Applications Note

Insight on Color **Vol. 19, No. 7**

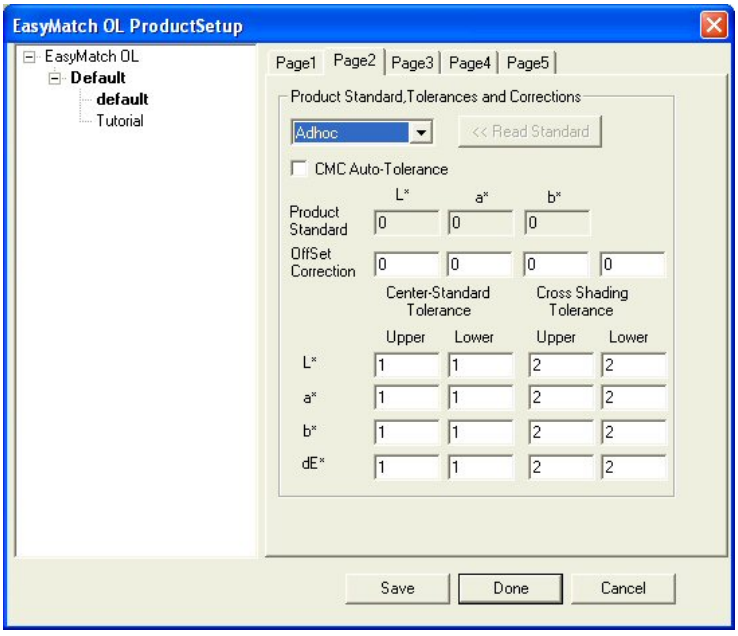
Establishing a Numeric Standard in EasyMatch OnLine

There are two methods for establishing a numeric product standard using EasyMatch OnLine and the SpectraProbe XE. The most statistically valid method is to accumulate data for at least ten runs of good product and calculate the average color values from these runs. This method is described in the first section below. In some cases, however, you may need to establish a numerical standard quickly and might be willing to use a less accurate method. This method is given in the second section below.

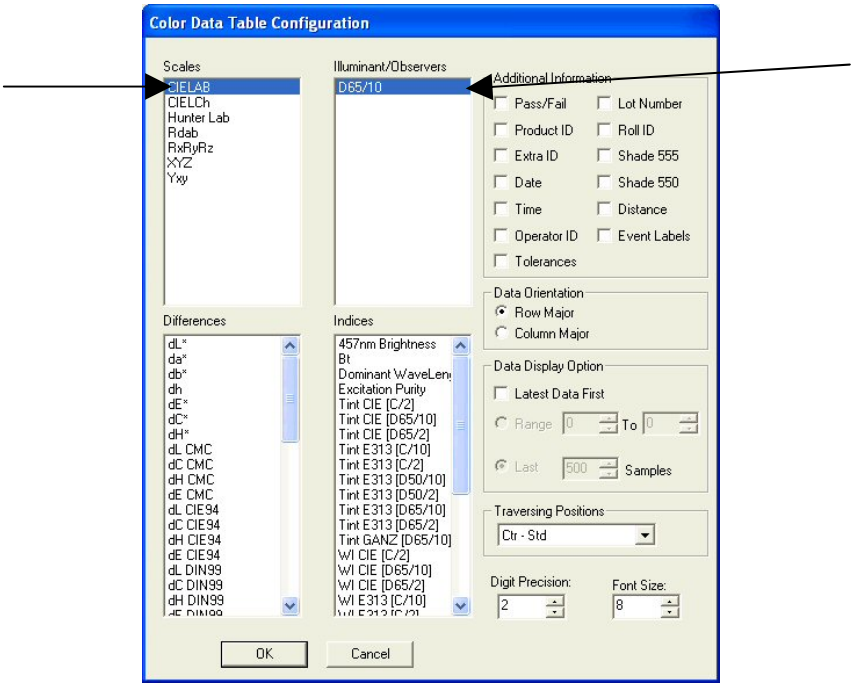
Statistical Method

Perform the following steps to complete the statistical method for determining a numeric product standard:

1. Open EasyMatch OL.
2. Choose **Product Setup** from the **Run** menu.
3. Select the product setup you wish to alter. The selected setup will be shown in bold type.
4. Click the tab to go to Page 2.
5. Select Ad Hoc for the product standard type.



6. Click **Save** and then **Done**. The product setup will be sent to the support unit.
7. Start good product that is as close to the desired standard for the product as possible running under the SpectraProbe XE.
8. Click the **Start Run** button on the toolbar to begin a run.
9. When the run is complete, or when standard product is no longer being presented to the SpectraProbe XE, click the **Stop Run** button.
10. Complete Steps 7-9 nine more times using this product setup.
11. Open the job corresponding to the first run you made in this process.
12. Add (if required) and configure a Color Data Table view to show the color scale, illuminant, and observer you wish to use for your numeric standard. In this example, we will use CIELAB and D65/10°.

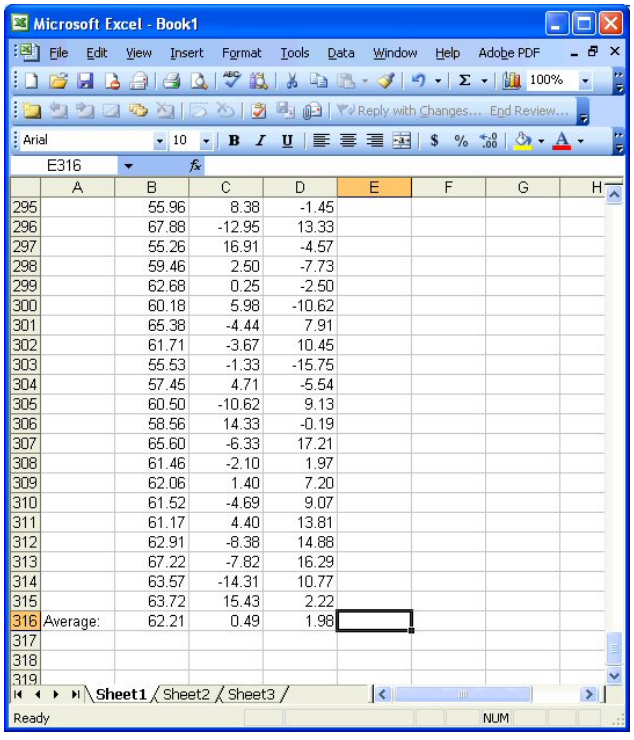


13. Select (highlight) the run data in the Job Tree so that it is shown in the Color Data Table.
14. In the Color Data Table, locate the columns (or rows) for the components of the color scale (L*, a*, and b* in our example) and highlight them.

	L*	a*	b*
Standard	60.69	-2.23	8.74
Sample 2	60.69	-2.23	8.74
Sample 3	60.55	0.12	2.73
Sample 4	63.67	4.10	5.41
Sample 5	60.91	3.62	8.30
Sample 6	60.03	4.88	-7.91
Sample 7	62.11	-3.15	3.30
Sample 8	62.59	3.00	7.30
Sample 9	59.49	2.39	-14.40
Sample 10	65.47	-1.08	7.88
Sample 11	61.71	-5.18	8.28
Sample 12	63.90	9.61	3.48
Sample 13	62.48	-15.33	-2.15
Sample 14	64.74	2.68	3.42
Sample 15	65.06	-2.58	5.73

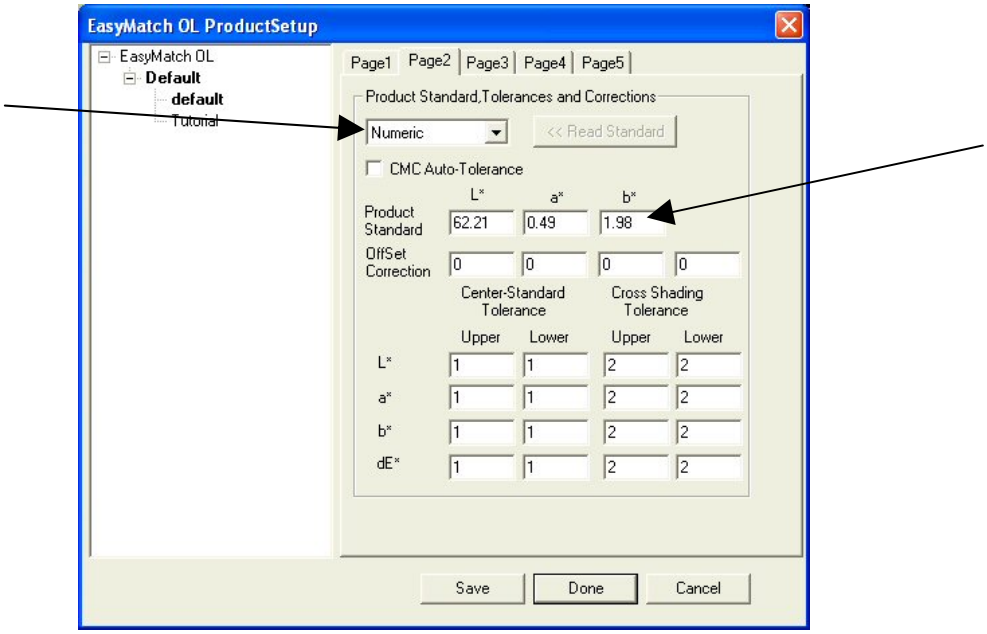
D65/10

15. Right-click anywhere in the Color Data Table and choose **Copy to Clipboard** from the menu that appears.
16. Open another Windows-based program where you can paste the data. Microsoft Excel or another spreadsheet package is recommended, but a word processing program or Windows Notepad will also work.
17. Open the **Edit** menu of this Windows program and choose **Paste**. The data you highlighted in EasyMatch OL's Color Data Table will be pasted into the Windows program.
18. Back in EasyMatch OL, close the job.
19. Complete Steps 11-18 for the additional nine runs you made for this product, pasting the data from each run at the bottom of the Windows program's file.
20. Calculate the average for each of the three parameters of your color scale (L*, a*, and b* in this example) for all of the data in the Windows program's file. If you are using a spreadsheet, it can automatically calculate the averages. Other packages require that you hand-calculate the averages.



	A	B	C	D
295		55.96	8.38	-1.45
296		67.88	-12.95	13.33
297		55.26	16.91	-4.57
298		59.46	2.50	-7.73
299		62.68	0.25	-2.50
300		60.18	5.98	-10.62
301		65.38	-4.44	7.91
302		61.71	-3.67	10.45
303		55.53	-1.33	-15.75
304		57.45	4.71	-5.54
305		60.50	-10.62	9.13
306		58.56	14.33	-0.19
307		65.60	-6.33	17.21
308		61.46	-2.10	1.97
309		62.06	1.40	7.20
310		61.52	-4.69	9.07
311		61.17	4.40	13.81
312		62.91	-8.38	14.88
313		67.22	-7.82	16.29
314		63.57	-14.31	10.77
315		63.72	15.43	2.22
316	Average:	62.21	0.49	1.98
317				
318				
319				

21. Back in EasyMatch OL, choose **Product Setup** from the **Run** menu again.
22. Click the tab to go to Page 2.
23. Define the standard type as Numeric, then enter the averages you just calculated for the components of the color scale into the boxes next to Product Standard.

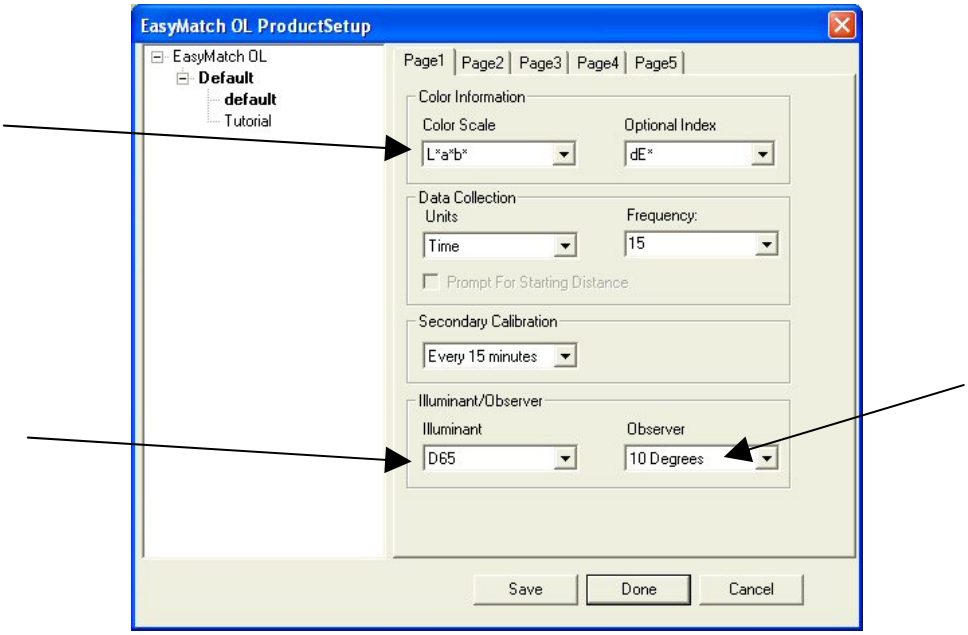


24. Click **Save** and then **Done**. The product setup will be sent to the support unit. You now have a product setup containing a product standard established using a large quantity of desirable product to which you can compare other product of this type to determine if it is acceptable.

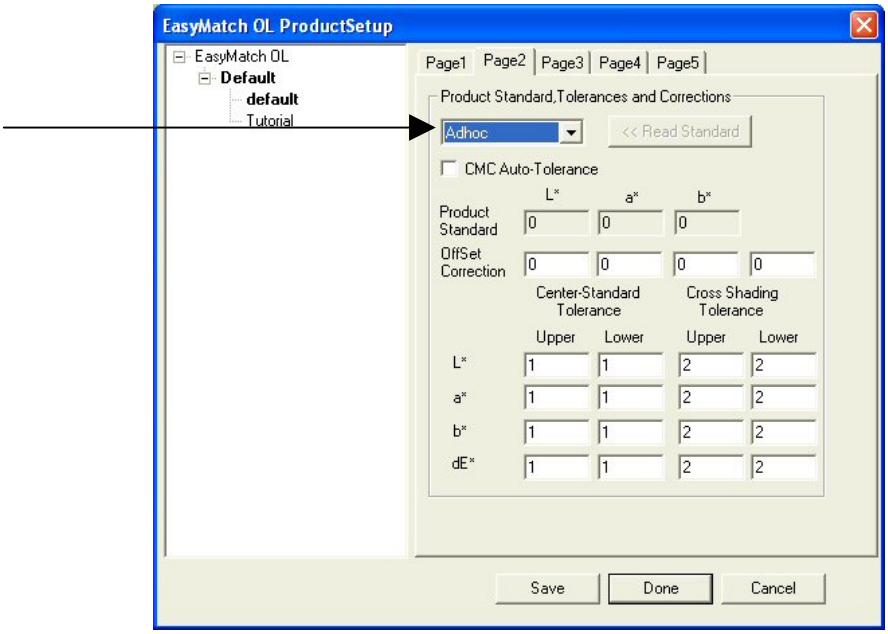
Quick Method

Perform the following steps to complete the quick method for determining a numeric product standard:

1. Open EasyMatch OL.
2. Choose **Product Setup** from the **Run** menu.
3. Select the product setup you wish to alter. The selected setup will be shown in bold type.
4. On Page 1, select the color scale, illuminant, and observer you wish to use for your numeric standard. In this example, we will use CIELAB and D65/10°.

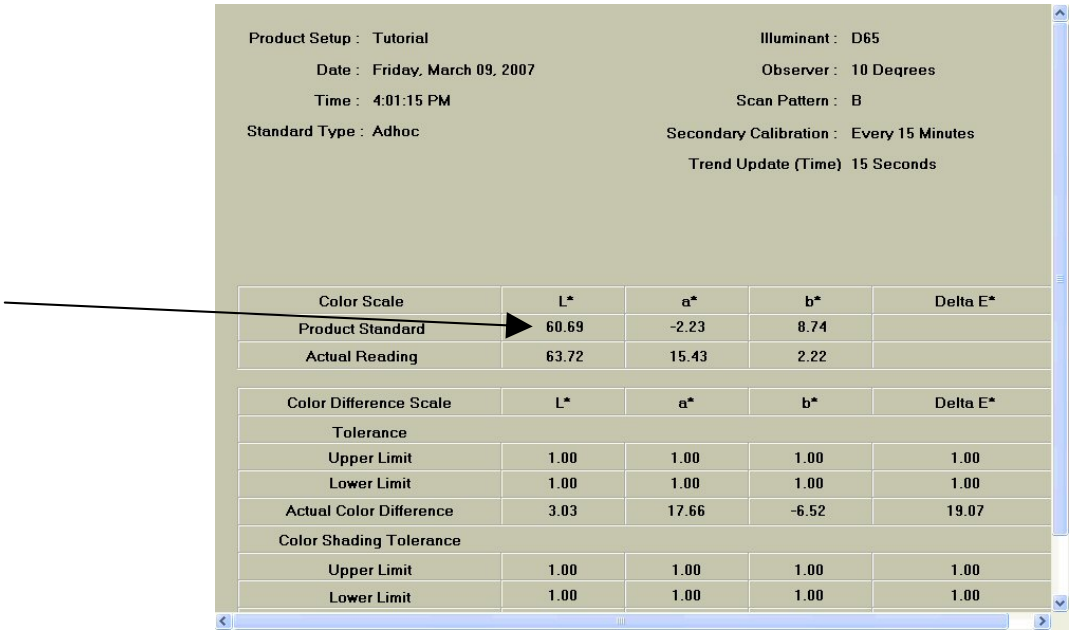


5. Click the tab to go to Page 2.
6. Select Ad Hoc for the product standard type.



7. Click **Save** and then **Done**. The product setup will be sent to the support unit.
8. Start good product that is as close to the desired standard for the product as possible running under the SpectraProbe XE.
9. Click the **Start Run** button on the toolbar to begin a run.
10. When the run is complete, or when standard product is no longer being presented to the SpectraProbe XE, click the **Stop Run** button.

11. Record the numbers listed on the Product Setup screen next to Product Standard. These numbers are the first ones reported for the run. If you suspect that the product at the beginning of the run was not good, you will not want to use these numbers and will want to perform Steps 8-10 again.



Product Setup : Tutorial
Date : Friday, March 09, 2007
Time : 4:01:15 PM
Standard Type : Adhoc
Illuminant : D65
Observer : 10 Degrees
Scan Pattern : B
Secondary Calibration : Every 15 Minutes
Trend Update (Time) 15 Seconds

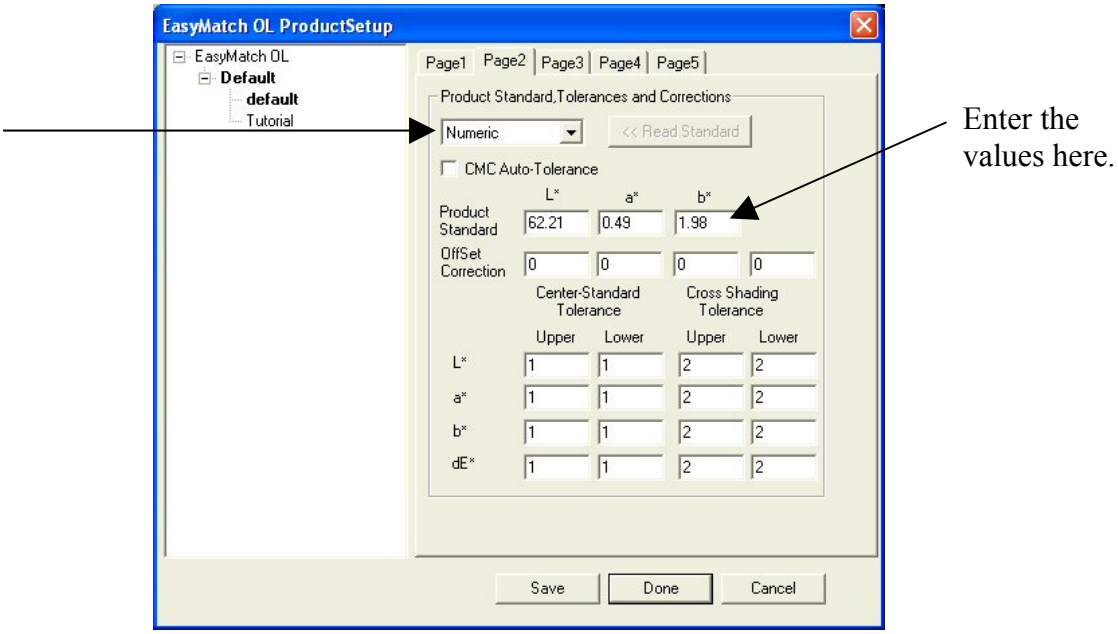
Color Scale	L*	a*	b*	Delta E*
Product Standard	60.69	-2.23	8.74	
Actual Reading	63.72	15.43	2.22	

Color Difference Scale	L*	a*	b*	Delta E*
Tolerance				
Upper Limit	1.00	1.00	1.00	1.00
Lower Limit	1.00	1.00	1.00	1.00
Actual Color Difference	3.03	17.66	-6.52	19.07
Color Shading Tolerance				
Upper Limit	1.00	1.00	1.00	1.00
Lower Limit	1.00	1.00	1.00	1.00

12. Choose **Product Setup** from the **Run** menu again.

13. Click the tab to go to Page 2.

14. Define the standard type as Numeric, then enter the values you recorded for the components of the color scale into the boxes next to Product Standard.



15. Click **Save** and then **Done**. The product setup will be sent to the support unit. You now have a product setup containing a product standard established using a small quantity of desirable product to which you can compare other product of this type to determine if it is acceptable.

Combination Method

You may use some combination of the statistical method and the quick method by completing the steps of the statistical method, but using data from fewer than ten runs. The greater the number of runs used, the more appropriate the numeric standard will be.

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