM drive. If the system is setup to automatically run CD programs, the menu will appear and you may skip to Step 5. Otherwise, continue with Step 3.
3. Select the Easy Match QC Icon or from Windows, go to **START > RUN > EZMQC_MENU** and **OPEN**. The following screen will be shown.

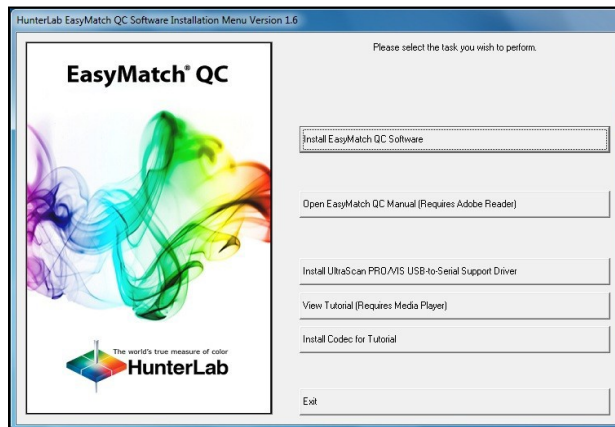


Figure 5. EasyMatch QC Installation

4. Select **INSTALL EASYMATCH QC SOFTWARE** and follow the screen prompts.
5. Select **SOFTKEY LICENSE** as the type of key to use with the software.

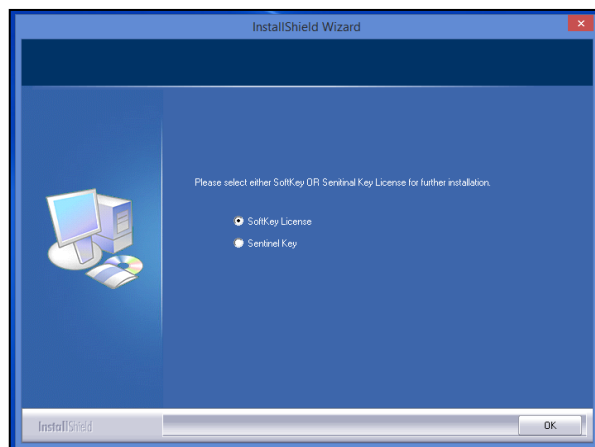


Figure 6. Software Key License

6. When the EasyMatch QC installation is finished, select the **OPTION BUTTON** next to **YES, I**

WANT TO RESTART MY COMPUTER NOW and then **FINISH** to restart the computer and log back in.

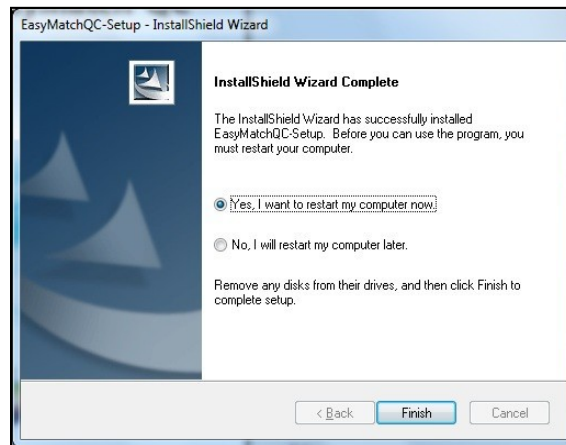


Figure 7. Completed Install

7. The CD can now be removed.

Activate the SoftKey License

1. From the Desktop, select the EasyMatch QC Icon or from the Windows Start menu, choose the following to open the software:

START > PROGRAMS > HUNTERLAB > EASYMATCH QC

2. A warning message to activate the license will be displayed as shown in Figure 8.

Note: EasyMatch QC functions are unavailable before key activation.

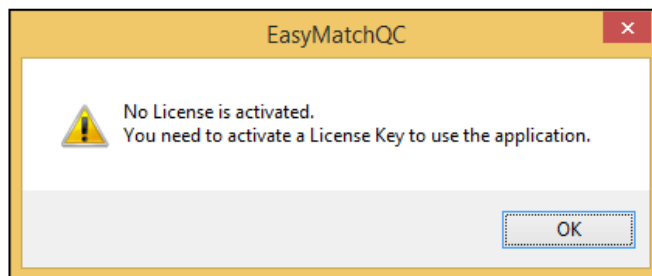


Figure 8. No License Warning

3. The SoftKey License is uniquely associated with the sensor serial number and is provided on a thumb drive supplied with EasyMatch QC or via email from HunterLab.
4. Go to **HELP > LICENSE REGISTRATION > ACTIVATION**.
5. Select **ACTIVATE LICENSE**.

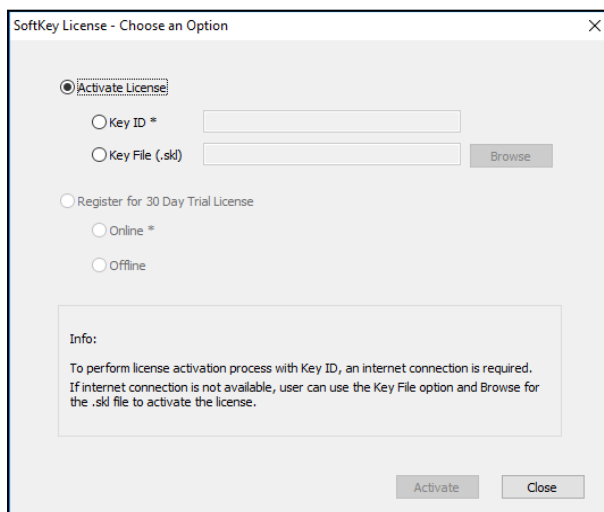


Figure 9. Activate License

i. Option #1: Key ID.

This method is for copying the ID from an email or writing down the 32-digit code. This requires an internet connection.

- a. From the **CHOOSE AN OPTION** page (Figure 9), select **KEY ID**.
- b. Paste-in or type-in the License Key ID and click **ACTIVATE**.
- c. An acknowledgement will be displayed showing the activation status.

ii. Option #2: Key File (.skl)

This method is for using the SoftKey License (.skl file) on the thumb drive.

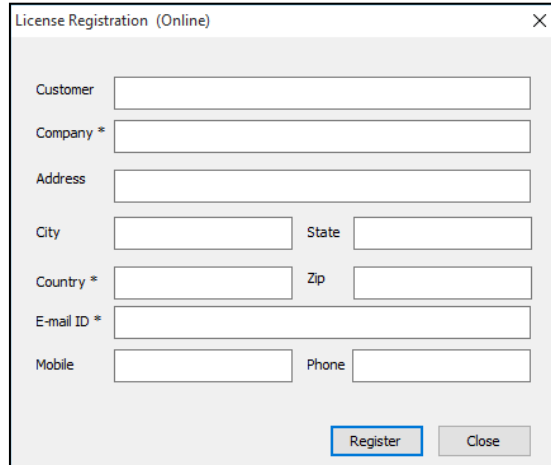
- a. Place the thumb drive with the SoftKey License in the USB port.
- b. From the **CHOOSE AN OPTION** page (Figure 9), select **KEY FILE (.skl)**.
- c. Browse the USB to find the **SOFTKEY LICENSE (.skl)** file, then click **ACTIVATE**.
- d. An acknowledgement will be displayed showing the activation status.

iii. Option #3: Sentinel Key

- a. If the user has a HunterLab USB hardware key, then it can be used with a new sensor on the same computer. Return to Install the Software, Step 5 (Figure 6) and select the Sentinel Key to continue.

iv. Option #4: 30-day trial

- a. Fill out the registration form provided for the 30-day trial. Connect to the internet. HunterLab will approve the trial and email the SoftKey license back. Follow the directions for Option #1 or #2 to complete.



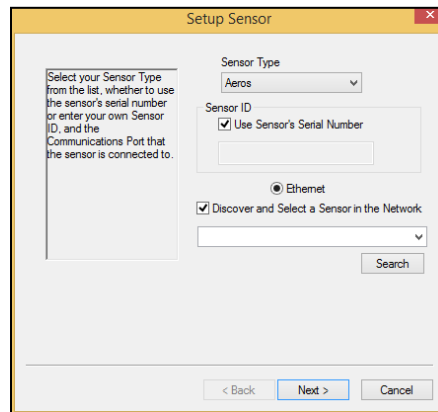
The image shows a 'License Registration (Online)' dialog box with the following fields: Customer, Company *, Address, City, State, Country *, Zip, E-mail ID *, Mobile, and Phone. There are 'Register' and 'Close' buttons at the bottom right.

Figure 10. Request 30-day Trial

Sensor > Install and Setup

EasyMatch QC and EasyMatch QC-ER Version can connect with Aeros through an ethernet cable.

1. Connect both the Aeros and the computer with EasyMatch QC via an ethernet cable.
2. Open EasyMatch QC in the computer.
3. From the **SENSOR MENU**, select **ADD SENSOR**.



The image shows a 'Setup Sensor' dialog box. It contains a text box with instructions: 'Select your Sensor Type from the list, whether to use the sensor's serial number or enter your own Sensor ID, and the Communications Port that the sensor is connected to.' The 'Sensor Type' dropdown is set to 'Aeros'. The 'Sensor ID' section has a checked box for 'Use Sensor's Serial Number' and an empty text field. The 'Ethernet' radio button is selected, and the 'Discover and Select a Sensor in the Network' checkbox is checked. There is a dropdown menu for the communications port and a 'Search' button. At the bottom, there are '< Back', 'Next >', and 'Cancel' buttons.

Figure 11. Add Aeros Sensor

4. Select **Aeros** as the Sensor Type and use the USB (selected as default) to connect Aeros with EasyMatch QC. Click **NEXT** to search available Aeros.

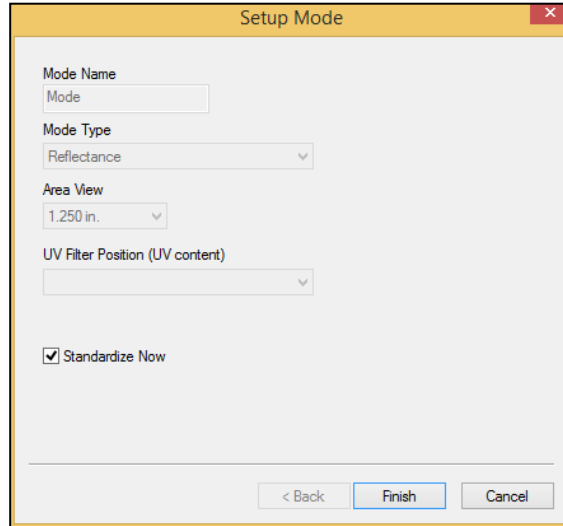


Figure 12. Setup Sensor in EasyMatch QC

5. Select **NEXT** to standardize.
6. You are now ready to use EasyMatch QC with the Aeros.

Sensor Manager > Standardization

The Aeros must be standardized on a regular basis to keep it operating properly. Standardization sets the top and bottom of the photometric scale. During standardization, the bottom of the scale is set using a black tile read on the Aeros. The top-of-scale is set using a white tile.

It is recommended that the instrument be standardized at least once every eight hours. Only reflectance is available on the Aeros.

The instrument can be standardized at any time by selecting **SENSOR > STANDARDIZE** or by clicking the **STANDARDIZE** button on the default toolbar. You are first prompted to indicate the instrument configuration.

To standardize, read the bottom-of-scale and the top-of-scale.

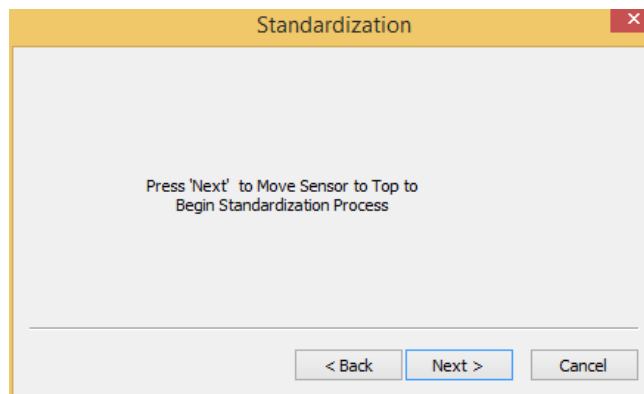


Figure 13. Sensor Moves to Top

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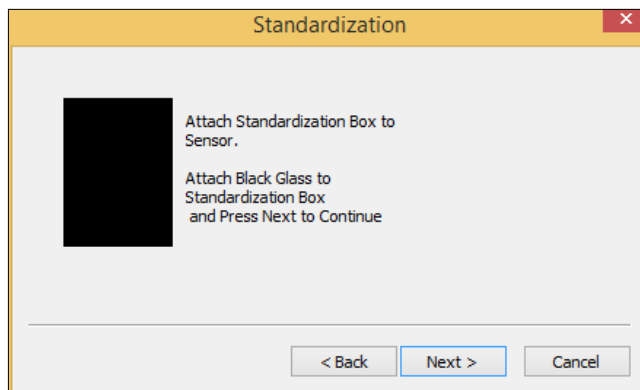


Figure 14. Read Bottom-of-Scale

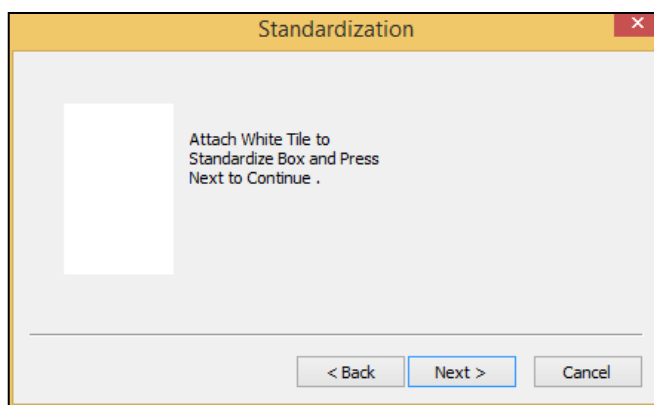


Figure 15. Read Top-of-Scale

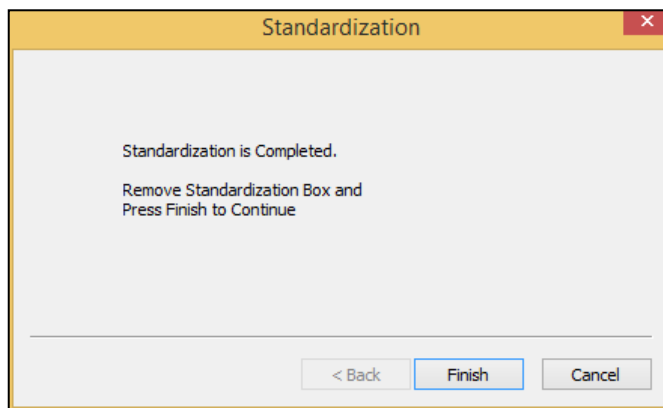


Figure 16. Standardization Complete

Take Sample or Standard Measurements

Selecting Measurement Parameters

In the **COLOR DATA TABLE** View, right-click to select **CONFIGURE** to apply indices, color scales, Illuminant/Observers and differences to the measurement.

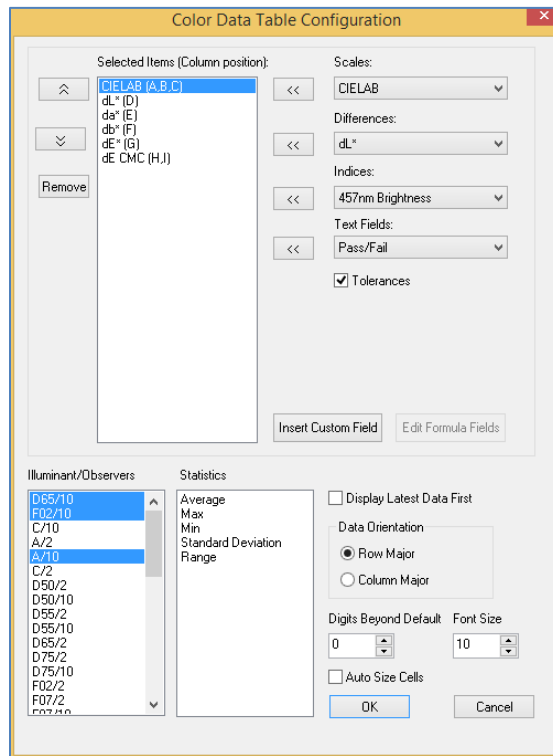


Figure 17. Color Data Table Configuration

Sensor Manager > Measurement Configuration

To adjust the measurement parameters for the Aeros, go to **SENSOR MANAGER > MEASUREMENT CONFIGURATION**. Select **TURNTABLE MOTION** to enable rotation. When **AUTO HEIGHT** is selected as a default, the sensor head will adjust its position to read samples automatically for each sample measurement. The **CREATE SAMPLE PROFILE** button will allow the Aeros to look at the specimen and select the optimum fixed distance from the turntable. When this is pressed, the Sensor will move to the Top position. When profile is complete, press **OK** to continue. The sample height will be shown next to the **CREATE SAMPLE PROFILE** button.

The **MEASUREMENT TIME** is the amount of time used to average the readings together. The longer the time, the more the averaging.

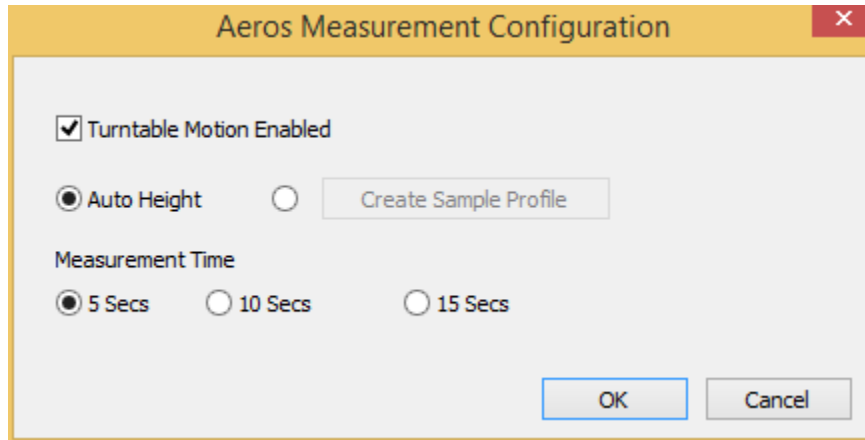


Figure 18. Sensor > Measurement Configuration

Measure Sample/Standard

From the **MEASUREMENTS MENU**, you may read either a standard or a sample. You may also average data. The functions available through the **MEASUREMENTS MENU** are described in the remainder of this chapter.

Measurements > Read Standard

The **MEASUREMENTS > READ STANDARD** command initiates reading of a standard. Place the standard before initiating the **READ STANDARD** command. If Prompt for standard name was checked in **OPTIONS > NAMING CONVENTIONS**, you will then be prompted to enter a name for the standard (as well as a Product ID and Extra ID, if you wish). You may simply accept the name defined using the **NAMING CONVENTIONS** command, if desired. The measurement is then accepted and added to the current job. The keyboard shortcut for this command is **F2**.

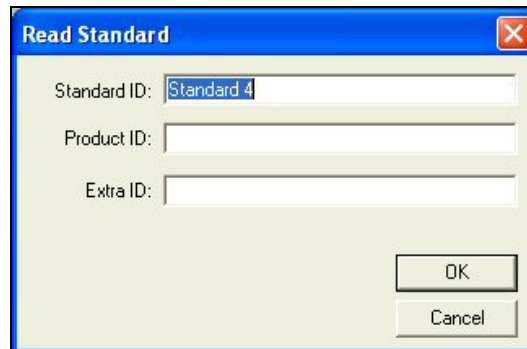


Figure 19. Enter Standard ID

Measurements > Read Sample

The **MEASUREMENTS > READ SAMPLE** command initiates reading of a sample. Place the sample before initiating the **READ SAMPLE** command. If Prompt for sample name was checked in **OPTIONS > NAMING CONVENTIONS**, you will then be prompted to **ENTER A NAME** for the sample (as well as a Product ID and Extra ID, if you wish) and to choose the standard with which the sample should be linked. ('Standard Empty' is a choice if you do not want to link to a standard.) You may simply accept the name defined using the **NAMING CONVENTIONS** command and the suggested standard, if desired. The measurement is then accepted and added to the current job. The keyboard shortcut for this command is **F3**.

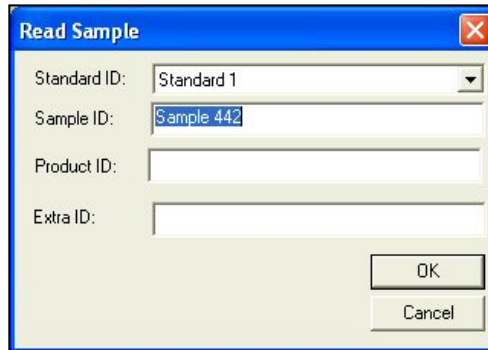


Figure 20. Enter Sample ID

Results are displayed.

ID	L*	a*	b*	UV Status	Gloss	Port Plate
Sample 4	96.05	-0.46	1.53	UV Excluded	2.58	2.000000
Sample 5	96.09	-0.47	1.55	UV Nominal	2.58	2.000000
Sample 7	96.05	-0.45	1.53	UV Nominal	2.79	1.000000

Figure 21. Measurement Results

Visual Inspection

Visually inspect the sample to confirm that the instrument readings agree with visual assessment.

Aeros Maintenance and Testing

The Aeros is engineered to be virtually maintenance free. This section outlines the few parts of the sensor that are to be maintained for the instrument to function properly.

Routine Maintenance

The following schedule outlines recommended maintenance procedures for the Aeros. The actual frequency of maintenance required will be determined by the measurement application and plant operating conditions.

Weekly

Clean the exterior of the sensor and mounting. The Aeros is NOT waterproof, but the exterior of the case may be wiped with a damp cloth. Standardize the sensor.

Monthly

Clean the standards (slide-on calibrator and sensor window monitor) using a laboratory-grade detergent and a nylon brush. Wipe dry with a lint-free paper towel containing no FWAs. If a Hitch Standard has been used, then compare hitch standard values for the Aeros to those of the off-line colorimeter. Re-hitch the Aeros if necessary or desired.

System Warm-Up

If power to any of the system components has been turned off, it must be restored to all components before operation can resume. If power to the support unit has been turned off, a 30-minute warm-up period is required for sensor temperature stabilization. If power to the support unit has been turned off for more than an hour, a two-hour warm-up period is required.

When restoring power to system components:

- Restore power to the support unit and computer (if included).
- Allow at least thirty minutes of warm-up time.
- Standardize.
- Select the desired product setup and begin operation.

Cleaning the Instrument Standards

It is extremely important that the standard tile (the slide-on calibrator) be treated with great care. It should always be protected from physical damage and dirt .

Be sure the standards are clean before using it for standardization. Once a month, use a soft nylon brush and a Sparkleen (Fisher Scientific Catalog Number 4-320-4) in water solution (1 tablespoon per gallon), followed by a running hot water rinse. Wipe dry with a clean, lint-free paper towel manufactured without fluorescent whitening agents (FWAs) to remove water marks.

Keep the standards in the standards case when not in use to prevent it from becoming scratched or collecting dust. Before standardizing the instrument, check the tiles for scratches and dust. Significant scratches that result in a hazy appearance to the finish may cause standardization to be in error. If the tile is scratched, call the HunterLab Order Processing Department, or contact your local HunterLab representative to order a replacement

Diagnostics on the Aeros

Diagnostics are included with the Aeros EasyMatch QC. To initiate, select **DIAGNOSTICS** from the **SENSOR MENU**. THE **GREEN TILE TEST**, **REPEATABILITY TEST** and **HARDWARE CHECKS** are the available tests.

Green Tile Test

To begin the Green Tile Test, standardize the instrument and place the Green Tile at the port. The software first prompts for the values on the back of the tile.

Enter Green Tile Values Read at Factory

Type of data being entered
Colorimetric

Colorimetric Conditions
Scale: XYZ Illuminant/Observer: D65/10

Assignment Date: 11/8/2018

	X	Y	Z
Values	15.56	21.64	16.78

Please enter X, Y, Z values from back of your Green Tile

OK Cancel

Figure 22. Enter Green Tile Values

Remove all samples from the instrument and attach the standardization box. The sensor will move to the top.

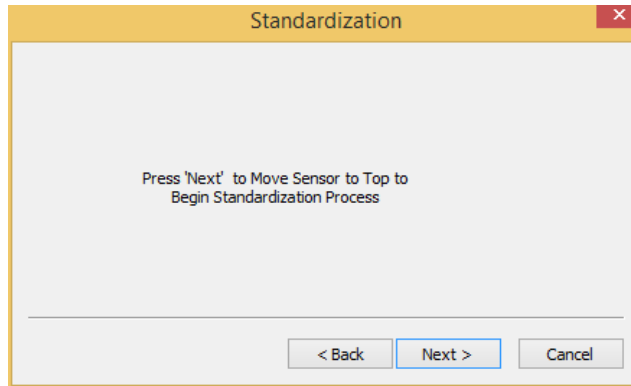


Figure 23. Standardize

Attach the standardization box to the sensor. Then attach the black glass to the standardization box. Press **NEXT** to continue.

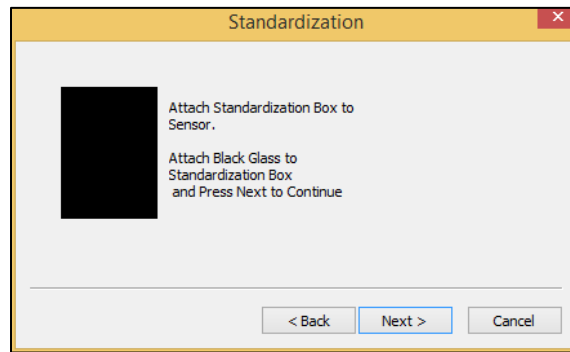


Figure 24. Read the Black Glass

Remove the black glass and attach the white tile. Press **NEXT** to continue.

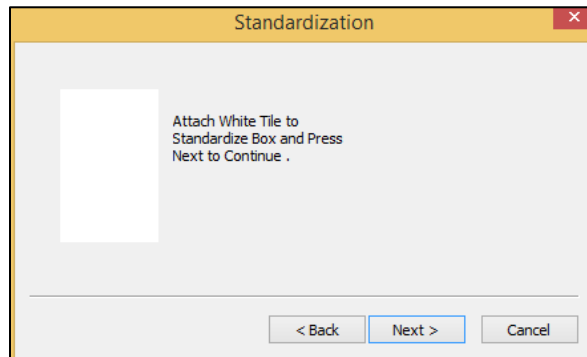


Figure 25. Read White Tile

Attach the green tile and press **NEXT** to continue. Ten readings of the green tile are made and averaged. The average reading and its Pass/Fail status will be shown. Confirm that the result is **PASS**. The Pass/Fail tolerance for the Aeros is ± 0.30 .

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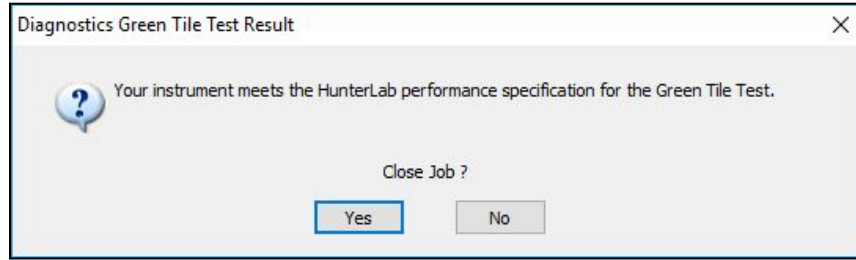



Figure 26. Screen Display for Test Results



HunterLab EasyMatch QC Green Tile Test Report

Report on Instrument Green Tile Test for Long Term Mid-Range Performance

Operator ID :
 Date : 4/22/2019
 Time : 1:43:43 PM
 File Name : EZMQC Green Tile Report_4-22-2019_1.43.43 PM.pdf

Sensor : Aeros "ARS00006"
 Mode : Reflectance - 1.250 in - None
 Software Version : EasyMatchQC 4.95
 Computer Name : ST-4V49PW1
 Operating System : Microsoft Windows 8.1 (64 bit)
 Test Result : PASS

Test Data:

ID	Pass/Fail	Date	Time	X	Y	Z	dX	dY	dZ
Green Tile Values Read at Factory		6 April 2017		15.56	21.64	16.78	15.56	21.64	16.78
+Tolerances							0.30	0.30	0.30
-Tolerances							0.30	0.30	0.30
Green Tile Reading	22 April 2019 1:43:27 PM Pass	22 April 2019	1:43:27	15.65	21.75	16.91	0.09	0.11	0.13

Green Tile Average Spectral Data :

Wavelength (nm)	Spectral Data	Wavelength (nm)	Spectral Data	Wavelength (nm)	Spectral Data
400	10.10	510	29.28	620	12.79
410	10.90	520	31.90	630	13.09
420	11.72	530	31.87	640	13.11
430	12.47	540	29.06	650	12.97
440	13.53	550	24.99	660	13.17
450	14.69	560	20.77	670	14.53
460	16.16	570	17.56	680	18.20
470	18.10	580	15.77	690	24.96
480	20.15	590	14.54	700	32.75
490	22.80	600	13.42		
500	26.01	610	12.75		

Figure 27. Green Tile Test Results

Repeatability Test

The repeatability test is initiated by standardizing and leaving the white tile in view. Each white tile reading is reported along with a pass/fail evaluation.

Remove all samples from the instrument and attach the standardization box. The sensor will move to the top.

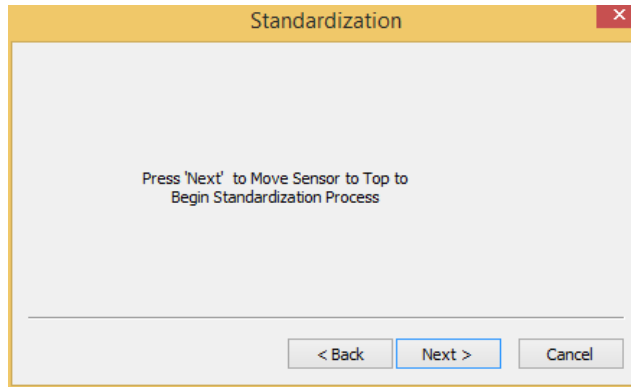


Figure 28. Standardize

Attach the standardization box to the sensor. Then attach the black glass to the standardization box. Press **NEXT** to continue.

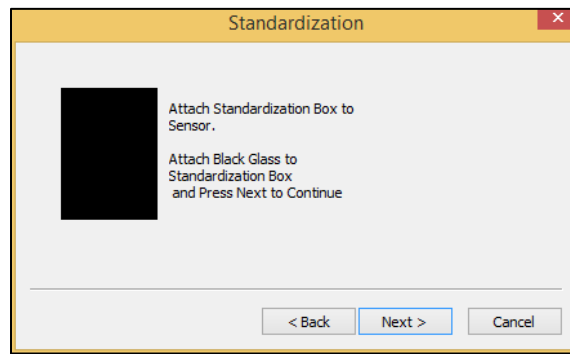


Figure 29. Read the Black Glass

Remove the black glass and attach the white tile. Press **NEXT** to continue.

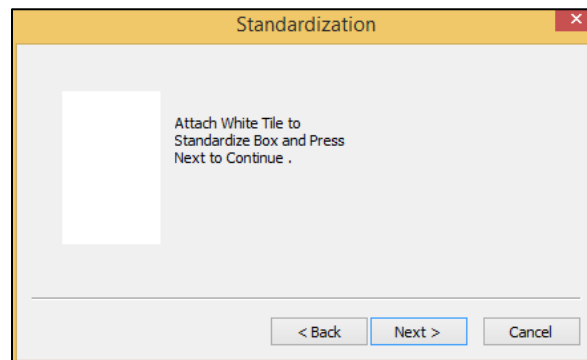


Figure 30. Read White Tile

Leave the white tile at the port press **NEXT** to continue.

Aeros Supplemental Manual for EasyMatch QC ver. 2.2

Repeatability Test								
	X	Y	Z	L*	a*	b*	dE*	Pass/Fail
Sample9	81.93	87.05	89.55	94.76	-1.17	2.67	0.00	Pass
Sample10	81.93	87.05	89.55	94.76	-1.17	2.67	0.00	Pass
Sample11	81.93	87.05	89.55	94.76	-1.17	2.67	0.00	Pass
Sample12	81.93	87.05	89.54	94.76	-1.17	2.67	0.00	Pass
Sample13	81.93	87.05	89.55	94.76	-1.17	2.67	0.00	Pass
Sample14	81.93	87.05	89.55	94.76	-1.17	2.66	0.00	Pass
Sample15	81.93	87.05	89.55	94.76	-1.17	2.66	0.00	Pass
Sample16	81.93	87.05	89.55	94.76	-1.17	2.66	0.00	Pass

Figure 31. Repeatability Readings

When the test is complete, results are shown and output as a report.

HunterLab EasyMatch QC Repeatability Test Report

Report on Instrument Short Term Repeatability Performance
 Operator ID :
 Date : 3/21/2019
 Time : 2:54:17 PM
 File Name : EZEMQC Repeatability Test Report_3-21-2019_2:54:17 PM.pdf

Sensor : Astos "ARS0009"
 Mode : Reflectance - 1.250 in - None
 Software Version : EasyMatchQC 4.94
 Computer Name : SI-4V49HW1
 Operating System : Microsoft Windows 8.1 (64 bit)
 Test Result : PASS

Test Data:

ID	Pass/Fail	Date	Time	X	Y	Z	L*	a*	b*	dE*
White Tile Standard 21 March 2019 2:50:25 PM	Pass	21 March 2019	2:50:25	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 1	Pass	21 March 2019	2:50:33	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 2	Pass	21 March 2019	2:50:38	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 3	Pass	21 March 2019	2:50:44	81.93	87.05	89.54	94.76	-1.17	2.67	0.00
White Tile 4	Pass	21 March 2019	2:50:50	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 5	Pass	21 March 2019	2:50:55	81.93	87.05	89.54	94.76	-1.16	2.67	0.00
White Tile 6	Pass	21 March 2019	2:51:01	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 7	Pass	21 March 2019	2:51:07	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 8	Pass	21 March 2019	2:51:12	81.93	87.05	89.54	94.76	-1.17	2.67	0.00
White Tile 9	Pass	21 March 2019	2:51:18	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 10	Pass	21 March 2019	2:51:23	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 11	Pass	21 March 2019	2:51:29	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 12	Pass	21 March 2019	2:51:35	81.93	87.05	89.54	94.76	-1.17	2.67	0.00
White Tile 13	Pass	21 March 2019	2:51:40	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 14	Pass	21 March 2019	2:51:46	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 15	Pass	21 March 2019	2:51:52	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 16	Pass	21 March 2019	2:51:57	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 17	Pass	21 March 2019	2:52:03	81.93	87.05	89.55	94.76	-1.17	2.67	0.01
White Tile 18	Pass	21 March 2019	2:52:08	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 19	Pass	21 March 2019	2:52:14	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 20	Pass	21 March 2019	2:52:20	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 21	Pass	21 March 2019	2:52:25	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 22	Pass	21 March 2019	2:52:31	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 23	Pass	21 March 2019	2:52:37	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 24	Pass	21 March 2019	2:52:42	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 25	Pass	21 March 2019	2:52:48	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 26	Pass	21 March 2019	2:52:54	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 27	Pass	21 March 2019	2:52:59	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 28	Pass	21 March 2019	2:53:05	81.93	87.05	89.55	94.76	-1.17	2.67	0.00
White Tile 29	Pass	21 March 2019	2:53:10	81.93	87.05	89.55	94.76	-1.17	2.66	0.00
White Tile 30	Pass	21 March 2019	2:53:16	81.93	87.05	89.55	94.76	-1.17	2.66	0.01

Figure 32. Repeatability Screen Results

Aeros Specifications

The specifications and characteristics of the instrument are given in this chapter. For best performance, the instrument should be placed where there is ample work space with medium or subdued illumination and no drafts. The operating conditions (temperature and humidity ranges) are given in the Operating Conditions section below.

Note: Do not leave Aeros in an area where temperature or humidity extremes are possible.

Operating Conditions

Storage Temperature (3weeks)	-20°C to 65°C (-5°F to 150°F)
Operating Temperature	4°C to 38°C (40°F to 100°F)
Noncondensing Humidity	10% to 90% for storage 10% to 85% RH noncondensing for operation

Physical Characteristics

Weight	23.0 kg (50.0 lbs.)
Dimensions (Height x width x depth)	56 cm x 38 cm x 51 cm (22.0 in x 15 in x 20 in)
Display	Touch Screen, high resolution color, 7in, 1280x800
Maximum Sample Height	65 – 140 mm (2.5 – 5.5 in)
Communications I/O: USB	Connectivity to printer, keyboard, mouse and other peripherals. Front Panel USB: 2.0 bidirectional data export/import via thumb drive.
Ethernet RJ45	Print directly to standalone or network printers; email directly from the instrument; stream data to LIMS and SPC systems.
Remote Access Support	Enabled via internet-based support tool

System Power	100 – 240 VAC, 47 – 63 Hz to universal power supply @ 24 VDC/3.75A 90W
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Conditions Of Illumination And Viewing

Light Source	Full spectrum balanced LED system array; 5 year typical LED life
Dual Beam Spectrophotometer	256 element diode array and high resolution, concave holographic grating; Sealed optics
Measurement Principle	Dual-beam Non-Contact Reflectance Spectrophotometer
Measurement Method	Port down, Non-contact, Rotating platter @ 12 RPM
Area Measured per Rotation	177.25 cm ² (27.5 in ²)

Instrument Performance

Spectral Data	Range: 400-700 nm; Reporting Interval (nm): 10 nm
Spectral Resolution	<3 nm
Spectral Component	Excluded
Effective Bandwidth	10 nm equivalent triangular
Sampling Rate	Continuous at 7 measurements per second
Photometric Range	0-150%
Measurement Duration	User Selectable 5, 10, 15, 30 seconds)
Measurements per Rotation	35
Maximum Sample Height	140mm (5.5in)
Inter-instrument Agreement	$\Delta E^*L^*a^*b^* < 0.30$ (Avg) on CCSII BCRA Tile Set
Colorimetric Repeatability	$\Delta E^* < 0.025$ Max on White Tile


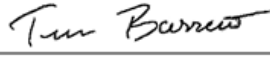
Measurement

Data Views	Color Data, Spectral Plot, EZ View, Color Plot, Trend Plot, Spectral Data
Illuminants	A, C, D50, D55, D65, D75, F02, F07, F11, TL84, ULT30, ULT35
Observers	2° and 10°
Color Scales	CIE L*a*b*, Hunter Lab, CIE L*C*h, CIE Yxy, CIE XYZ and differences
Color Difference Indices	ΔE^* , ΔC^* , ΔE , ΔE CMC, ΔE 2000
Indices and Metrics	E313 Yellowness, E313 Whiteness, YI D1925, Y Brightness, Z%, 457nm Brightness, Baking Contrast Units, Tint, HCCI, SCAA
Data Storage	>1 million Records; 8GB
Languages	English, Japanese, simplified Chinese
External Software	HunterLab EasyMatch QC, EasyMatch QC-Electronic Records

Standard Accessories

Standard Accessories	Calibrated instrument White Tile, Certificate of Traceability, Black Glass Standard, Green Diagnostic Tile, Standards Box, 30.5 cm (12-in) and 15.2 cm (6 in) sample pans, Power Supply, Quick Start Guide, Aeros User's Guide on CD
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Regulatory Notice

	
<h3><i>Declaration of Conformity</i></h3>	
EU / EMC Directive:	2014/30/EU
Standard to which Conformity is Declared:	IEC 61326-1: 2012 / EN: 2013
Manufacturer:	Hunter Associates Laboratory, Inc. 11491 Sunset Hills Rd, Reston, VA, USA
European Representative: Representative's Address:	Christian Jansen Griesbraeustrasse 11, 82418 Murnau, Germany
Type of Equipment:	Reflectance Spectrophotometer
Model No.:	Aeros
<p><i>I, the undersigned, hereby declare that the equipment specified above conforms to the Directive(s) and Standard(s) above</i></p>	
Place: <u>Reston, VA, USA</u>	Signature <u></u>
Date: <u>December 14, 2017</u>	Full Name <u>Tim Barrett</u>
	Position <u>Systems Engineer</u>

Aeros Sample Accessories

HunterLab Flash Drive (A10-1013-423)

2 GB USB 2.0 flash drive formatted for customer use with customized code for Setup backup and CSV Datalog export.

USB Flexible Keyboard (A13-1014-294)

This 88 character keyboard allows the user to enter IDs directly into the instrument.

USB Barcode Scanner (A13-1018-566)

Barcode Scanner scans product IDs directly into the instrument.

USB Adapter Cable (A21-1014-375)

Standard-A receptacle to Standard B plug, 1 meter long. This allows connection to the USB receptacle on the instrument to other peripherals such as a Personal Computer or the A13-1014-259 USB Printer.

Sample Holder, Offset, 3.5" Dish (D02-1016-773)

Black Anodized Aluminum Sample Dish for use with offset 3.5" petri dish holder to measure spice blends/seasoning mixtures/powder.

Sample Holder 145mm and 90mm Petri Dishes (D04-1018-680)

Sample Holder provides easy and repeatable positioning of 145 mm and 90 mm Petri dishes. Bottom of holder has molded spindle to allow quick positioning of sample holder in center turntable platter.

Sample Handling Package for Chips (L02-1014-741)

This three-piece kit provides the ideal accessories for preparing and presenting for color measurement of any large particulate products, such as: crushed potato, corn and vegetable chips. Includes (1) Black Anodized Aluminum Sample Dish 180 mm OD; 165 mm ID (D04-1013-402) and (1) Collar and Compressor (A13-1013-901).

90mm Plastic Petri Dish, 10-Pack (L02-1016-781)

Sample Trays

Accessory	Size	Part Number
Sample Tray	15.2 cm (6 in) Dia x 2.5 cm (1 in) Depth	D02-1016-971
Sample Tray	20.3 cm (8 in) Dia x 2.5 cm (1 in) Depth	D02-1017-308
Sample Tray	25.4 cm (10 in) Dia x 2.5 cm (1 in) Depth	D02-1017-309
Sample Tray	15.2 cm (6 in) Dia x 5.0 cm (2 in) Depth	D02-1017-310
Sample Tray	20.3 cm (8 in) Dia x 5.0 cm (2 in) Depth	D02-1017-311
Sample Tray	25.4 cm (10 in) Dia x 5.0 cm (2 in) Depth	D02-1017-312
Sample Tray	30.5 cm (12 in) Dia x 2.5 cm (1 in) Depth	D02-1016-490
Sample Tray	30.5 cm (12 in) Dia x 5.0 cm (2 in) Depth	D02-1017-313
Sample Tray (Nested)	30.5 cm (12 in) x 2.5 cm (1 in) & 15.2 cm (6 in) x 2.5 cm (1 in)	D02-1017-314
Sample Tray (Nested)	30.5 cm (12 in) x 5.0 cm (2 in) & 15.2 cm (6 in) x 5.0 cm (2 in)	D02-1017-315

When You Need Assistance

If you need for technical or sales assistance on applications, troubleshooting, , service, warranty, accessory pricing and more, please contact the office nearest you:

For the Americas, Support@hunterlab.com

For Asia, AsiaSupport@hunterlab.com

For Europe, EuropeSupport@hunterlab.com

For India, Middle East and Africa, IMEASupport@hunterlab.com

For all other regions, Support@hunterlab.com

Additionally, our global support website offers 24/7 assistance with a library of information on various color measurement and appearance topics such as applications, instrument operation, and troubleshooting. The HunterLab global support website is located at support.hunterlab.com.

For personalized assistance, go to support.hunterlab.com and locate the [Create A Ticket](#) button on the menu. A subsequent form gathers information on your request for response from our Customer Experience Teams around the globe.

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