

OnColor Profiler

Quick Start Guide V1.x





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OnColor Profiler – Quick Start Instructions

I. Overview

OnColor Profiler Improves Numerical Correlation between Multiple Spectrophotometers to Improve Color Communication

OnColor Profiler uses unique algorithms, combined with a specially designed set of 32 durable and long-term stable ceramic tiles, to develop a spectrophotometer profile on the master and target instruments. A powerful set of equations is then calculated by Profiler to match all readings on the target instrument(s) to the master spectrophotometer. The resulting correlation between instruments facilitates the sharing of stored electronic standards with confidence and reduces the chaos, confusion and rejected batches that results when instruments, even those of the same brand, present different numerical color measurements. A Certificate of Performance can be printed to document the results for ISO and other quality management systems.

II. FAQ's

What is OnColor Profiler? It's a computer software program that is used to improve the inter-instrument agreement between two or more color instruments (spectrophotometers), thereby improving color data correlation. This improved correlation is necessary when using stored electronic color standards and sharing colorant files.

Don't they already read the same? Two instruments of the same model and the same manufacturer might start out to read the same. Two instruments of a different model or from a different manufacturer will most likely read color differently. With use and over time, instrument readings drift making the results vary even more. The OnColor Profiler software correlates all these instruments to match one designated Master instrument.

Why do I care? In this electronic age, companies and their customers increasingly want to share data and use numerical color standards. Rather than passing around different panels or swatches of color that change with use and handling, it is desirable to peg a color standard to numbers and for everyone to match those numbers. Also common is to share computer color-matching databases. Global commerce has also escalated the need for this. With lots of manufacturing being done in China and other off-shore locations, sending color standards and color submits back and forth is too time-consuming. And when the product hits the shelves in the final consumer market, the color better be right! Even within a single company at a single location, having all color data be

interchangeable among departments is a desirable goal. Increasingly, color standards are stored in a database that is network-accessible by all locations and departments. Without the color instruments reading the same, confusion and chaos ensue when different users report different numbers.

How is it done? An instrument is “profiled” using CyberChrome’s proprietary algorithms and a specially designed set of 32 ceramic tiles. These tiles are very durable and stable over a long period of time—meaning the color doesn’t change and they aren’t easily damaged. The tiles are measured under controlled conditions on the master (or reference) instrument and then the target instrument. A set of equations is calculated by the Profiler and is then used in the OnColor QC or Match program to correct all readings from the target instrument to match the master instrument.

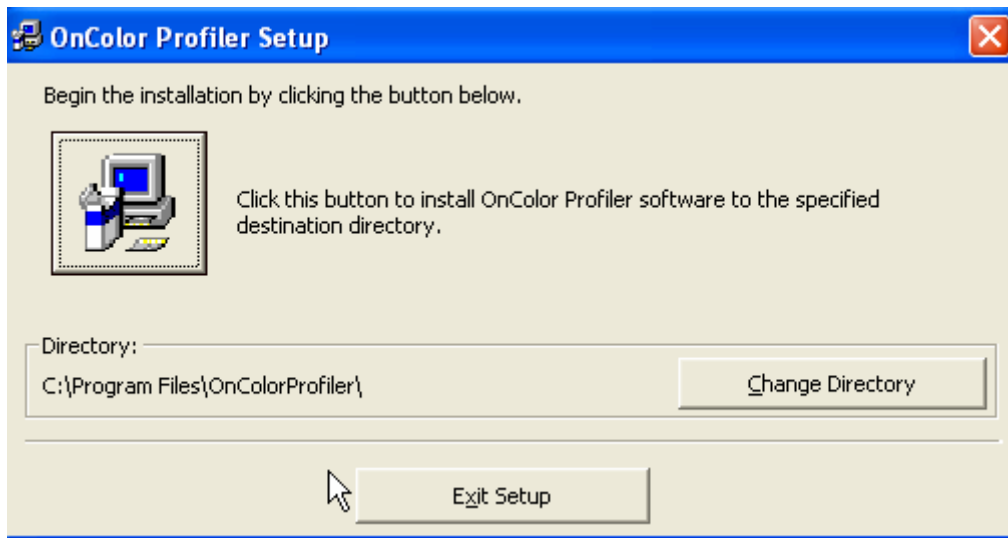
How long does it last? We recommend profiling an instrument at least once a year with routine checks of a green tile daily. The Instrument Performance module of Profiler should be used monthly or quarterly to monitor the performance of the instrument vs. the master. If the instrument is out of specification, then it can be re-profiled to take into account drift, aging, dirt, and yellowing of the sphere. If a re-profiled instrument does not pass the pre-set specification, then it must be returned to the factory for service and repair.

How is CyberChrome’s product different from the competitors? Many color computers purposely do not have access to the internet. With OnColor Profiler, you don’t need an internet connection on the color computer. The customer purchases the Profiling software from CyberChrome to go with their OnColor software. The user is free to profile as many instruments as often as needed. There is no yearly charge or subscription for each instrument to pay. OnColor Profiler also generates an instrument certification report of agreement to the master data which can be used on as an on-going basis to verify and document instrument performance.

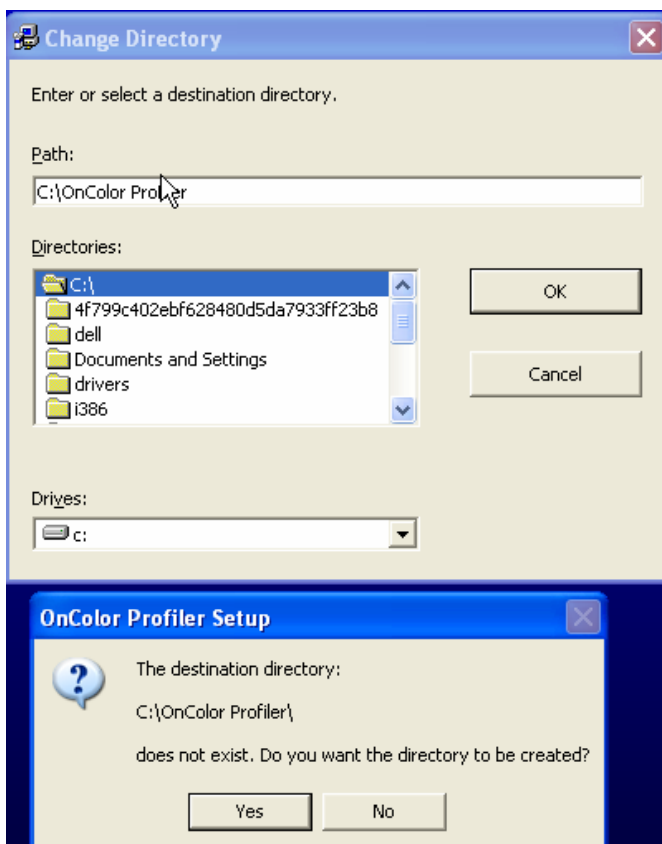
III. Installation Instructions

1. Do NOT plug in the Profiler Hardlock USB key until later.
2. Place the OnColor Profiler CD into the CD drive. If the installation doesn’t auto run, then use Windows Explorer to Browse to the CD drive and then double-click on the file “SETUP.EXE”.
3. Follow the prompts to begin the process. When you get to this window below:





For Windows XP, use the default directory of **C:\Program Files\OnColor Profiler**. For Vista or Windows 7, click the “Change Directory” button and then at the Path: prompt type: **C:\OnColor Profiler**. You will see the dialog boxes as shown below. Click YES to create a new folder and then install the software there.



4. Follow the rest of the prompts to complete the installation of the software.
5. Create a shortcut icon on your desktop for Profiler by right-clicking on a blank area on your desktop. Select NEW --> Shortcut. Then click on the Browse button and browse to the folder that you used during the installation. For XP it should be **C:\Program Files\OnColor Profiler**. For Vista and Win 7 it should be **C:\OnColor Profiler**. In the appropriate folder, then click on OnColorProfiler.exe as the target of the icon and then click OK. Click NEXT and then in the next window type OnColor Profiler as the name for this shortcut. Then click FINISH.
6. Next you need to install the Hardlock drivers for the USB key for Profiler. If you have already installed OnColor on this computer then you can skip this step. If not, then Browse the CD using Windows Explorer and find the file named "HLDRV32.EXE". Double click on it to begin the installation process. Follow the screen prompts to install the Hardlock Driver.
7. Now plug in the USB hardlock for OnColor Profiler. The PC should automatically find it and a red light should light up on the key saying it is active. You can now double-click on the OnColor Profiler shortcut on your desktop to run the software.

IV. Overview of Profiling Procedure

1	Measure the tile set in OnColor on the Master instrument. Save the data as a save-set WSV file. This format must be used. Measure the same tiles on the Target instrument and save to A WSV file. <i>See Section VI for detailed instructions.</i>
2	Go to the Profiler program and run the Profiler Wizard using these two files. The output is a CCF file which contains the profiled correction coefficients for both SCI and SCE status. <i>See section VIII for detailed instructions.</i>
3	On the computer with the Target instrument attached, go to OnColor. Enable the profiling option found under Options→Profile Settings. Now you are ready to take profiled readings on the Target instrument. <i>See Section IX for detailed instructions.</i>
4	To profile more instruments to this Master instrument, use the same Master tile data set, but measure the tiles and save a different file for each Target instrument.

IV. Ambient Conditions for Profiling

Controlling the ambient room conditions used when profiling and making measurements is extremely important in obtaining the optimum results. The temperature of the room should be 21 +/- 1° C and 65 +/- 2% relative humidity. The Profiler ceramic tile set should be allowed to equilibrate for at least one hour at these conditions before making measurements on the tiles.

V. Generating the Data Set for the Tiles in OnColor

OnColor QC or OnColor Match software is used to measure the ceramic tile set and generate the save-set used in Profiler. Using the option under Trial→Measure from File is helpful for consistently naming the tiles and avoiding repetitive input of tile names. Before beginning, be sure to condition the tiles to ambient room conditions as recommended above and clean any that have dirt, dust, or fingerprints on them according to the recommended procedure. Also be sure that the white calibration tile for the instrument is clean. Then, calibrate the instrument for the instrument settings that you want to profile (for example, SCI + SCE). If the instrument is capable of doing SCI + SCE simultaneously, then be sure to calibrate for that condition. Select aperture sizes for both instruments that match closest to the normal usage level. Use the following procedure to measure the tiles **for both the Master instrument and the Target instrument**. You will need one save-set WSV file for each instrument.

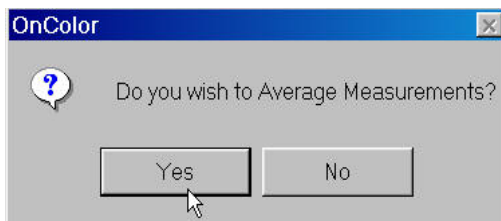
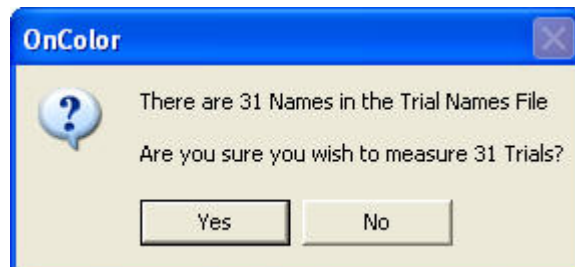
1. In OnColor, Open a New document by clicking on or File→New and then select an OnColor WSV file.
2. Go to File→Page Setup to check the company name. This will automatically be read later in the Profiler software. If you need to change it, do so now. The default for the Company Name is saved in the PRP file, but each WSV file can have a different company name.
3. Click on Standard → Measure or Standard →Average and take the prescribed number of

The screenshot shows the 'Naming -- Std1' dialog box. It has four tabs: 'Std', 'Options', 'Std Defaults', and 'Trial Defaults'. The 'Std' tab is selected. The dialog contains the following fields and values:

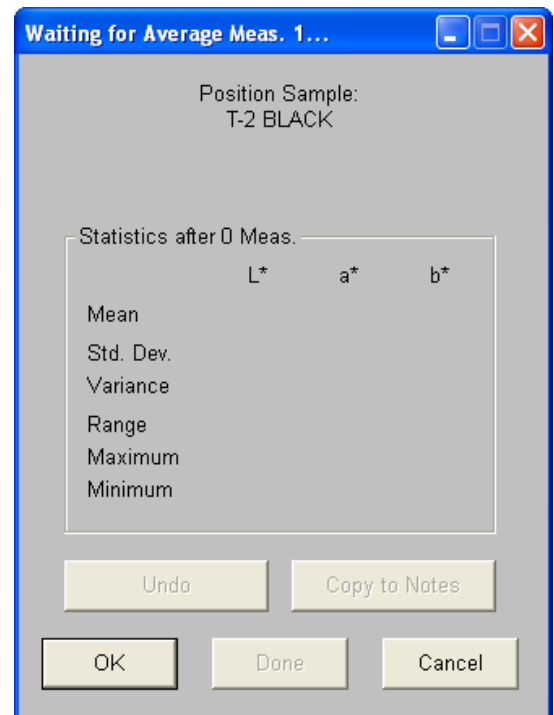
- Name: T-1 ULTRA WHITE (40 characters max)
- Alternate Name: John Smith (40 characters max)
- System: H123456 (20 characters max)
- Notes: MBR Profile Set #123 (80 characters max)
- Date/Time: 2/3/2012 -- 2:14:14 PM

At the bottom of the dialog are four buttons: 'OK', 'Cancel', 'Apply', and 'Help'.

- readings on the first tile which is T-1 ULTRA WHITE.
4. After entering the name for the Standard which is the first tile in the tile set, you can also enter the default information for:
The Operator – This goes in the Alternate Name: field
The Instrument Serial Number – This goes in the System: field
The Color Tile Set Number – This goes in the Notes: field
 You will have the option to change this data when you Profile the Instrument.
 5. To measure the remaining 31 tiles in the Profiler ceramic tile set, click on Trial→ Measure from File.
 6. In the File Containing Trial Names dialog box, browse to the folder that contains the file called “PROFILER TILE NAMES.TXT” or other file that contains the names of the remaining 31 tiles. Open this file. This should be in the same folder as your Profiler executable.
 7. The following dialog box is shown:
 8. Click on Yes.
 9. If you wish to average measurements, click on Yes (recommended if you are using an 8mm or smaller aperture) in the following dialog box:



10. The name for the next tile is automatically read from the file. Click OK to begin the measurement sequence. If you are averaging measurements, the dialog box shown below will appear. Click OK to read the tile. Then re-position the tile and click on OK to read the next spot. Repeat this procedure until you have read 4 spots on the tile. Click on Done when you are finished and the average of the 4 readings will be displayed. If you did not select averaging, then clicking OK will initiate the single measurement and you will proceed to step 11.
11. The name for the next tile in the series is read from the file. Position the next tile at



- the measuring port and click on OK to begin measurement procedure.
12. Repeat steps 10 & 11 until all tiles have been read.
 13. Finally, save this file by clicking on File→Save As or this icon on the toolbar. Select a folder to save the data and then name the file according to the instrument model and serial number.
 14. If you have single status instrument (one that measures only SCI or SCE at a time and not simultaneously), then you will need to repeat this procedure to generate a data-set for each condition.

VI. OnColor Profiler Wizard

You will need at least two save-set files (WSV) containing the measurements on the 32 Profiler tiles according to the above procedure before running Profiler—one file for the Master instrument and one for the Target instrument. The output file of Profiler is called a correlated coefficients file (*.CCF). The coefficients file saves the correlation data for both SCI and SCE in the same file. Therefore depending on the instruments that you are profiling, you may need anywhere between 2 to 4 save-sets of data. See the table below:

Master Type	Target Type	# of WSV files	# of CCF files
multi-status	multi-status	2 WSV's	1 CCF
multi-status	1-status	3 WSV's	1 CCF
1-status	multi-status	3 WSV's	1 CCF
1-status	1-status	4 WSV's	1 CCF

Examples of a multi-status instrument are the Konica Minolta CM-3600d, CM-2600d, CM-2500d, X-Rite XTH, Color Eye i7 and i5. Single status instruments include the Datacolor SF 600, SF 300, SF 350, Color Eye 7000 and 7000A, Color Eye 3000, Hunter LabScan, Mini Scan, Color Quest, and UltraScan. If the instrument reads both SCI and SCE conditions at the same time, then it is a multi-status instrument and OnColor will save the tile data for both conditions in one file. If the instrument reads only one condition at a time, then it is a single-status instrument and OnColor saves only one condition in a file.

Once you have the requisite number of files, launch the OnColor Profiler program by double-clicking on this icon on your desktop:

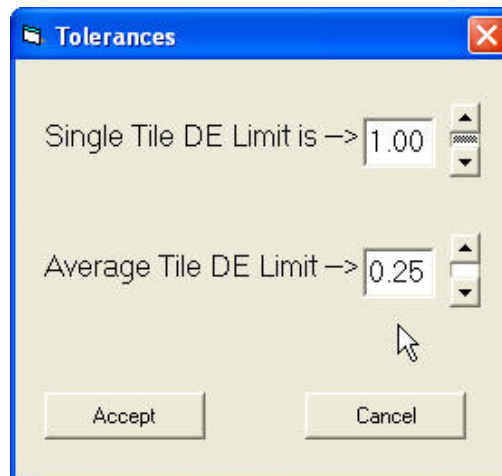


OnColor Profiler provides three Wizards to guide you through the process of:

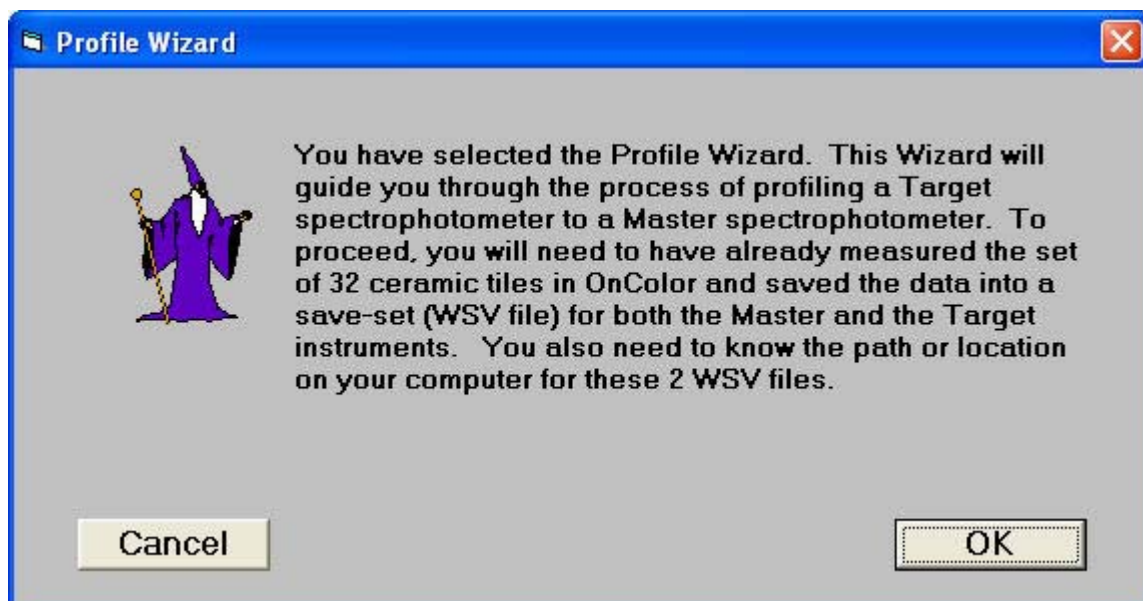
- Profiling an instrument
- Checking the performance of an instrument (Section XIII)
- Converting legacy data (Section IX)

To profile an instrument follow the steps below. The operations of the other two wizards are detailed later in this manual.

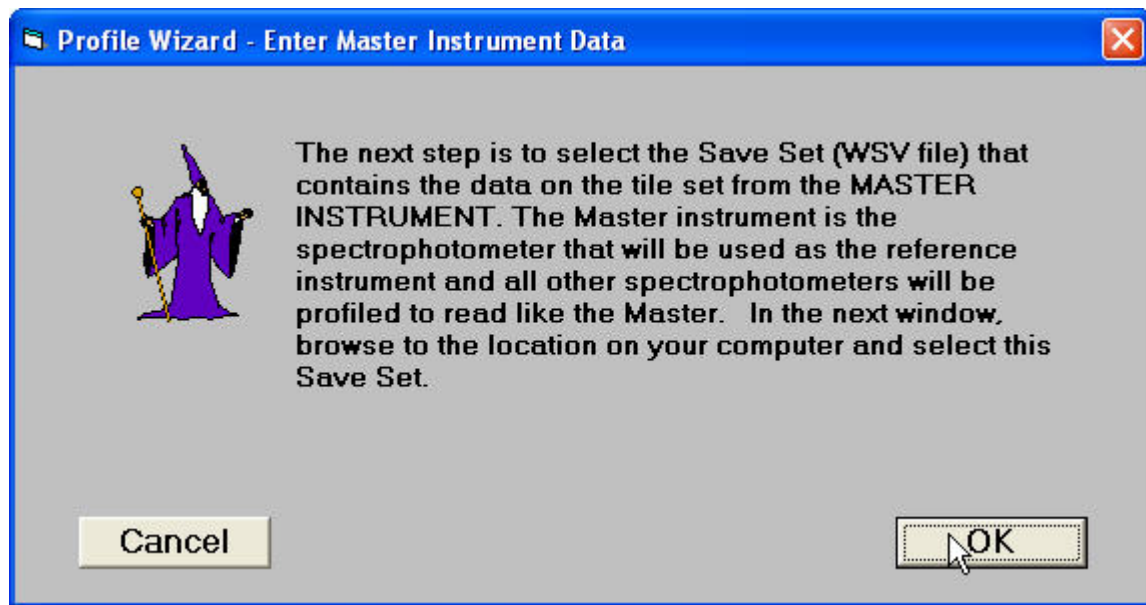
1. Open the Profiler software. To enter tolerances for each individual tile and the average of all tiles, click on Tolerances. This dialog box allows you to adjust the tolerances according to your specifications. Typical tolerances would range from 0.5 to 1.0 for each individual tile and 0.20 to 0.40 for the average of all tiles.



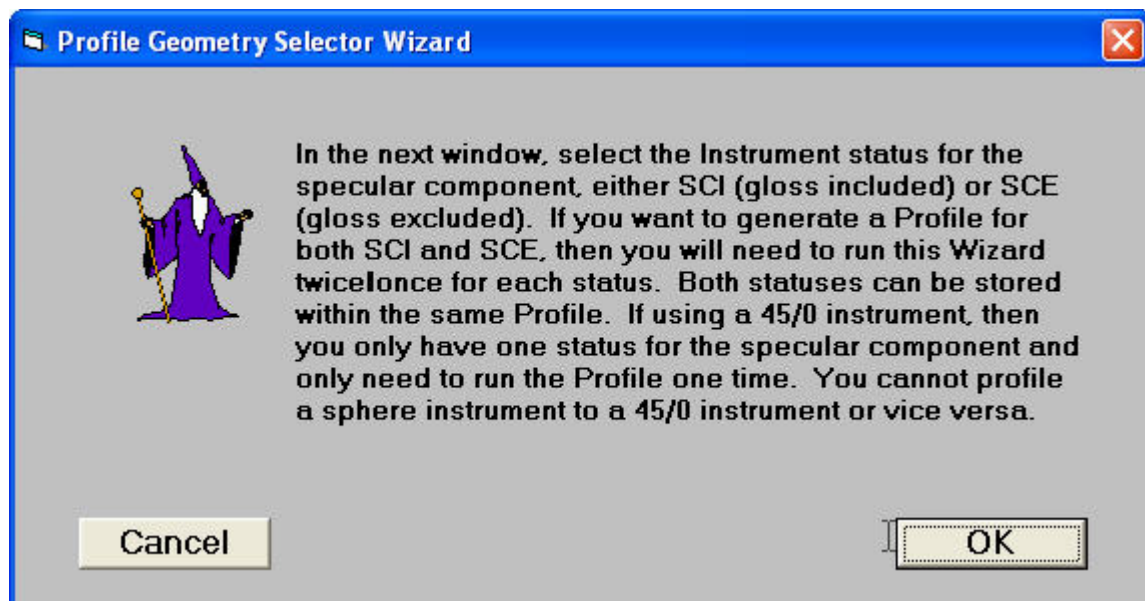
2. To run the profiling wizard, click on Wizards → Profile. The following dialog box explains the procedure:



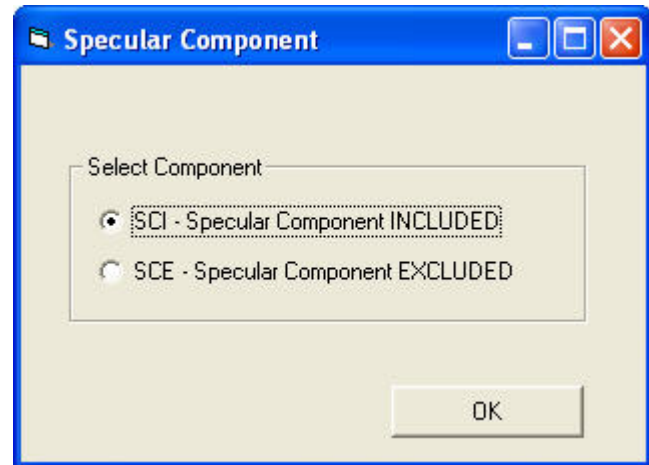
3. Click OK to continue. The following dialog is displayed where you select the WSV file for the Master instrument.



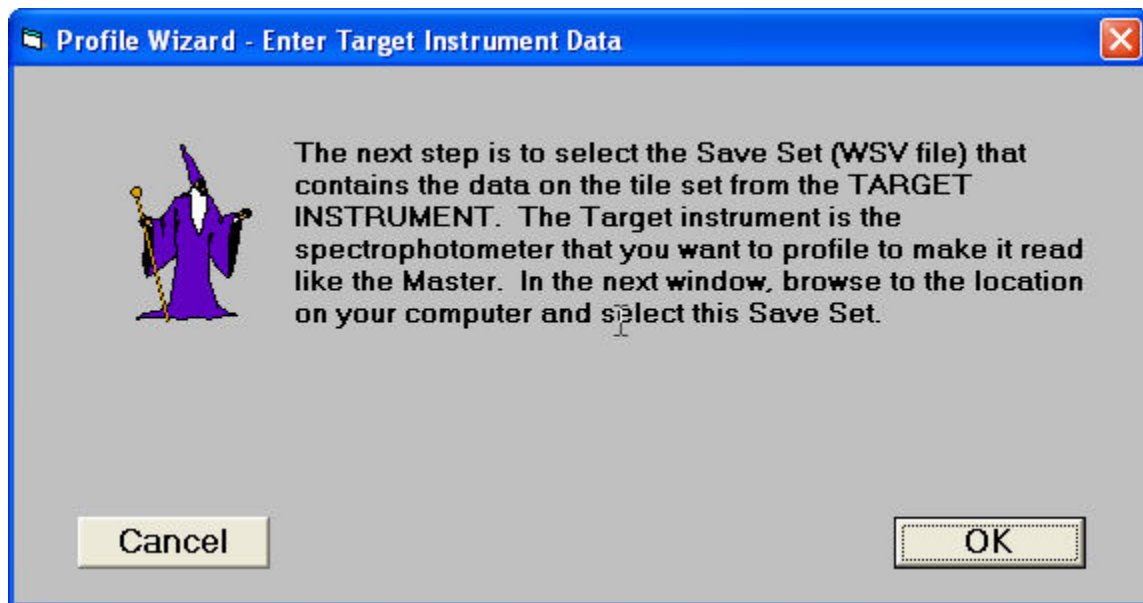
4. Browse to the location on your computer to select the WSV file of the readings on the 32 tiles for the Master instrument. Highlight the name of this file and click "Open".
5. If you selected a multi-status instrument (one that does both SCI & SCE), the following dialog will appear. If you selected a single status instrument, then the gloss is fixed and you will go to step 7.



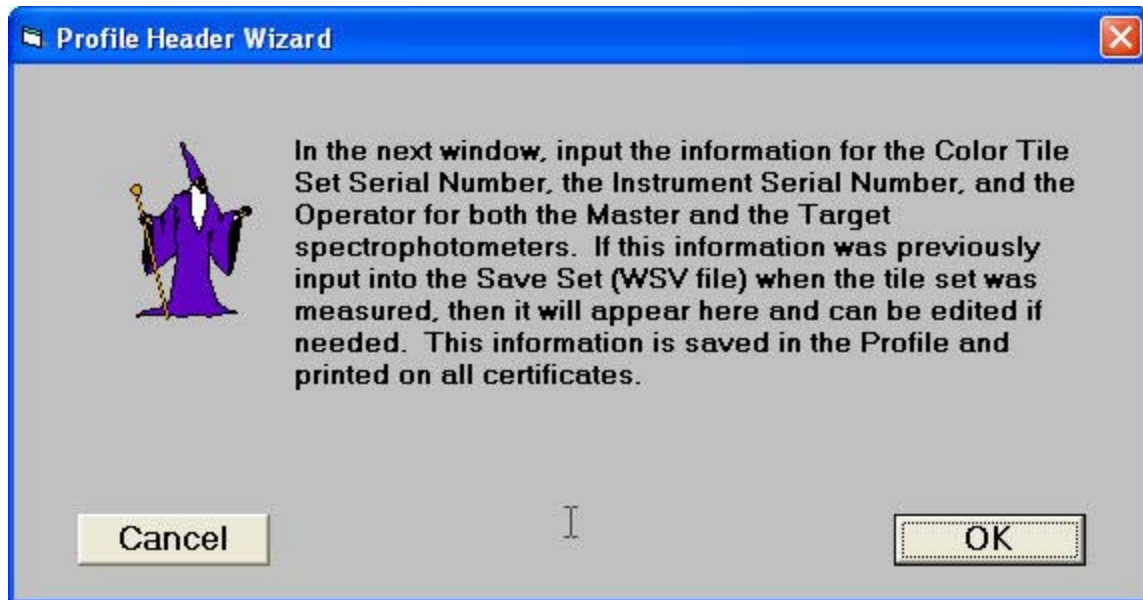
6. After clicking OK, select the gloss setting (specular component) on your instrument, either SCI or SCE and click OK :



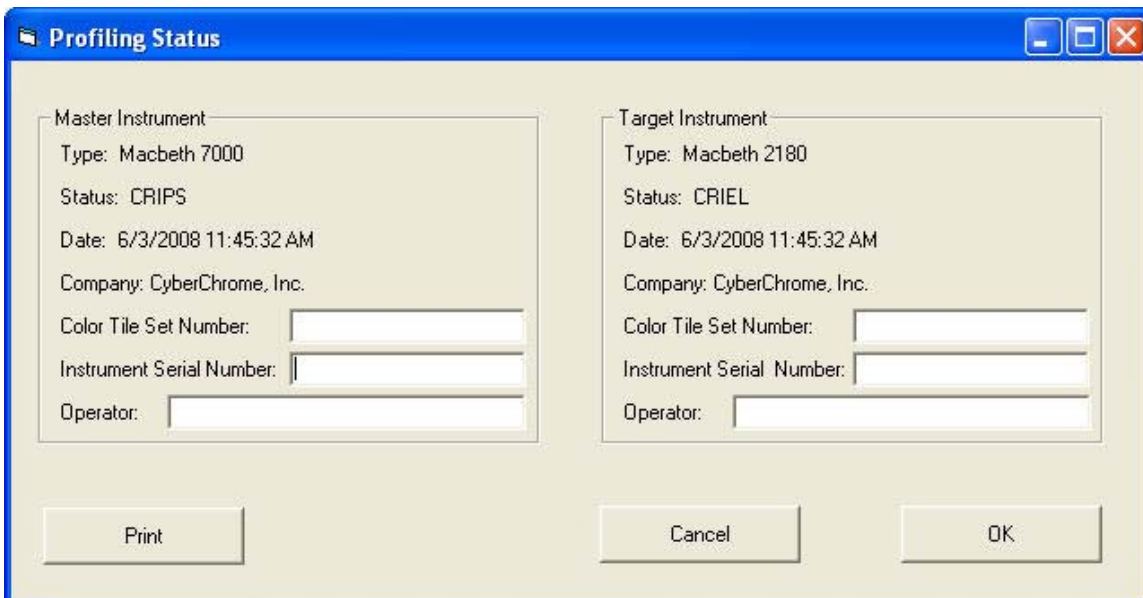
7. The following dialog is displayed.



8. Browse to the location on your computer to select the WSV file of the readings on the 32 tiles for the Target instrument. Highlight the name of this file and click "Open".
9. After opening the file, the following window is displayed:



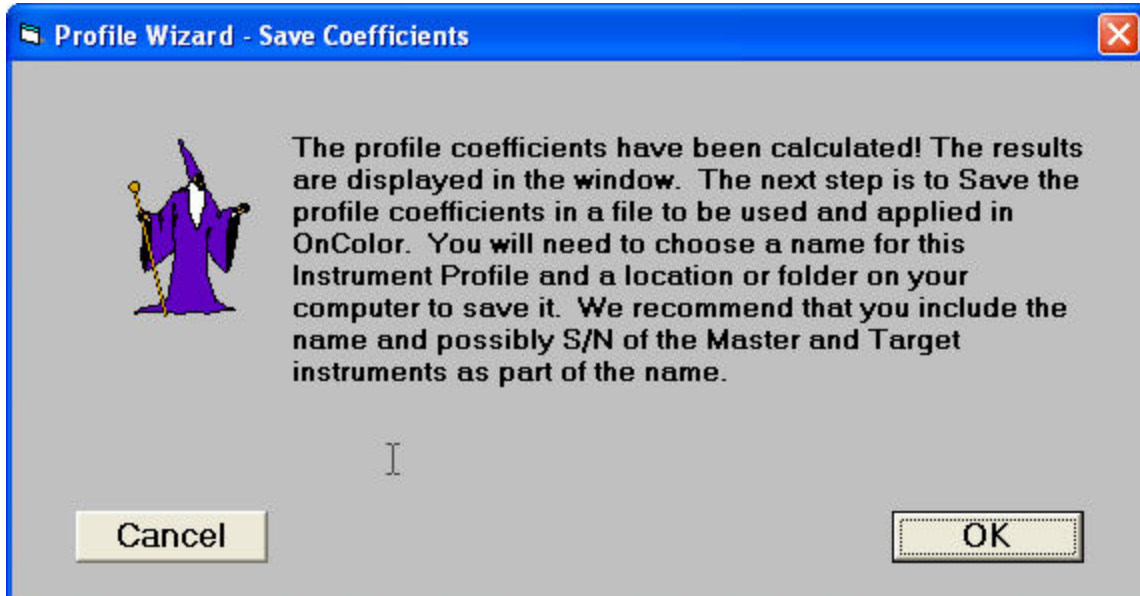
10. On the next window, enter the information for the serial number of the color tile set, the instrument serial number and operator. The company name is taken from the name stored in OnColor when the tiles were read. To change this, go back to OnColor and open the save-set WSV file for the Master and Target instruments. Go to File→Page Setup and change the company name there. Then re-save the WSV files. The instrument type and status are automatically recorded in OnColor and cannot be changed. After entering the data, click OK to continue.



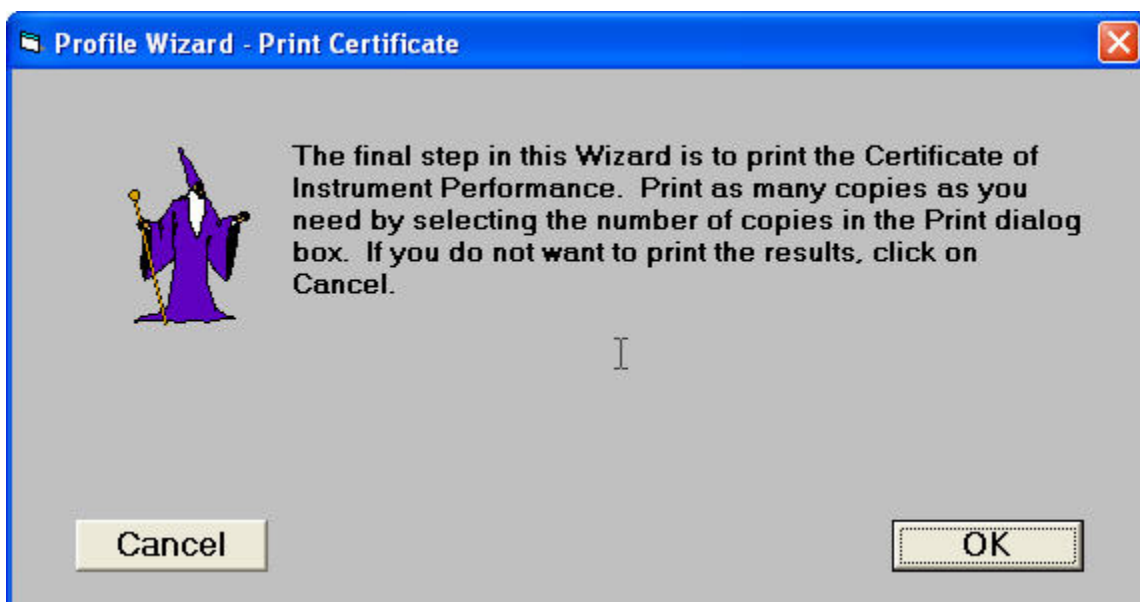
11. The raw data is displayed for each tile with a progress bar at the top while the profiled correction coefficients are being calculated. The result is a CCF file which contains the equations on how to correct the target

instrument to match the master. This CCF file is then used in OnColor to correct all subsequent readings.

12. After reviewing the data, save the resulting CCF file on your computer. We suggest that the name of this file should include the name and serial number of both the Master and Target instruments. Choose a nomenclature that is unambiguous, so that you know which instruments are profiled in this CCF file. This CCF file contains the profile coefficients for both SCI and SCE statuses. You will need to repeat this procedure for the second status, regardless of whether this is a multi-status instrument or not.



13. The final step in the process is to print out the certificate and optionally save it as a text file:



14. The results are displayed in the format shown below. The raw data comparing the individual tile readings is shown aside of the profiled or corrected readings. The average DE for all 32 tiles is displayed before and after profiling. Any readings that are highlighted in red have failed the tolerances entered in step 1 above in this section.

	Raw Data				Corrected Data			
Sample Name	DL*	Da*	Db*	DE	DL*	Da*	Db*	DE
Average DE	0.11	0.09	0.16	0.24	0.06	0.09	0.07	0.15
B-1 LT GRAY	-0.02	-0.12	-0.09	0.15	0.00	0.00	0.00	0.01
B-2 DEEP RED	0.16	0.16	0.33	0.40	0.02	-0.06	0.19	0.20
B-5 WHITE	-0.18	0.00	-0.29	0.34	0.00	0.00	0.00	0.00
B-6 MID GREY	0.09	-0.07	-0.14	0.18	0.00	0.00	0.00	0.01
B-7 DEEP GREY	0.05	-0.11	-0.05	0.13	0.00	-0.01	0.00	0.01
B-8 BLACK	0.04	-0.12	-0.04	0.13	0.00	0.00	0.00	0.00
B-9 YELLOW	-0.02	-0.19	-0.20	0.28	-0.02	0.11	-0.09	0.14
B-10 DEEP GREEN	0.00	0.05	-0.13	0.14	-0.04	0.24	-0.01	0.24
B-11 MID-BLUE	0.11	-0.08	-0.05	0.14	0.08	-0.08	0.18	0.22
B-12 DEEP ORANGE-RED	0.13	-0.31	0.23	0.40	-0.11	-0.36	-0.08	0.38
B-13 CYAN	0.07	0.00	-0.19	0.20	0.06	0.11	-0.04	0.14
B-14 DEEP BLUE	-0.07	-0.01	-0.15	0.17	-0.10	0.02	-0.09	0.14
B-15 MID-ORANGE	0.30	-0.01	0.46	0.54	0.13	0.13	0.31	0.36
B-16 DEEP ROSE PINK	0.19	-0.10	0.03	0.22	0.04	-0.17	-0.05	0.18
P-1 GREY 20%	-0.03	-0.12	-0.08	0.15	-0.11	-0.04	0.04	0.12
P-2 GREY 85%	-0.11	-0.07	-0.26	0.30	0.04	-0.04	0.00	0.06
P-4 GREY 40%	0.01	-0.06	-0.10	0.12	-0.02	0.06	0.00	0.06
P-5 GREY 80%	-0.18	-0.08	-0.24	0.31	-0.07	-0.04	-0.02	0.08
P-8 LIGHT YELLOW	-0.18	-0.04	-0.36	0.40	-0.05	0.07	-0.07	0.11
P-9 LIGHT PINK	0.07	-0.15	-0.01	0.17	-0.05	-0.07	0.03	0.09
P-12 LIGHT CYAN	-0.08	0.07	-0.14	0.17	-0.06	0.14	-0.03	0.16
P-15 GREY 50%	0.05	-0.10	-0.11	0.15	0.03	0.01	-0.03	0.04
P-16 GREY 33%	0.13	-0.07	-0.12	0.19	0.06	0.00	-0.01	0.06
S-2 DEEP VIOLET	0.09	-0.13	0.03	0.17	0.04	-0.10	0.04	0.11
S-4 RED	0.30	0.24	0.38	0.53	0.10	0.08	0.16	0.20
S-5 YELLOW GREEN	0.07	-0.04	-0.18	0.20	0.06	0.19	-0.03	0.21
S-6 PURPLE	0.11	-0.04	0.06	0.13	0.02	-0.17	0.10	0.20
S-7 YELLOW-ORANGE	0.12	-0.19	-0.05	0.23	0.06	0.08	-0.03	0.11
S-8 GREENISH YELLOW	0.22	-0.08	0.19	0.30	0.28	0.16	0.49	0.59
S-9 RED-ORANGE	0.32	-0.13	0.21	0.40	0.11	-0.09	-0.02	0.15
S-11 DARK BLUE	0.12	0.01	-0.16	0.20	0.10	0.05	0.02	0.12
S-13 MID-GREEN	0.02	0.06	-0.19	0.20	0.01	0.18	0.04	0.18

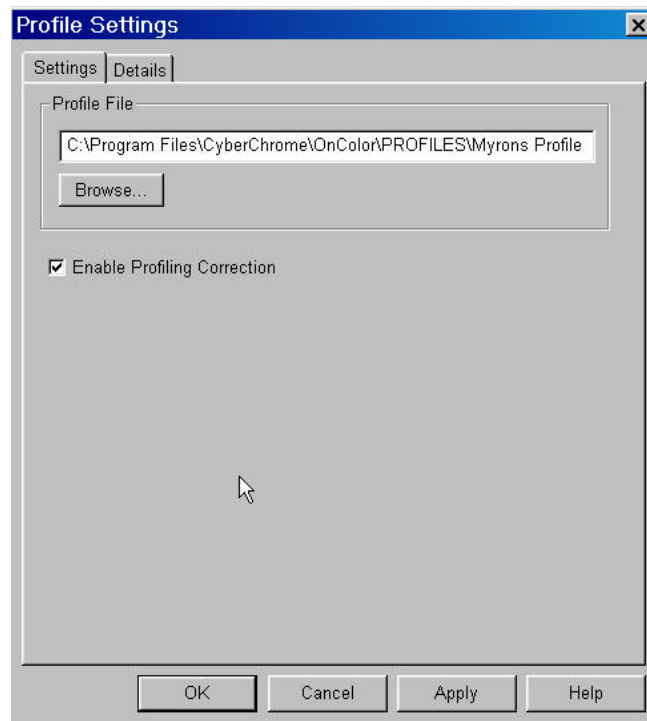
15. Repeat this procedure for the second instrument status (Specular component) by starting with step 2 above using the WSV files for the appropriate status. When saving the CCF data for the second status, use

the same file name that you used the first time. Both statuses are saved in the same CCF file.

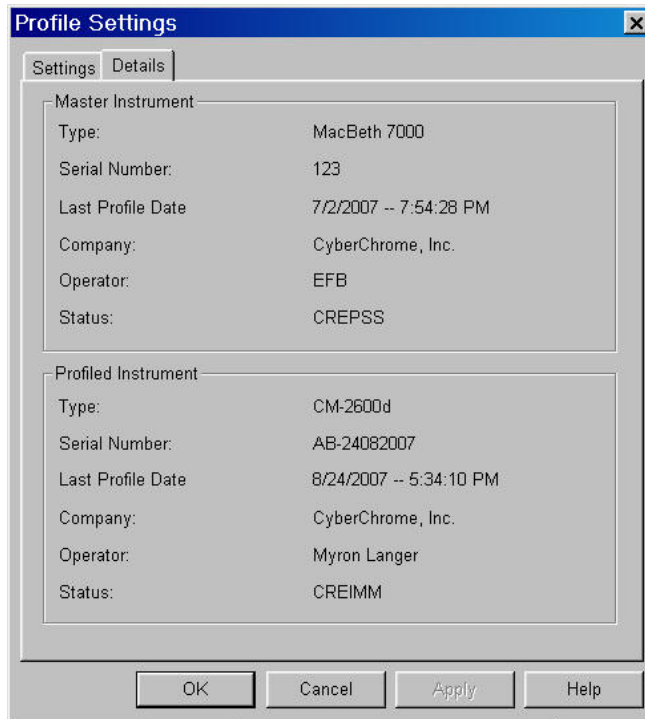
VII. Using Profiling in OnColor

The Correlation Coefficients file (*.CCF) that was generated in the Profiler Wizard is used in OnColor to correct the raw reflectance data coming from the target instrument to closely match the master instrument.

1. Be sure that a copy of the *.CCF file generated above is copied onto the local computer that runs the target instrument. While the file can be located anywhere that the computer has access to, it is easiest if it resides in the OnColor folder or a sub-folder of OnColor.
2. To activate the use of Instrument Profiling in OnColor, go to Options→Profile Settings and then click on the Browse button to locate the Profile that you want to apply to the target instrument. It will be a CCF file.
3. Click on the check box to Enable Profiling Correction. This must be checked in order for the corrections to be applied in OnColor. Click Apply to recall the file. See the screen below:



4. To see the details of this profile file, click on the Details tab, where you can print a report to attach to data printouts of the profiling specifics.



5. Click OK to exit the dialog box and proceed using OnColor with Profiling enabled. Any profiled measurement will have a “P” in the second position of the status code; for example, CPIIMM. See Section XI for a listing of the Status Codes.

VIII. Instrument Performance Wizard

The Instrument Performance Wizard is used to monitor the performance of an instrument over time and tell whether it conforms to a reference instrument. This tool can tell you whether your instrument is drifting over time due to dirt, yellowing of the sphere, usage, etc. A log of these results can be used to show instrument conformance for ISO or Quality Management programs. A baseline of readings must be established. Usually a Target instrument is compared to a Master instrument and therefore the baseline is the data on the tile set from the Master instrument.

An alternate way to use this would be to establish a baseline on the Target instrument (preferably after it has been serviced and certified by the manufacturer) and then compare on-going readings to this baseline. This will tell you if the instrument is drifting over time, but it won't tell you if it still conforms to a Master.

Either the set of 32 Profiler Tiles or a shortened set of ceramic tiles can be used. Other types of samples such as paint, plastics, or textiles are allowed but it

should be understood that these samples may drift over time and not provide the stability that ceramic tiles do. This method is sometimes used to conduct customer/supplier audits where a set of product color standards is used rather than the Profiler tile set.

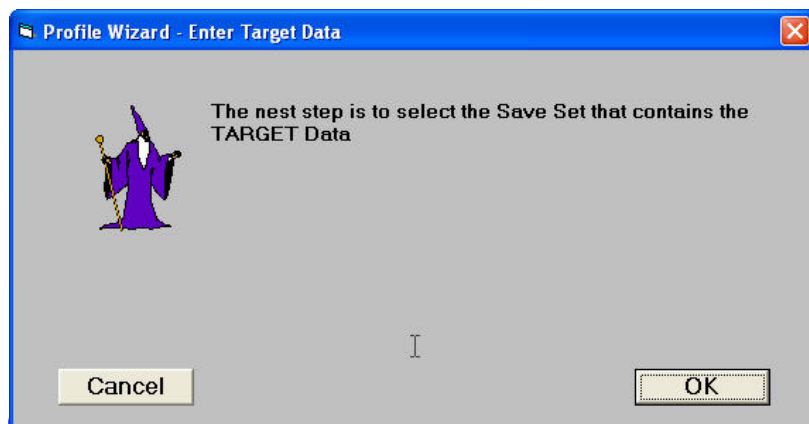
The user designates a tolerance for the readings on each individual tile as well as the overall average. If the Instrument Performance shows any readings out of tolerance, further checks need to be done. First, clean the offending tile and re-measure it. If it still fails, then this instrument needs to be re-profiled to the Master. If the instrument cannot be brought within the specification after re-profiling, then it must be serviced or re-calibrated by the manufacturer. This can either be done on-site or by return to the factory depending on the manufacturer.

Follow these steps to run the Instrument Performance Wizard.

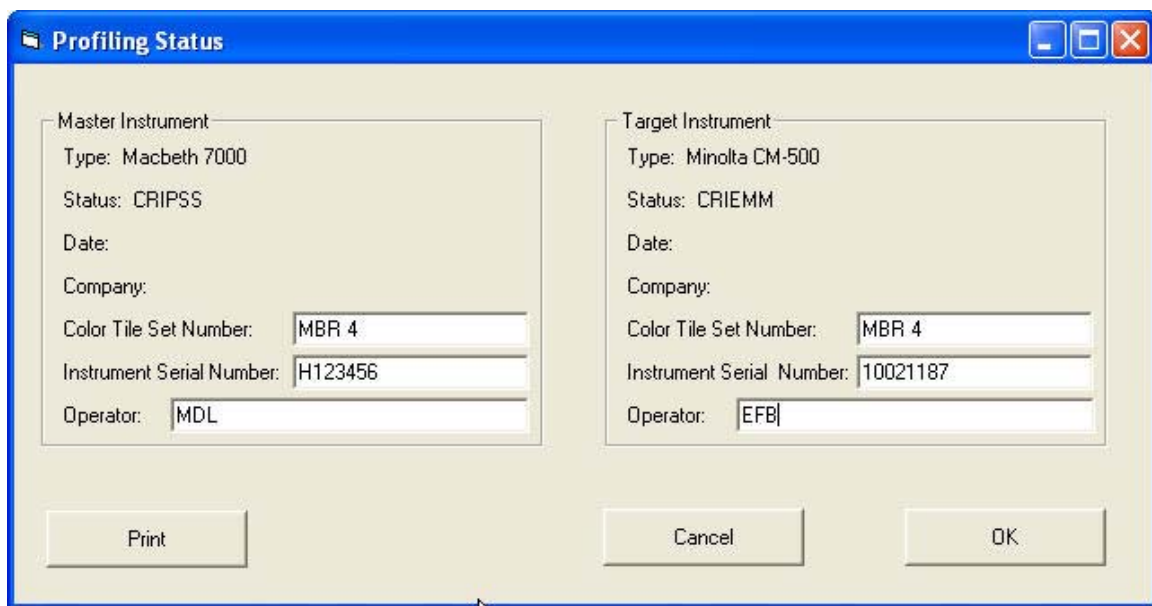
1. In OnColor Profiler, click on Wizards → Instrument Performance. A message is displayed that you have selected this Wizard. Click on OK to continue.
2. The following dialog is displayed: Click OK to continue.



3. In the next dialog box, select the file that contains the reference data for the Master instrument. This data can either be on the set of 32 tiles or another collection of samples.
4. The next step is to select the data for the Target instrument on the same collection of samples. The two save-sets must match in terms of number of samples and their order!



5. In the next dialog box, select the file that contains the current data for the Target instrument.
6. After opening the file, the following window is displayed:
7. Enter the information for the serial number of the color tile set, the instrument serial number and operator. You can use the Tab key to move from box to box. The company name is taken from the name stored in OnColor when the tiles were read. To change this, go back to OnColor and open the save-set WSV file for the Master and Target instruments. Go to File→Page Setup and change the company name there. Then re-save the WSV files. The instrument type and status are automatically recorded in OnColor and cannot be changed. After entering the data, click OK to continue.



The image shows a Windows-style dialog box titled "Profiling Status". It has a blue title bar with standard minimize, maximize, and close buttons. The dialog is divided into two main sections: "Master Instrument" on the left and "Target Instrument" on the right. Each section contains a list of fields: "Type", "Status", "Date", "Company", "Color Tile Set Number", "Instrument Serial Number", and "Operator". The "Master Instrument" section shows "Type: Macbeth 7000", "Status: CRIPSS", "Date:" (empty), "Company:" (empty), "Color Tile Set Number: MBR 4", "Instrument Serial Number: H123456", and "Operator: MDL". The "Target Instrument" section shows "Type: Minolta CM-500", "Status: CRIEMM", "Date:" (empty), "Company:" (empty), "Color Tile Set Number: MBR 4", "Instrument Serial Number: 10021187", and "Operator: EFB". At the bottom of the dialog are three buttons: "Print", "Cancel", and "OK".

Field	Master Instrument	Target Instrument
Type	Macbeth 7000	Minolta CM-500
Status	CRIPSS	CRIEMM
Date		
Company		
Color Tile Set Number	MBR 4	MBR 4
Instrument Serial Number	H123456	10021187
Operator	MDL	EFB

8. The measurement data for the Target instrument is compared to the Master instrument and the following report is given:

Sample Name	DL*	Da*	Db*	DE
B1 Light Grey	0.18	-0.09	0.10	0.23
B-2 DEEP RED	0.11	-0.14	0.18	0.26
B-5 WHITE	0.07	-0.06	0.04	0.10
B-6 MID GREY	0.38	0.09	0.21	0.44
B-7 DEEP GREY	0.36	0.04	0.19	0.41
B-8 BLACK	0.38	0.00	0.22	0.44
B-9 YELLOW	0.29	0.17	1.14	1.19
B-10 DEEP GREEN	0.27	-0.39	0.37	0.60
B-11 MID-BLUE	0.29	-0.15	0.05	0.33
B-12 DEEP ORANGE-RED	0.29	0.04	0.50	0.58
B-13 CYAN	0.25	-0.47	-0.20	0.57
B-14 DEEP BLUE	0.25	0.03	0.01	0.25
B-15 MID-ORANGE	0.30	0.65	0.70	1.00
B-16 DEEP ROSE PINK	0.11	0.26	-0.03	0.29
P-1 GREY 20%	0.23	0.04	0.19	0.31
P-2 GREY 85%	0.04	-0.05	0.13	0.15
P-4 GREY 40%	0.08	0.05	0.20	0.22
P-5 GREY 80%	0.07	-0.08	0.07	0.12
P-8 LIGHT YELLOW	0.19	-0.11	0.53	0.58
P-9 LIGHT PINK	0.09	0.28	0.08	0.30
P-12 LIGHT CYAN	0.20	-0.37	0.06	0.43
P-15 GREY 50%	0.24	-0.20	0.16	0.35
P-16 GREY 33%	0.28	-0.03	0.23	0.36
S-2 DEEP VIOLET	0.25	-0.23	-0.09	0.35
S-4 RED	0.38	0.44	0.73	0.93
S-5 YELLOW GREEN	0.32	-0.51	0.83	1.03
S-6 PURPLE	0.14	0.02	-0.12	0.19
S-7 YELLOW-ORANGE	0.20	0.26	1.01	1.06
S-8 GREENISH YELLOW	0.51	-0.01	1.31	1.40
S-9 RED-ORANGE	0.11	0.62	0.29	0.69
S-11 DARK BLUE	0.32	-0.14	-0.05	0.35
S-13 MID-GREEN	0.36	-0.62	0.45	0.85
Average				0.51

The red highlighted areas indicate data points that failed the tolerance, including the overall average. In this case, the instrument needed to be profiled back to the Master.

9. The final step is to print a certificate of instrument performance.

IX. Legacy Data Conversion Wizard

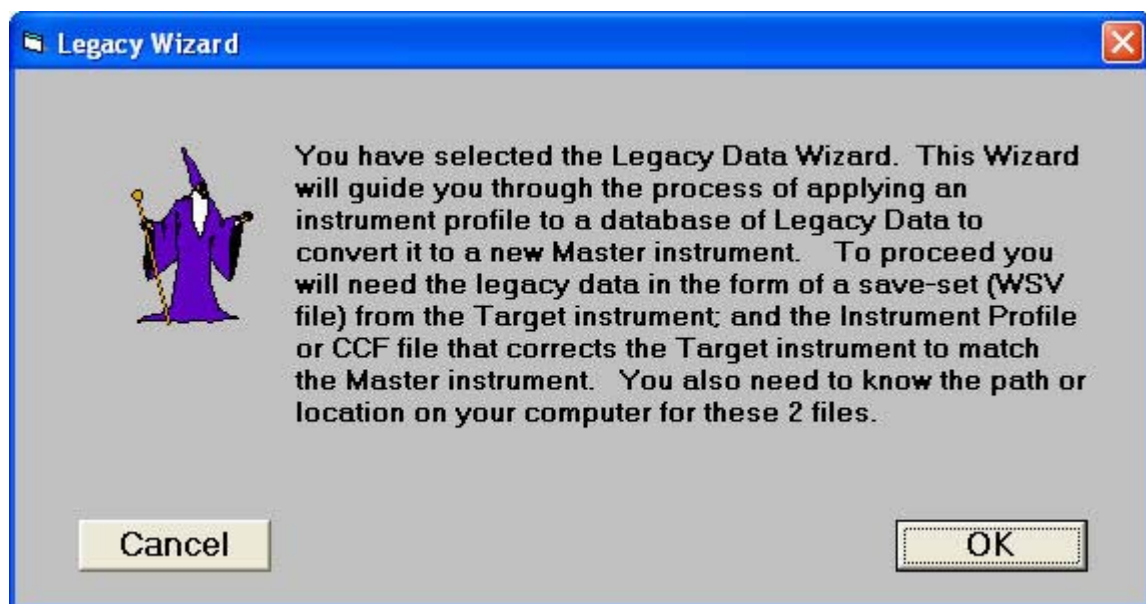
The Legacy Data Conversion Wizard provides a tool for you to take a set of color data that was measured on one instrument and convert those readings to a new instrument. For example, this option might be used when you have stored color standards that were measured years ago on an older spectrophotometer. Some or many of those standards may no longer physically exist, or if they do, they might be faded, scratched, or dirty. You may still need to match those stored readings, but now you would like to have them relative to a new instrument that you bought. The Legacy Data Conversion Wizard helps you accomplish this.

The legacy data needs to be brought into OnColor format, if it is not already in that format. OnColor provides several options to do this. Several other file formats can be directly imported into OnColor. Or you can use the feature to import the data from a TXT file. Consult the OnColor documentation or contact your CyberChrome applications engineer on how to do this.

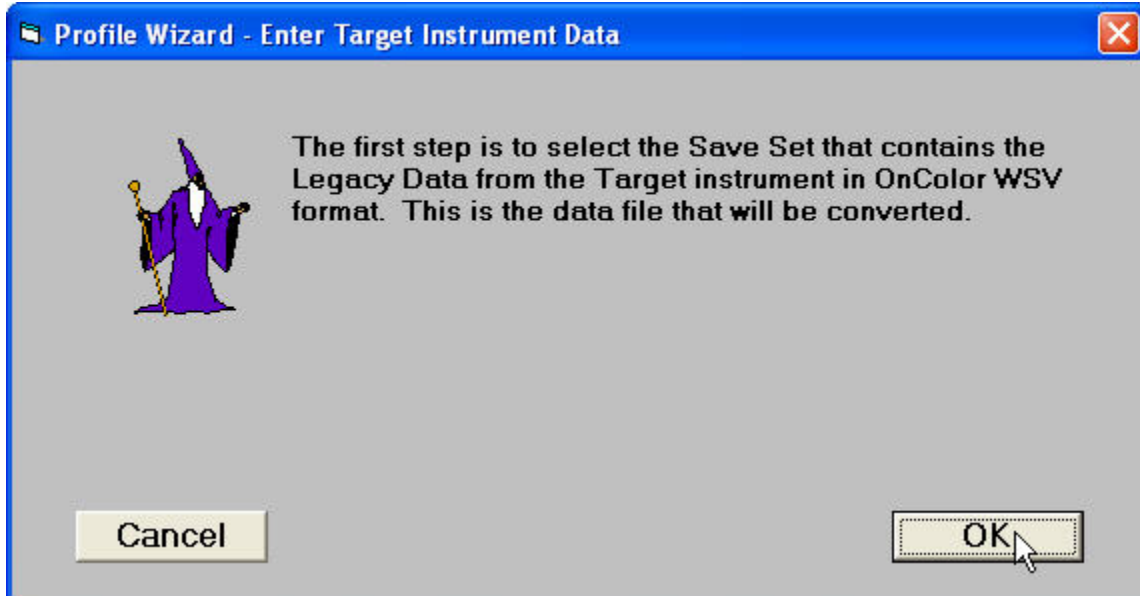
In order to use this Wizard, you will need your legacy data in an OnColor WSV file and you will also need the CCF file from the Profiling Wizard that profiles the old instrument to the new one. The CCF file is used to apply the new profile to the old data to convert it relative to the new instrument.

Follow these steps to run the Legacy Data Conversion Wizard.

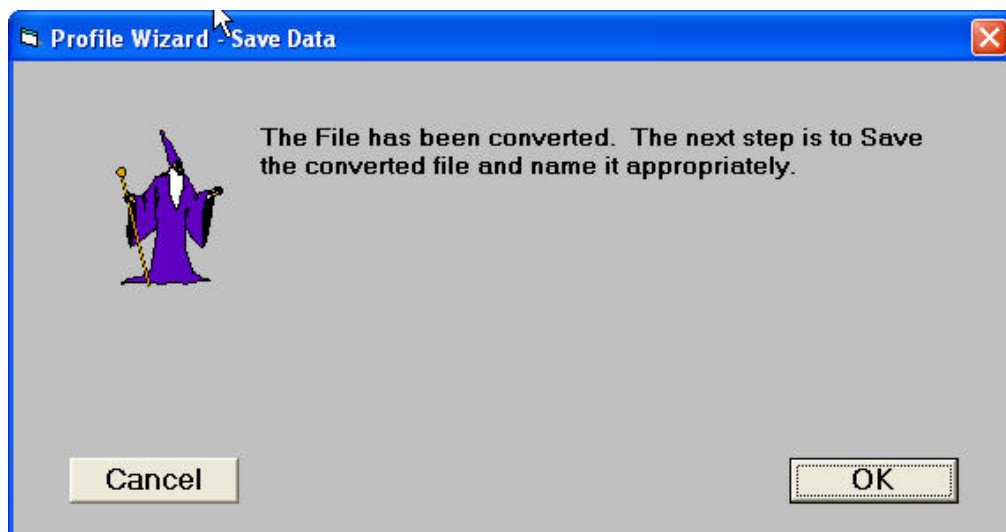
1. In OnColor Profiler, click on Wizards → Legacy Conversion. The following message is displayed. Click on OK to continue.



2. The next screen is displayed:



3. In the next dialog box, browse on your computer to select the OnColor WSV file that contains the old legacy data that needs to be converted. The data must be in WSV format at this point.
4. The next screen directs you to open the CCF file that contains the profile of the old instrument (Target) to the new one (Master). Browse on your computer to find and open the appropriate CCF file.
5. After clicking OK to open this file, the CCF file is applied to the data and it is converted. The following dialog is displayed:



6. Click OK and then enter a name for this new file. It will be an OnColor WSV file. The data is now ready to be recalled in OnColor. Once in this format, you can copy the data to a Database of Standards or manipulate it in many ways.

X. How to Handle and Care for your Ceramic Tile Set

A. Introduction

For many years, technologists who need to measure and control color have used optical glasses and ceramic tiles as color transfer standards. Color standards fabricated from vitreous materials are practical because of their durability, maintainability, and long-term stability.

Whenever a precision optical component is cleaned, its critical surface may be damaged. If consistency and long-term stability are important, proper cleaning procedures must be employed. Storing and handling color standards as described below reduces the frequency of cleaning, preserves the standards, and maintains their stability. With proper care vitreous color standards should remain stable and in good working condition for many years.

B. Inspection

To inspect a glass or ceramic optical standard for the presence of lint or dust, illuminate the surface with a diffuse light source. (Reflected northern daylight works well for this. An illuminated magnifier (ring lamp) can also be useful.) Hold the tile by the edges of the Delrin® holder, and view the optical surface at several angles to minimize surface glare.

C. Contamination

Two types of soiling alter the reflectance characteristics of precision optical standards:

1. Dust, dirt, skin oils, grease, and films of aerosols (from unfiltered air or commercial cleaners) alter the reflectance properties of vitreous color standards. These changes usually can be reversed using appropriate cleaning techniques. Careful storage and handling procedures minimize contamination and the need for cleaning.
2. Exposure to abrasives, chemical vapors, skin acids or liquid acids, liquid alkalis, high temperatures, and some types of radiation can induce irreversible color changes. If the optical surface of the standard has not been damaged physically and the damage to the glass or glazed surface is not severe, the standard can usually be re-calibrated and returned to use.

D. Physical Damage

Ceramic and glass optical standards (including CERAM® tiles) are vulnerable to etching by acidic and alkaline aqueous solutions. Exposure of ceramic glazes to dilute acids can cause leaching of metallic oxide, sulfide, or selenide pigments. The optical surfaces can be etched permanently following exposure to dilute acids that contain even small concentrations of dissolved metallic fluorides. (Hydrofluoric acid has long been used to etch glass and fused silica.) Immersion of vitreous transfer standards in strongly alkaline solutions that contain dissolved

metallic phosphates (e.g., Na_3PO_4) or hydroxides (e.g., NaOH) may cause etching.

Exposure to organic solvents may damage the printed labels and the Delrin® plastic holders in which our standards are mounted.

Glass and ceramic optical standards are vulnerable to scratching by abrasives, including kitchen/bathroom cleansers. Any scratching or abrasion of the glazed or polished optical surface causes permanent damage and ruins the standard. To avoid this, keep your work area free from grit and dirt such as household dust or cement dust, and use only the materials and procedures recommended below for cleaning. Never clean your standards using ordinary paper, cloth, or commercial cleaners.

E. Handling

Always wear lint-free gloves when you handle glass and ceramic color standards during spectroscopic measurements. We recommend using high-quality woven cotton film gloves or cotton or nylon cloth inspector's gloves. After several hours of use, launder cloth gloves to remove soiling and contamination by perspiration and skin oils.

Whenever you use liquid cleaning agents, wear disposable powder-free polyethylene or nitrile lab gloves. For impermeability to chemical solvents we recommend disposable nitrile gloves. Wash your gloved hands with soap and warm water to remove traces of powder or other contamination. Rinse with clean water and dry the gloved hands with a clean, lint-free towel. Discard disposable gloves after a single use.

F. Storage

We jacket individual glass and ceramic color transfer standards in lint-free optical component bags. We package sets of color standards in dust- and light-tight boxes fabricated from high-impact plastic. (Descriptions and photographs of the standards are published on the Mt. Baker Research. website <www.mrbakerresearch.com>).

After a measurement, return each color standard to its container. After a work session, insert each standard in its protective jacket. Store the closed boxes in a controlled environment that is clean, dark, and dry. For long-term storage we recommend using locked cabinets housed inside the lab, office, or warehouse. If the storage environment is dusty or subject to airborne contaminants, seal each boxed set of standards inside a 3-mil laboratory grade zip-loc polyethylene bag.

G. Cleaning

For routine dust removal use a clean camel's hair or anti-static brush and/or non-flammable compressed fluorocarbon propellant. If you store and handle standards properly, frequent treatment with liquid cleaners should not be necessary.

When a glass or ceramic standard becomes contaminated with skin oil, immediately clean it with isopropyl alcohol. Always wear disposable lab gloves during this procedure since isopropyl alcohol dissolves skin oils and cosmetic creams causing contamination of the optical surface. Because isopropyl alcohol is irritating and toxic, wear eye protection and avoid prolonged exposure to its vapors.

Clean the soiled standard with a fresh absorbent, non-abrasive wiper moistened with a few drops of isopropyl alcohol. Wipe the optical surface gently in a single path using a circular motion. (Do not use a scrubbing motion. Any abrasive grit adhering to the wiper may permanently scratch the optical surface.) Remove excess alcohol using a fresh, dry wiper and inspect the standard. If you observe smears, streaks, or fingerprints, clean the standard with liquid detergent as described below. Discard each wiper after a single use.

Remove water spots with a fresh non-abrasive wiper moistened with one drop of dilute distilled white vinegar. Immediately rinse the cleaned surface with distilled water. Remove excess moisture with a fresh wiper, and proceed immediately to the isopropyl alcohol cleaning procedure that is described above. Never soak optical standards in dilute vinegar (or another acid) that contains dissolved metallic fluorides, and avoid prolonged exposure of your standards to skin acid or acidic solutions.

Remove fingerprints, heavy soiling, or grease stains with a fresh non-abrasive wiper moistened with unscented lab detergent. Use a gentle scrubbing action, but avoid scratching the optical surface if the soiling contains abrasive material. For heavy soiling use several treatments — always with fresh wipers. Rinse the cleaned surface with distilled water. Remove excess moisture with a fresh wiper, and proceed immediately to the isopropyl alcohol cleaning procedure as described above.

H. Long-term Stability

Precision optical standards are fabricated from glass and ceramic materials, which have long been noted for durability and chemical stability. As these color standards age, their optical properties do not undergo spontaneous change. As noted above, temporary (reversible) changes in color and appearance may result from surface contamination. Permanent changes may result from physical damage to the optical surface (etching or scratching) or from chemical changes following exposure to chemically reactive liquids or vapors or certain types of radiation.

In practical terms the long-term stability of vitreous color standards is mainly influenced by the work environment and the procedures used to store, handle, and clean the standards. In adverse work environments gradual changes in color and appearance may be unavoidable. We encourage you to standardize your maintenance procedures based on the guidelines presented here.

For critical applications we recommend that you purchase color standards that have been calibrated with certification at a commercial metrology laboratory. The contract calibration services offered by the National Institutes of Standards and Technology and the National Research Council of Canada are very expensive. In North America Mt. Baker Research L.L.C. offers high quality, traceable calibration services. If very long-term stability of color and appearance is important, we recommend that you engage a suitable metrology laboratory to re-calibrate your standards on an annual basis.

I. Temperature Stability

The colorants used in glass and ceramic transfer standards include stable inorganic chemicals such as metallic oxides, sulfides, and selenides. Colored vitreous materials may exhibit reversible changes in color that accompany changes in temperature. This characteristic, which is termed thermochromism, is significant in color metrology.

Malkin, et al. reported the thermochromic behavior of BCRA Series II tiles, which are manufactured by CERAM Technology Ltd. (See: F. Malkin, J.A. Larkin, J.F. Verrill, and R.H. Wardman, "The BCRA-NPL Ceramic Colour Standards, Series II — Master spectral reflectance and thermochromism data," *Journal of the Society of Dyers and Colorists*, 113, 84 – 94 (1997).)

According to Malkin, et al. red, orange, and yellow tiles exhibit greater sensitivity to temperature than other colors. Intensely colored tiles exhibit greater sensitivity than pastels or white and grey tiles. Consult the original reference for quantitative details, and remember that standard glazes are used in all ceramic color standards including CERAM tiles. (See: R.A. Eppler and M. Obstler, "Understanding Glazes," The American Ceramic Society, Westerville, Ohio, 2005, ISBN 1-57498-222-2, <www.ceramics.org>).

More recently, Dr. David Wyble (Rochester Institute of Technology) measured the temperature sensitivity of the ceramic color standards introduced during 2007 by Mt. Baker Research L.L.C. and Profiler Technologies L.L.C. Dr. Wyble performed these new measurements with a custom instrument that operated in the (0°/45°) bi-directional geometry. His measurements correlate well with the results published by Malkin, et al. for CERAM tiles. We look forward to the detailed report of this important new study.

J. Appendix—Recommended Chemicals & Supplies

Isopropyl alcohol: Use spectroscopic grade or the best available medical grade available at your pharmacy. (Note: Commercial laboratory supply firms offer spectroscopic grade solvents in Teflon® squirt bottles. While spectroscopic grade isopropyl alcohol is preferred, it is very expensive.)

Distilled water, de-ionized water, or filtered tap water: Available in plastic containers at supermarkets and pharmacies.

Mild liquid soap or detergent solution: Avoid commercial cleaning agents that contain scents, acids, or strong alkalis. Unscented liquid hospital soap is okay. Prepare a working solution by dissolving 1 teaspoon of liquid soap in 1 quart of distilled water. Store the solution in a laboratory grade plastic squirt bottle.

Fluorocarbon propellant: We recommend using canned 1,1,1,2-tetrafluoroethane, such as SPI Easy Duster® (Structure Probe, Inc.

<www.2spi.com/spihome.html>). Although 1,1,1,2-tetrafluoroethane is non-flammable and minimally toxic, avoid chronic exposure to the vapors. (Visit the Structure Probe, Inc. website to access a material safety data sheet.) Don't shake the propellant container. Do use a ventilated hood or work in a well-ventilated lab, and avoid flammable propellant products, including difluoroethane. Dilute acetic acid: Dilute distilled white vinegar with distilled water to 1% acetic acid concentration. (Note the restrictions listed in the cleaning procedure.)

Camel's-hair or anti-static brush: We recommend StaticWisk® brushes (Kinetronics Corporation <www.kinetronics.com>). When your brush becomes contaminated with dust or skin oil, wash it gently in accord with the manufacturer's instructions.

Dust- and lint-free, absorbent, non-abrasive lens tissues and wipers: We recommend Pec*Pads® (Photographic Solutions, Inc. <www.photosol.com> and SPI-CleanWipes Polyester Wipers® (Structure Probe, Inc. <www.2spi.com/spihome.html>). After you open a new package, store the unused wipers in a sealed 3-mil laboratory grade polyethylene zip-loc bag. Lint-free cotton and nylon inspector's gloves. (For sources visit the following websites: <www.criticaltool.com>, <www.galeton.com>, or <vwrlabshop.com>.)

XI. Instrument Status Codes

The following table of Instrument Status Codes is helpful in deciphering the 6-digit code that is used to describe the instrument set-up conditions at the time of measurement. These codes are also printed on the Certificate of Performance so that you can tell the instrument settings used for this Profile.

Instrument Status Codes

Position	Letter	Meaning
1	B C H K L X	100% Line Calibration Ceramic Calibration Hitch Calibration Keyboard Input Low Illumination Calibration Not Calibrated
2	R T P	% Reflectance % Transmission Profiled % Reflectance
3	I E B	Specular Component Included (Gloss Included or SCI) Specular Component Excluded (Gloss Excluded or SCE) Both SCI and SCE
4	A E F G I P Q R	Extra Filter UV Component Excluded UV Component Excluded w/420nm Cutoff UV Component Excluded w/400nm Cutoff UV Component Included Partial UV Partial UV w/420nm Cutoff Partial UV w/400nm Cutoff
5	X L M S V U	Extra Large Aperture lens setting (XAV) Large Aperture lens setting (LAV) Medium Aperture lens setting (MAV) Small Aperture lens setting (SAV) Very Small Aperture lens setting (VSAV) Ultra Small Aperture lens setting (USAV)
6	X L M S V P U	Extra Large area of View Mask (XAV) Large Area of View mask (LAV) Medium Area of View mask (MAV) Small Area of View mask (SAV) Very Small Area of View mask (VSAV) Petri Dish Accessory (CM-3500d only) Ultra small Area of View mask (UAV)

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