
Onyx Graphics White Paper **Spectral ICC Profile Generation**

February, 2005

Onyx Workflow version 6.0

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Spectral ICC[®] Profile Generation

For the next version of AutoUpdate, Onyx Graphics has implemented a new feature for those with Profile Generator. The new feature allows you to read and use spectral data for ICC profile generation. Using spectral data instead of just L a*b* values allows you to get better color and improves the accuracy of your ICC profiles – especially on media with optical whiteners. Better still, with spectral measurements, you can now generate profiles for different light viewing conditions.

Note: Spectral data is only used for building ICC profiles. This new spectral feature does not affect Ink Limiting or Linearization.

Minimum Requirements

In order to use these new spectral data features, you must have the following:

- Media Manager Version 6, Build 11100 or greater
- Onyx Profile Generator Option for Media Manager
- A Spectrophotometer - a color measurement device that can read spectral data, not just color (colorimeter) or density (densitometer)

A Brief Lesson on Light

Think of visible light as a wave that oscillates at frequencies with wavelengths ranging from 400 nanometers (which is blue) to 700 nanometers (which is red). When an object is radiated, some wavelengths absorb the light while other wavelengths re-emit or bounce back the light. The wavelengths that are not absorbed determine the color of an object. For example, when you see a red car, it means that all of the green and blue light has been absorbed and the red portion of the light has been bounced back. A spectrophotometer is a device that exposes white light and measures how much light bounces back for each wavelength. The amount of light that comes back for each wavelength is known as “spectral data”.

From spectral reflectance you can calculate how a color appears by using a model of a “human” observer under a modeled light source (i.e., you can calculate CIEXYZ and CIELAB values). An important point to note is that spectral reflectance is light source independent (except in cases of fluorescence). You can think of spectral reflectance as an expression of absolute color – independent of the observer or the light source.

Issues with Light in Profiling

Despite your best attempts, you may encounter issues in creating perfect profiles. Two such issues that can occur are the result of phenomenon with light. These issues include metamerism and fluorescence. The new Onyx Spectral Data tool resolves these issues and enables you to create profiles unhindered by issues with light.

Metamerism

Because the eye averages broad regions of spectra together, two colors with different spectral reflectance can appear the same in one viewing condition, and different in another. This is what is known as “metamerism” – a phenomenon that occurs when two colors appear to match under one source of light but appear completely different under another source of light.

The Onyx[®] Solution to Metamerism

You can use Onyx Spectral Data to generate ICC profiles for output that will be viewed under other illuminants beside D50 (D50 is a blackbody illuminant defined by the ISO – International Organization for

Standardization). Once you have spectral reflectance you can calculate XYZ/L*a*b* values for any illuminant. In short, you'll be able to generate profiles for different viewing conditions.

Fluorescence

Sometimes when an object reflects light, it changes the wavelength of the light. This is known as fluorescence. Papers with optical brighteners can cause this. They convert light from the UV region into blue light (i.e. invisible light to visible light). With this, a color measuring device measures more light in the blue region than is actually exposed. Fluorescence is light source dependent. As the light source in color devices is different than normal viewing conditions, the color measurement is inaccurate. This means that the spectral reflectance is false. Any profiles you generate with this incorrect reading result in extra yellow ink (which "dims down" the appearance of the "extra" blue light). A further issue is that with L*a*b* measurements you can't tell that an alteration of the light wavelength is occurring.

The Onyx® Solution to Fluorescence

With the Onyx Spectral Profile Generator tool, you can identify that fluorescence occurred (for example, if the spectral reflectance is greater than 100% in a blue region, this indicates fluorescence), and make the required adjustments to account for the fluorescence in the media. Because of this, you'll be able to get better colors from your profiles when you work with media that contains optical whiteners.

Using Spectral Data

To use the new Spectral Data tool:

1. Within Media Manager, select Color Device Setup from the File menu to open the Devices dialog.

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| <p>Note: This information pertains directly to using the new spectral reading functionality. For further information regarding setting up a Color Measurement Device and creating an ICC profile, refer to the Media Manager Profiling Guide.</p> |
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2. Within the Devices dialog, click *Add* to open the Add New Device dialog.
3. Within the list of devices, scroll to find the appropriate color device. New devices such as Spectrofiler Spectral (which doesn't have a device setup interface) and Spectral Text File can now be found in the Add New Device dialog.
4. After you select and add the new color device, indicate that you wish to perform "Spectral Readings" (instead of colorimetric). Select this on the same tab in which you specify port settings.
5. Choose to create a new profile.
6. Then, print and read the swatches.
7. Once you have read the swatch values into the software, click *Options* to open the Build Options dialog.
8. Within the Build Options dialog, you can enable the Correct for Optical Brighteners option to compensate for fluorescence or use the Viewing Light Source drop-down menu to select a desired viewing illuminant.
9. Once you set all desired ICC Profile build options, click *OK* to return to the Build ICC dialog and click *Build*.

For further information, contact Onyx Graphics Technical Support. Please call 801.984.5353 or toll free at 1.800.295.8324 for assistance. You can also contact Tech Support via email at: support@onyxgfx.com.