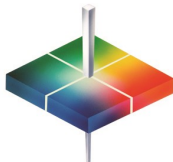# EasyMatch® QC
Basic User's Manual
ver. 4.0

**For EasyMatch QC Software
Version 4.88 and Higher
A60-1012-312**

Contents:

For support, please connect via the support site at support.hunterlab.com

PART I. INSTALL SOFTWARE & SENSOR

A. INSTALL EASYMATCH QC SOFTWARE

1. Log into the system using an Administrator account with privileges for the PC — network or local.

2. Insert the installation CD into the CD-ROM drive.

3. Go to **Windows Start** > **Run** >**EasyMatch_QC_Menu** and **Open**. The following screen will be shown.
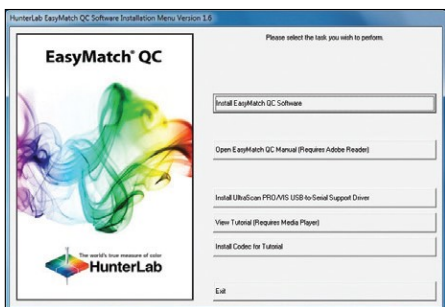

Figure 1. Installation Wizard

4. Select **Install** EasyMatch QC and follow the screen prompts. When prompted, select **SoftKey License** as the type of key to use with the software.
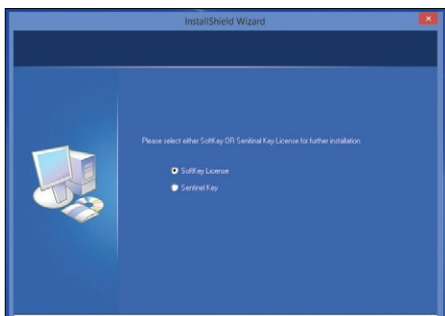

Figure 2. Select SoftKey License

5. When the EasyMatch QC installation is finished, select the button next to ***Yes, I want to restart my computer now*** and then ***Finish*** to restart the computer and log back in.
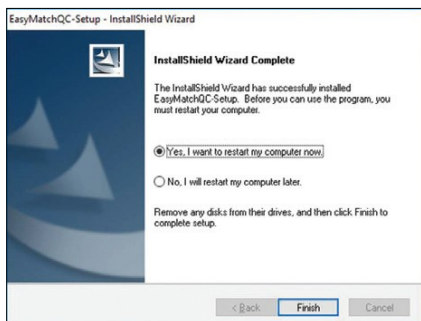
Figure 3. Installation Complete

6. The CD can now be removed.

B. ACTIVATE THE SOFTKEY LICENSE

1. Select the EasyMatch QC Icon or from the Windows Start menu, choose the following to open EasyMatch QC:

Start > Programs > HunterLab > EasyMatch QC

2. A warning message to activate the license will be displayed as shown in Figure 4.

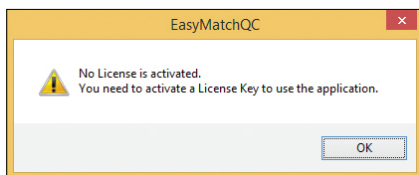*Note: EasyMatch QC functions are unavailable before key activation.*

Figure 4. Warning Message for Key Activation

3. The SoftKey License is uniquely associated with the sensor serial number and is provided on a USB thumb drive supplied with EasyMatch QC or via email from HunterLab.

    a. Go to *Help > License Registration/Activation*.

    b. Select *Activate License*.

Choose an Option

    ⊙ Activate License

       Key ID   [   ]

          or

       key file (.skl) [   ] [Browse]

    ○ Register for 30 day Trial License

      ○ Online

      ○ Offline

      Info:
      To perform registration for a trial license online, an internet connection is required.
      The registration details will be sent to HunterLab directly.
      If internet connection not available, user can perform registration offline. The
      registration details can be saved to a file. User has to send this file to HunterLab by
      email (*hunterlabtecsvc.gmail.com*) from any other system.

                  [Next] [Activate] [Close]

Figure 5. Activate License

    c. **Option #1: Key ID**

        i. Copy the License Activation ID from the email or write down the 32-digit code.

        ii. From the *Choose an Option* page (Figure 5), select *Key ID*.

        iii. Paste-in or type-in the License Key ID and click *Activate*.

        iv. An acknowledgement will be displayed showing the activation status.

         Note: An internet connection is required to perform license activation process with Key ID.

    d. **Option #2: Key File (.skl)**

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

        i. Place the thumb drive with the SoftKey License in the USB port.

        ii. From the *Choose an Option* page (Figure 5), select *Key File* (.skl).

        iii. *Browse* the USB to find the *SoftKey License* (.skl), then click *Activate*.

        iv. An acknowledgement will be displayed showing the activation status.

D. RESTART EASYMATCH QC

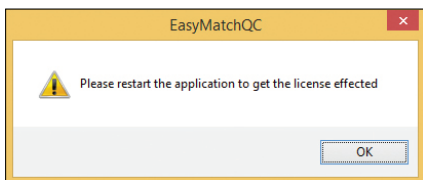1. When the acknowledgement page has been shown, press **OK** to restart EasyMatch QC.

Figure 6. Activate License

E. INSTALL THE HUNTERLAB SENSOR

1. Upon re-start, the following message will be displayed: ***Sensor not yet installed***. Connect the sensor to the computer using the cable provided. The Setup Sensor screen allows selection of the instrument model and the communications port. To continue select **Add Sensor**. Select **OK** when ready.
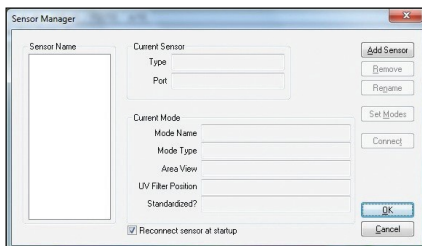

Figure 7. Sensor Manager

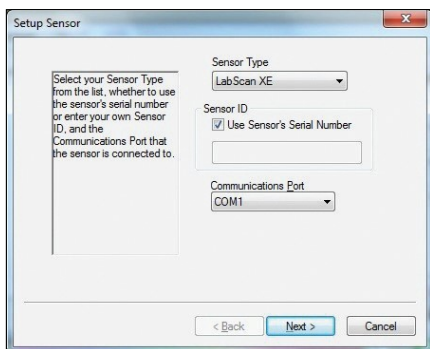2. The next screen sets up the communication port. Select **Next** when ready.

Figure 8. Type & Port Selection

Note: The sensor must match the SoftKey License. If a sensor mismatch error occurs, please connect to the correct sensor or contact HunterLab to obtain a license to match the sensor to connected.

PART I. STANDARDIZE THE INSTRUMENT

To *Standardize* in the current mode selected, press *F4*. The prompts depend on the instrument in use and the standardization mode. To find the current mode, refer to the instrument status bar at the bottom of the measurement screen. The table below provides some guidance. For more information on standardization for haze and opacity, please refer to the User's Manual.

Note: If the instrument has not yet been installed, go to: *Sensor > Install Configure*. From the *Sensor Manager* screen, select *Add Sensor* and select your instrument from the drop down box. Press *Next* to continue to the *Set Mode (F7)* Screen. Make sure that the *Standardize Now* button is checked. Continue to the *Add Sensor* Screen and press *OK*.

Instrument/ Mode	Geometry: Diffuse					Directional	
	RSIN	RSEX	RTRAN	TTRAN	Haze	Reflectance	Opacity
ColorFlex EZ		✔				✔	✔
LabScan XE						✔	✔
MiniScan EZ 4000	✔					✔	✔
MiniScan EZ 4500		✔				✔	✔
UltraScan PRO	✔	✔	✔	✔	✔	✔	✔
UltraScan VIS	✔	✔	✔	✔	✔	✔	✔
Vista			✔	✔	✔		
D25NC		✔				✔	

Instrument Geometry: As referenced in CIE Publication 15.2:2004, the geometry of an instrument defines the relative position of light source, sample plane and detector. There are two broad categories of instrument geometries - directional and diffuse.

Instrument Mode: For an instrument of a defined geometry, a mode is a configuration of the optical path of the sensor that defines all optical elements such as sample measurement position at the reflectance port in RSIN specular-included or RSEX specular-excluded or at the TTRAN or RTRAN transmission ports. The size of the measured area and UV filter position can also be included as part of the mode.

A. REFLECTANCE MEASUREMENTS

Materials Needed for Reflectance: Light Trap or Black Glass and White Tile

1. **Read the Bottom-of-Scale: Reflectance**: For Reflectance measurements a Light Trap (d/8° instrument) or Black Glass (directional type instrument) is used at the port. Select *Next* when you are ready to read and continue to follow the prompts.
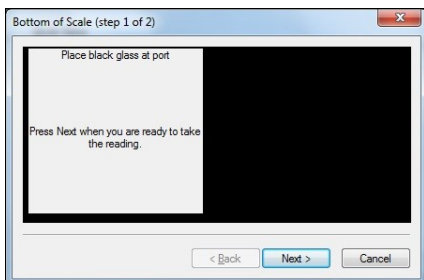

Figure 9. Reflectance Bottom-of –Scale

2. **Read the Top-of-Scale: Reflectance**. For Top-of-Scale, a White Tile is used at the port. Select *Next* when you are ready to read the White Tile standard**.**
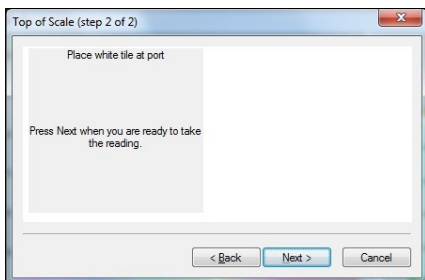

Figure 10. Reflectance Top-of-Scale

When you have read the Bottom and Top-of-Scale, then you have successfully standardized. Select *Finish* when ready.

B. TRANSMITTANCE MEASUREMENTS

Materials Needed for Transmittance: Black Card and White Tile

1. **Read the Bottom-of-Scale:** For Bottom-of-Scale, follow the instructions on the screen. Select *Next* when you are ready to read**.**
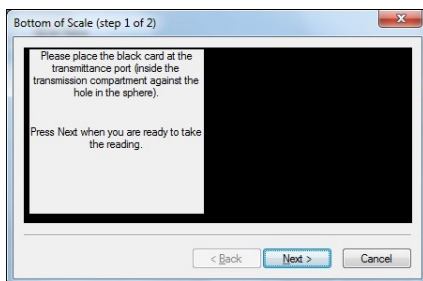

Figure 11. Transmittance Bottom-of-Scale

2**. Read the Top-of-Scale:** For Top-of-Scale, a White Tile is used at the port (except for Vista). For measurement of liquids in Total Transmittance, the blank sample cell is placed in the transmittance chamber for the Top-of-Scale reading.
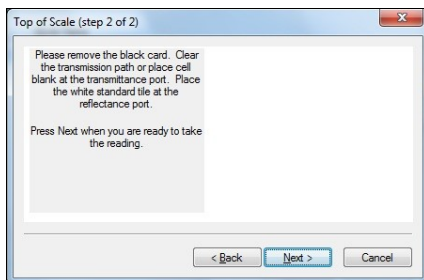

Figure 12. Transmittance Top-of-Scale

Select *Next* when you are ready to read the standard. Continue to follow the prompts. When you have read the Bottom and Top-of-scale, then you have successfully standardized. Select *Finish* when standardization is complete.

PART II. GETTING STARTED WITH EASYMATCH QC

A. SETTING UP A JOB TEMPLATE

A Job is a collection of all the data views (displays) and measurements (standards and samples) that you use for a particular task, product, or customer. Jobs (with a .JSD file extension) show relationships within the data—a comparison between a lot made today and a standard or a comparison of lot colors over several years and more.

1. When you first install the software, a basic color template will be displayed as the default Job Template (see below). To change this template, right select on the area (Color Data Table, Spectral Plot, 2D Color Plot) to change.
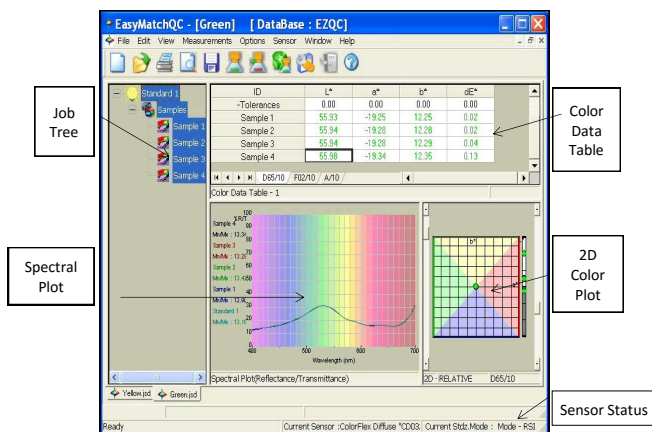

Figure 13. Shows Job Tree on left side, Color Data Table at top right, Spectral Plot in center and 2D color difference plot on lower right.

2. To Save your changes or create a new job template under a new name, go to:

File > Save Job Template As>

3. Once the Job Template has been configured and saved, then the Applications Preferences command applies the job template globally. Go to:

Options> Application Preferences> Startup defaults

Select the box to choose the Default Job Template and then select the saved name of the Default (*.jtp) name.

B. DATA VIEWS

The types of data views that are available are described below:

1. **Job Tree** shows the list of sample and standard measurements.

2. The **Color Data Table** shows color scale, color difference, and index data for the standards and samples in the job. The items in the Color Data Table may be sorted by selecting the column header (for row major) or row header (for column major) of interest.
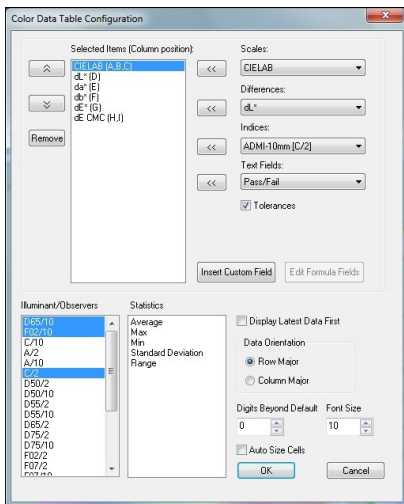

Figure 14. Color Data Table Configuration

3. The **2D Color Plot** displays a two-dimensional representation of color space with the standard as the center point of the plot and the samples plotted on the graph. In the example (Figure 13), the *a** of the L*a*b* scale is plotted on the x-axis and the *b** of L*a*b* is plotted on the y-axis. Just to the right of this square portion of the plot is a thermometer graph that plots *L*.* The samples in the job are shown on the plot relative to the standard and each other. Tolerance limits will be shown as a red box around the standard position. Rolling the mouse over a point will display the sample ID, its pass/fail status, and its color values.

4. The **3D Color Plot** displays a three-dimensional representation of color space with the standard as the center point of the plot and the samples plotted on the graph. In Figure 15, L* a* and b* are shown on the axes as labeled. The samples in the job are plotted relative to the standard and each other. The tolerance limits are shown as a magenta box (around the standard position). Rolling the mouse over a particular point will display the Sample, Pass/Fail status, and its color values.
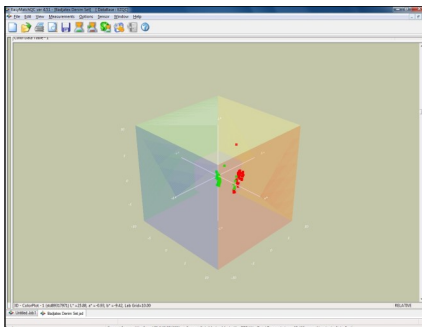

Figure 15. 3D Color Difference Plot

5. The **Color Render** view (Figure 16) shows a color rendering of measurements highlighted in the Job Tree view. This makes it easy to visually compare standards and samples even when the physical standards and samples are no longer available. By placing the mouse cursor over an area of the Color Render view, you may display a flag indicating the name of the item displayed and the illuminant/observer combination shown.
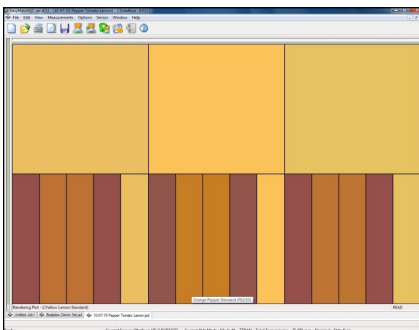

Figure 16. Color Render Plot.

6. The **EZ View** is a simple display of a limited amount of color data: up to four fields of color scale, difference, and/or index data, as well as Pass/Fail status if tolerances have been defined for the standard.

7. The **Memo View** is a blank view in which text, such as the measurement method, may be entered using the keyboard and then stored in the job.

8. The **Spectral Data Table** displays percent reflectance, percent transmittance, K/S, or absorbance values for each selected measurement at the wavelengths being measured. When reflectance, transmittance, or absorbance is being displayed, the cell representing the wavelength of minimum reflectance or transmittance (maximum absorbance) for each measurement is shaded pink.

9. The **Spectral Plot** shows a plot of wavelength versus reflectance, transmittance, K/S, or absorbance for the entire scanning range of the spectrophotometer. The minimum and maximum values and their corresponding wavelengths are shown to the left of the plot.

10. The **Trend Plot** displays the trend of the data for each sample relative to the current standard.
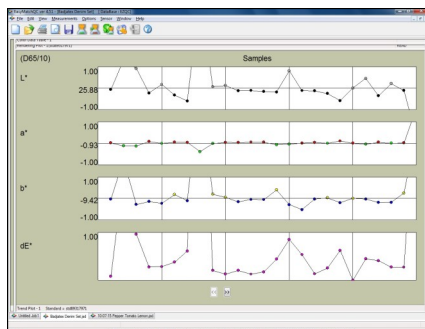

Figure 17. Color Trend Plot

C. MEASURE YOUR SAMPLES

1. **Read Product Standard (F2)**. The *Read Standard* command in the *Measurements Menu* initiates reading of a standard. Note: If the prompt for standard name was checked in *Naming Conventions* in the *Options* menu, then you will be prompted to enter a name for the standard. Place the standard in view of the sensor before initiating the *Read Standard* command. The keyboard shortcut for this command is *F2*.
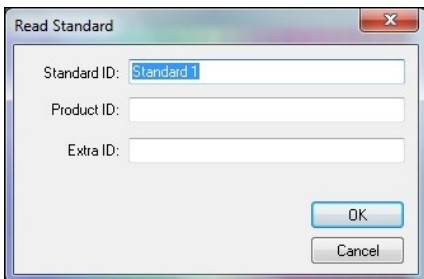

Figure 18. Read Standard

2. **Read Sample (F3)**. The *Read Sample* command in the *Measurements* menu initiates reading of a sample. The same *Naming Conventions* noted for Standards applies to Samples too. Place the sample in view of the sensor before initiating the *Read Sample* command. The keyboard shortcut for this command is *F3*. The instrument *Read* button will also initiate this action.

3. **Set Tolerances for Differences**. The *Default Tolerances* command in the *Options* menu allows for assignment of default tolerances in the current job. These tolerances may be set for as many scales, indices, and differences and for as many illuminant/observer combinations as needed.

   Autotolerancing can be selected after a standard is identified. Right click on the standard in the Job Tree and choose *Properties* from the menu. Autotolerancing will be added to the menu.

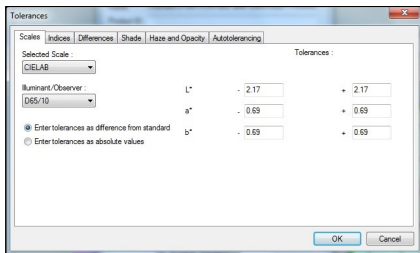*Figure 19. Input Tolerances*

4. **Data Output > Print This View**. The easiest way to print out results is to put the cursor in the area of interest and use the *RIGHT* Mouse button to select *Print This View*. To design a custom report using the *File/Print Job* feature, refer to the User's Manual for instructions on how to design a custom data output. Other data output options include:

   i. Copy and paste from the Color Data View to Excel.

   ii. ASCII Export to a File from Options, i.e.

   Options > ASCII Export > Configure

   iii. Data Send to COM Port or URL from Options, i.e.

   Options > Data Send > Configure

PART III. SENSOR DIAGNOSTICS

The Diagnostics command in the Sensor menu opens to a submenu allowing access to the various diagnostic tests available to verify performance of the instrument during installation and over time. Those tests are described below.

Note: Make sure that the standard port plate is currently installed.
This will be the port insert with the largest opening that is not covered by glass.

Instrument	Repeatability Tolerances		Green Tile Test
	dE*	dL* da* db*	dX dY dZ
ColorFlex® EZ 45°/0°	≤ 0.05		≤ 0.3
LabScan® XE	≤ 0.09		≤ 0.15
MiniScan® EZ 4000	≤ 0.05		≤ 0.3
MiniScan EZ 4500	≤ 0.05		≤ 0.3
UltraScan® PRO	≤ 0.03		≤ 0.15
UltraScan VIS	≤ 0.03		≤ 0.15
Vista®[1]	≤ 0.025		n/a
D25NC	<0.05	<0.03	

Note 1. Repeatability on the Vista is measured on air in TTRAN. The White Tile is automatically measured in place to complete the sphere. Diagnostics for Vista is not included in the EasyMatch software but repeatability and wavelength accuracy can be run manually or through Vista

A. WHITE TILE FOR SHORT TERM REPEATABILITY

1. Follow the on-screen prompts to perform a normal standardization in reflectance/ RSIN mode. The White Tile is read as a standard and then twenty times as a sample. The color values for each reading are displayed on the Repeatability Test screen as they are made. The *Pass/Fail* result for each reading is also shown.

2. Once all of the readings have been made, instructions concerning a failed repeatability test will be displayed as needed.

3. *File/Exit* to close the report and finish the test. A PDF of the test results will appear on the screen that can be printed. A copy is digitally stored in:
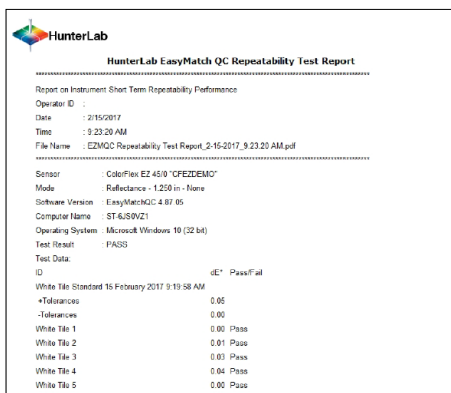
C:\HunterLab\EasyMatchQC\reports.

Figure 20. Repeatability Report

B. GREEN TILE TEST FOR LONG TERM REPEATABILITY

Note: This test is available for all instruments except Vista.

1. When *Green Tile Test* is selected from the Diagnostics submenu, a special job is opened in EasyMatch QC.

2. Enter the values from the back of the Green Diagnostic Tile. Once all three numbers have been entered, select *OK*. Follow the on-screen prompts to perform a normal standardization in reflectance/RSIN mode.
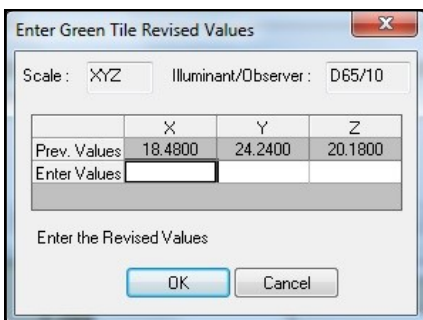
Figure 21. Enter Green Tile Values

3. Center the Green Tile over the sample port/reflectance port with the colored side facing the instrument. Select *OK*. The Green Tile is read and the measurement with Pass/Fail status added to the Green Tile check job. If this test should Fail, a different message will appear suggesting actions to take.

4. A PDF digital report will be displayed to document the results.

Figure 22. Green Tile Results

Figure 23. Green Tile Test Report

C. DIDYMIUM FILTER TEST FOR WAVELENGTH ACCURACY

Note: Available for UltraScan PRO and UltraScan VIS only.

1. When the ***Didymium Filter Test*** is selected from the Diagnostics submenu, a special job is opened in EasyMatch QC.

2. Follow the on-screen prompts to perform a normal standardization in RTRAN mode.

3. Inside the transmission compartment, insert the Didymium filter, at the lens. Shut the transmission compartment door and select ***OK*** to continue. The Didymium Filter Test screen is displayed.
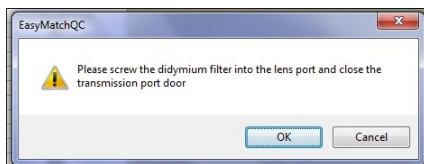

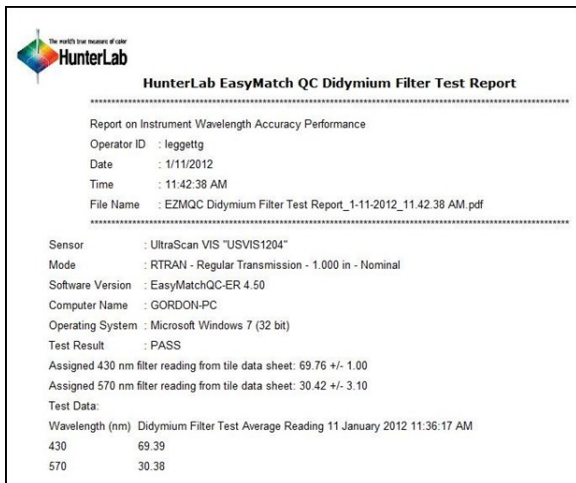*Figure 24. Insert the Didymium Filter*

4. ***Enter the 430 nm and 570 nm transmission values from the Didymium Filter area of the tile data sheet***. For an UltraScan PRO, also enter the 820 nm reading. Twenty readings of the Didymium filter are made and then averaged.

Figure 25. Didymium Filter Test

5. A ***Pass/Fail*** assessment is provided for the averaged reading along with instructions concerning what to do if the instrument fails the test. ***Pass/Fail*** tolerances for each instrument are listed in the next table.

| Instrument | Didymium Filter Test | | |
	PASS Value for 430nm	PASS Value for 570nm	PASS Value for 820nm
UltraScan VIS	± 1.00 %T	± 3.10 %T	n/a
UltraScan PRO	± 1.20 %T	± 4.50 %T	± 2.0 %T

6. Remove the Didymium filter from the lens port and select ***OK***. A PDF report is automatically generated as shown.

Figure 26. Didymium Filter Test Report

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