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IDEAlink™ Curve

User Guide

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User Guide

IDEAlliance®

1421 Prince Street, Suite 230
Alexandria, Va 22314-2805
Phone (703) 837-1070
Fax (703) 837-1072
www.idealliance.org

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Introduction

IDEAlink™ Curve is a software utility designed to simplify implementation of the IDEAlliance G7™ proof-to-press calibration method. Using IDEAlink Curve you can calibrate and verify all your printing and proofing systems without the tedium and uncertainty of manual curve drawing. IDEAlink Curve calculates the curve adjustment values for CtP and proofing RIPs necessary to match the ideal gray scale conditions detailed in the G7 specification. For more details on the G7 Method and specifications, see the companion document *'Calibrating, Printing and Proofing by the G7 Method'* available free at *www.gracol.org*.

IDEAlink Curve accepts measurement files from the GRACoL P2P23x target (and later versions) produced by standard measurement tools, and produces a list of CMYK percentage values that can be exported as a text file or printed directly from IDEAlink Curve. These percentage values can then be applied to the calibration tables of most RIPs or software drivers.

System Requirements

IDEAlink Curve is a standalone software package available in both Mac and Windows versions. You must order the correct version for your platform. One version will not work on the other platform.

Installing and Registering IDEAlink™ Curve

When you purchase IDEAlink Curve you will be given an authorization code that requires registration before the software is unlocked. Simply go to www.chromix.com/idealink/register and enter this authorization code along with your desired username, platform and other registration information and you will be issued a serial number to unlock the software. If you have not yet downloaded the software, you can download it from www.chromix.com/idealink. When you have downloaded the program just run it and then enter your user name and serial number and you are good to go!

Differences between Mac and Windows

There are cosmetic User Interface (UI) differences between the Mac and Windows versions of IDEAlink Curve, but functionality is identical on both platforms. The Mac interface is shown in *Figure 1.1*. The Windows interface is shown in *Figure 1.2*. Both UIs will be used throughout this documentation.

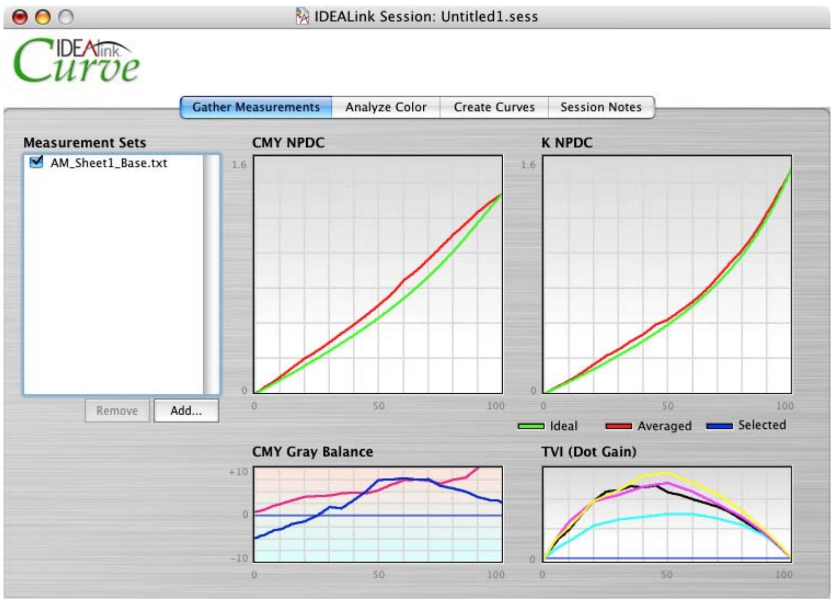


Figure 1.1 IDEAlink Curve User Interface (Mac)

Figure 1.2 IDEAlink Curve User Interface (Windows)

Software Updates

Like many software programs, IDEAlink Curve can automatically check to see if software updates are available. With your permission, updates will be downloaded and installed automatically. *See Figure 1.3.*

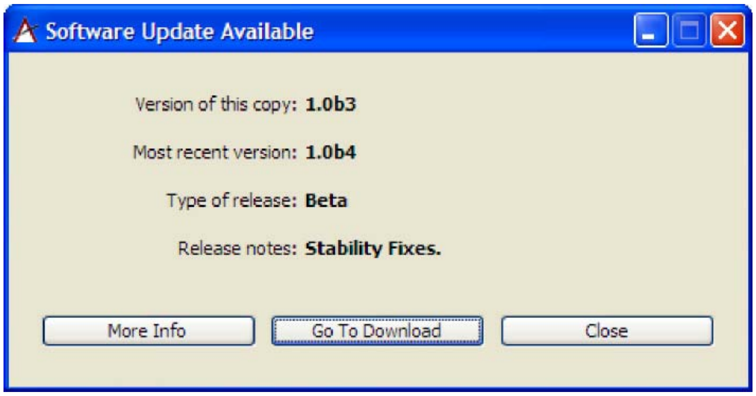


Figure 1.3 Software Update notice (Windows)

Reporting Software Problems

If you have problems or suggestions for new features, you can report them using the IDEAlink Curve feedback system. In the Windows version, click on the Window menu and select `Feedback System`. In the Mac version, click on the IDEAlink Curve menu and select `Feedback System`. *See Figure 1.4.*

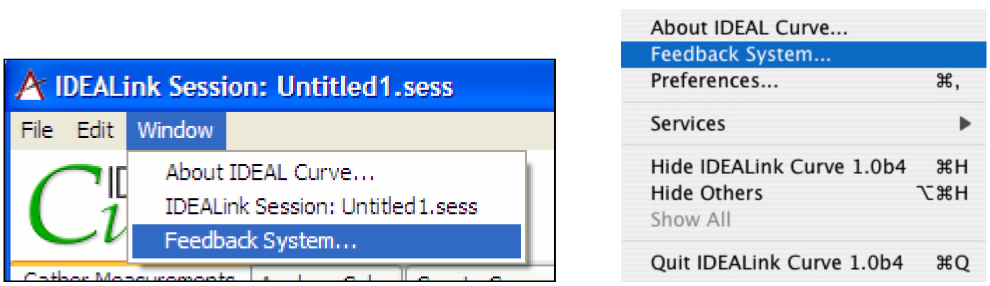


Figure 1.4 Accessing the Feedback System on Windows (left) and Mac (right)

About Sessions

The unit of work in IDEAlink Curve is the **Session**. A Session consists of all measurements from a calibration exercise or device and all user-settings. With IDEAlink Curve you can average and compare measurements in one Session to one another and to G7 aim values. The main product of a session is a set of correction percentages that can be applied to your RIP or device. Sessions can be saved, loaded and opened in another copy of IDEAlink Curve.

About Function Tabs

The most frequently used functions in IDEAlink Curve are organized as tabs across the top of the program interface. *See Figure 1.5*. Each of these functions is documented in detail in this Users Guide.

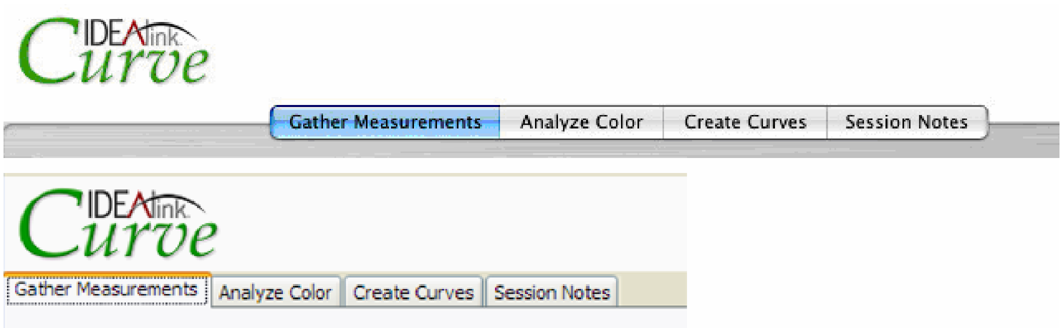


Figure 1.5 Function tabs on Mac (top) and Windows (bottom)

User Guide Conventions

For this User Guide, the following conventions have been used:

Terms are identified by bold roman type. Terms can be found in the index.

Menu items or **command buttons** are identified in san serif bold type.

A *reference* within the text is identified in italics.

Note: indicates that an explanatory note follows.

Target Printing and Measurement

Directions for printing and measuring the P2P target to provide input to IDEAlink Curve can be found in *Appendix A* of the User Guide.

Applying Values to a RIP

Directions for applying the Output Curve values calculated by IDEAlink Curve to a RIP or printer driver can be found in *Appendix B*

2

Begin a Session

The IDEAlink Curve unit of work is the **Session**. A Session is made up of the measurements you are evaluating from a particular calibration exercise. When beginning a Session, the best practice is to start by making session notes. Session notes document all aspects of the session for future use.

Record Session Notes

To begin a session click on the Session Notes function on the upper tabs. *See Figure 2.1.*

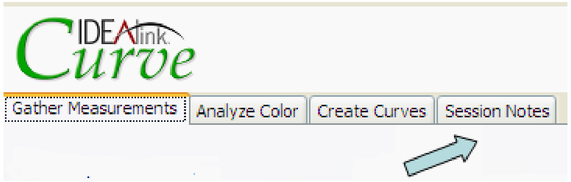


Figure 2.1 The Session Notes tab (Windows)

You will now see the Session Notes Screen. *See Figure 2.2.* From this screen you can enter all relevant information about the session or device you are calibrating, including company, operator, paper, inks, device, date, and notes.

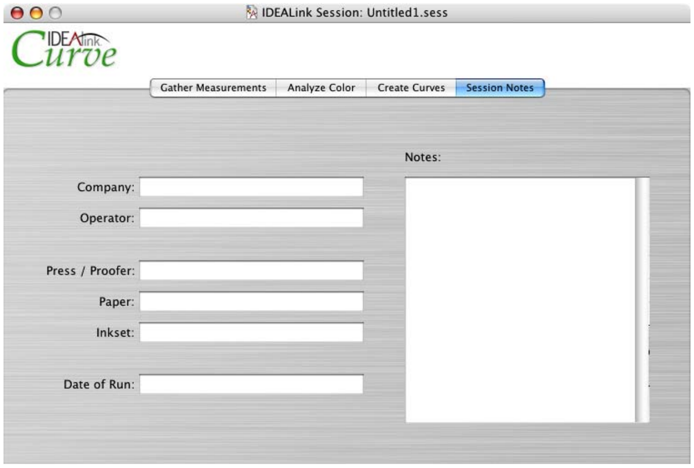


Figure 2.2 The Session Notes screen (Mac)

Gather Measurements

The next step is to import the data from your measurement device. IDEAlink Curve does not interface directly with a measurement device. You must first measure the P2P target and save the measurement data file on your computer. You can then add the measurement data file to the session by clicking on the **Gather Measurements** tab. *See Figure 2.3.*

Note: IDEAlink Curve can import the Logo file format saved out of GretagMacbeth software and the CGATS file format saved out of X-Rite software. Other formats may not be compatible with IDEAlink Curve. To learn more about printing and measuring the P2P target see *Appendix A*.

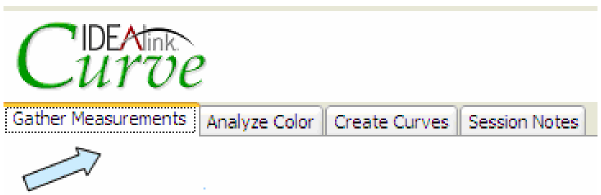


Figure 2.3 The Gather Measurements tab (Windows)

Gather Measurements Screen

The **Gather Measurements Screen** lets you gather the measurement files you wish to evaluate during the Session. It also lets you make comparisons between the measurement sets and the ideal G7 **Neutral Print Density Curves (NPDCs**) which are the target curves of a properly G7-calibrated device. *See Figure 2.4.*

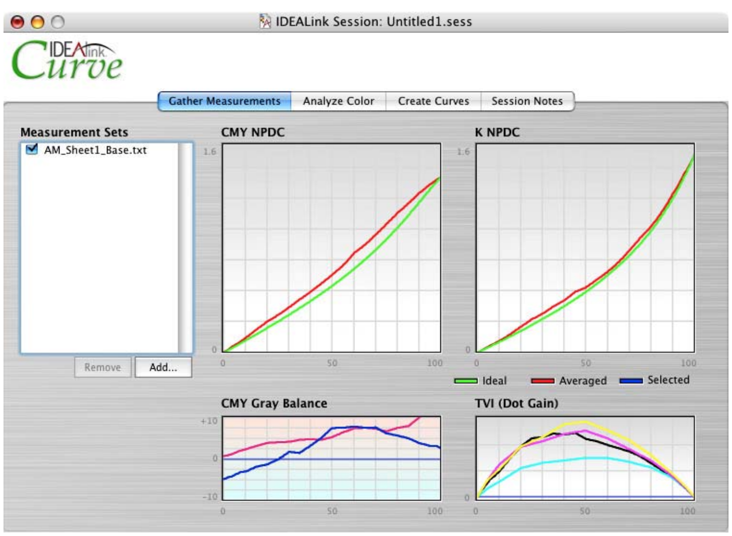


Figure 2.4 The Gather Measurements screen (Mac)

Adding Measurement Sets

To add a new measurement set, click the Add button and browse for the file you want. *See Figure 2.5.*

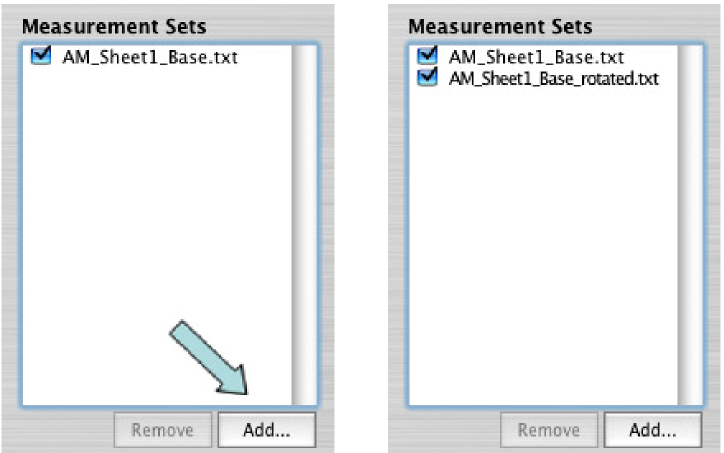


Figure 2.5 Adding Measurement Sets (Windows)

You can also drag and drop files into the measurement sets window. New sets appear in the Measurement Sets list with a check mark to indicate they are being averaged with other sets in the session.

Temporarily Disabling and Enabling Measurement Sets

To temporarily disable a measurement set, click on the checkbox alongside it. When the check mark disappears the de-selected set will no longer be part of the session average. To re-enable it, simply click the checkbox again till the check mark appears. This will add the measurement set back into the session average.

Removing Measurement Sets

To permanently remove a set from a Session, click on the measurement set you wish to remove to highlight it. Then click the Remove button.

Saving Your Session

Before exiting IDEAlink Curve, remember to save your session. If you quit IDEAlink Curve without saving the session, a warning dialog appears. *See Figure 2.6.*

Figure 2.6 The Save Session warning (Mac)

3

Compare Measurements

Once measurements have been gathered you can compare them to one another and to the ideal G7 **NPDC** curves in real time. By default all measurement sets added to a session will be averaged and contribute to the displayed graphs. You can compare individual data sets by checking / unchecking each set. This lets you determine if any measurement set is significantly different from the average, and if necessary eliminate it from the set.

Averaging Measurement Sets

By default all checked measurement sets are averaged together. The resulting 'average curve' is displayed (separately for Black and CMY) in red. The ideal NPDC curves appear in green. *See Figure 3.1.*

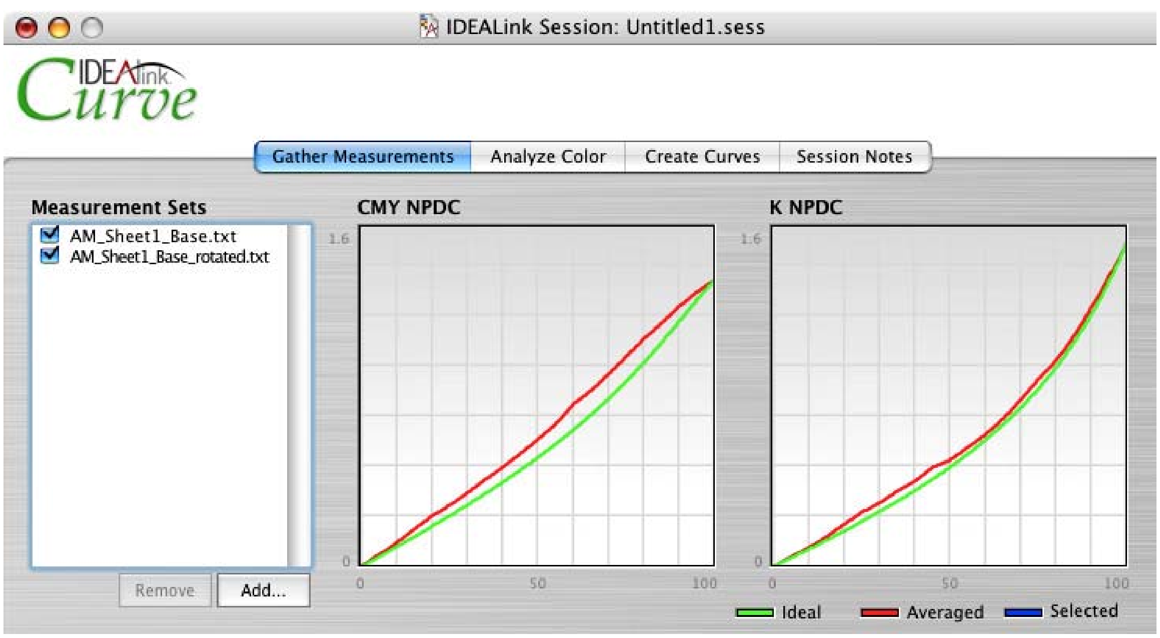


Figure 3.1 Graphs of the average of two measurement sets (red) vs. ideal NPDC curves (green)

Displaying a Single Measurement Set

If you want to see the curve of just one measurement in a session, simply click on the measurement file name. The graphs will change colors to show the selected data in blue. *See Figure 3.2.*

Note: Although one measurement set may be highlighted (blue) all other functions in the software still act on the average of all enabled sets.

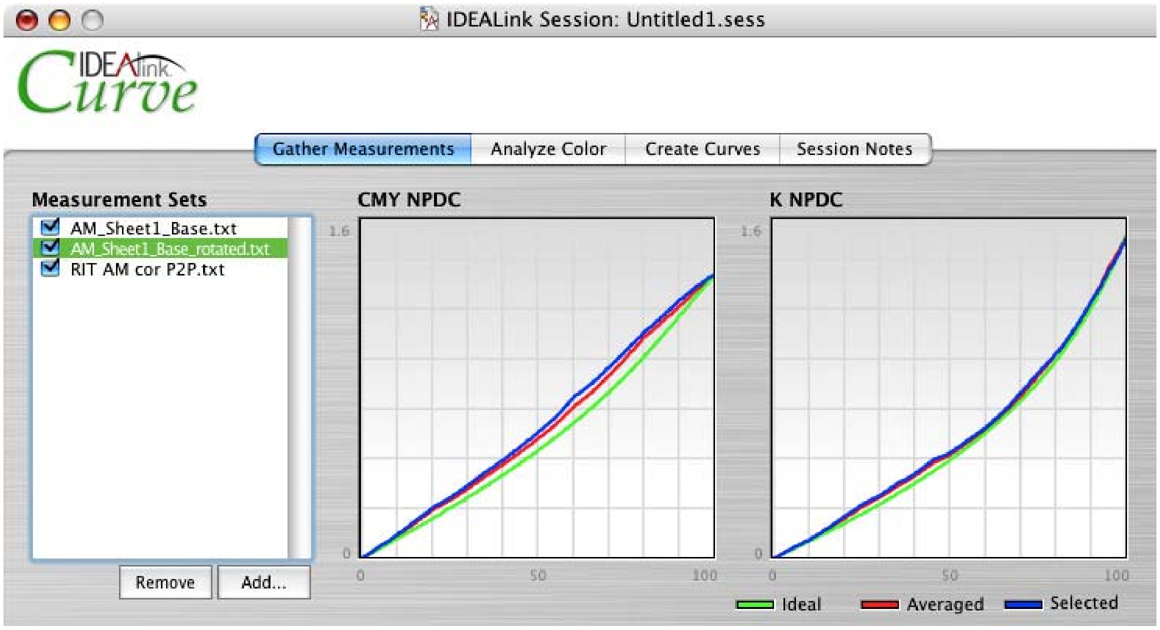


Figure 3.2 Graphs showing average (red) and selected (blue) measurement sets (Mac)

4

Analyze Color

In addition to comparing your measurements with the Ideal NPDCs, you can use IDEAlink Curve to analyze certain aspects of the averaged data's color. To access this function, click on the Analyze Color tab. *See Figure 4.1.*

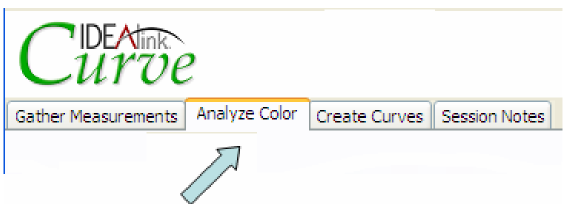


Figure 4.1 The Analyze Color tab (Windows)

Analyze Color Screen

The **Analyze Color Screen** lets you view the Ink Hue and Chroma, Gray Balance and TVI graphs of the averaged session data.

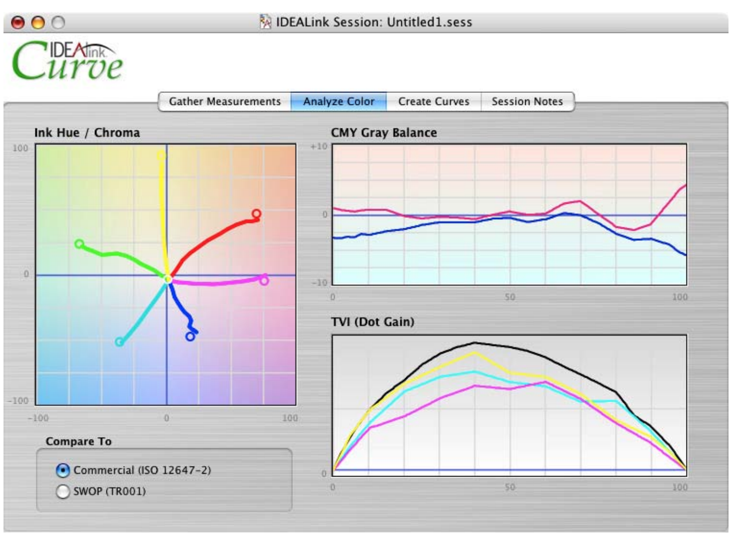


Figure 4.2 Analyze Color screen (Mac)

Note that the Gray Balance and TVI curves are also shown (smaller) in the Gather Measurements Screen to help evaluate each measurement set as it is added to the Session.

Evaluate Ink Hue/ Chroma

The **Ink Hue / Chroma** graph lets you evaluate ink hue and chroma relative to specifications for publication printing (SWOP/ISO TR001) or standard commercial printing inks (ISO 12647-2). Click on the appropriate `Compare To` option to choose SWOP or ISO 12647-2. The default is ISO12647-2. *See Figure 4.3.*

The **Ink Hue / Chroma** graph shows a*/b* plan-view plots of each pure ink scale (CMY) and each two-color overprint scale (RGB) as it increases from paper white at the center to maximum saturation at the outer end. The aim point circles are located at the ideal a*/b* values of the selected reference, with the circle size representing an approximate tolerance.

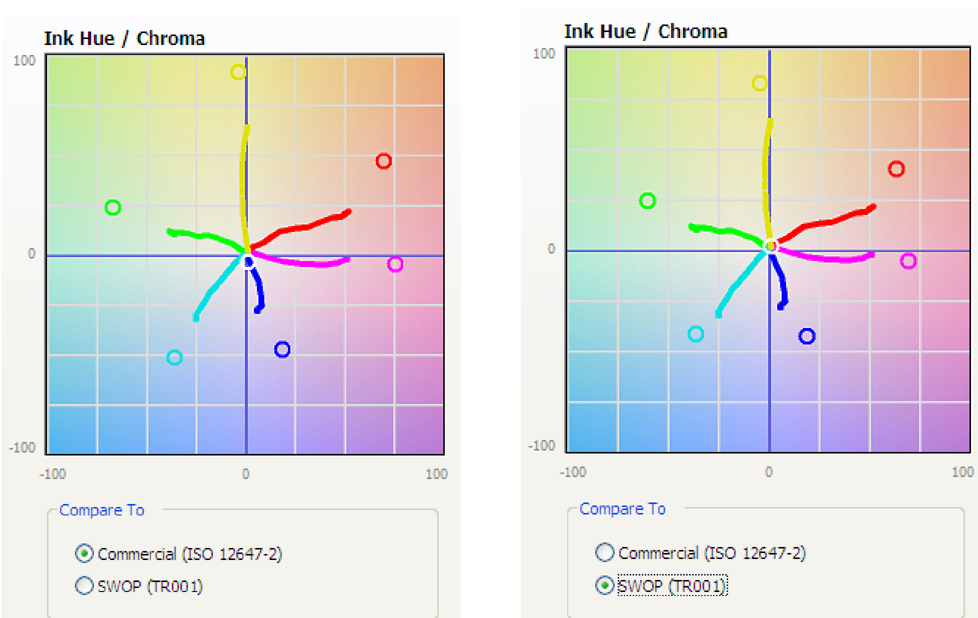


Figure 4.3 Ink Hue/ Chroma compared to ISO 12647-1 and SWOP/TR001 (Windows)

In theory the solid CMY inks and their two-color overprints (RGB) when printed in the correct way on the correct paper should end within each circle, however the acceptable tolerance may be greater in some applications than indicated by these diagrams.

Note: The `Compare To` choice only affects the Ink Hue / Chroma graphs. It has no effect on the Gray Balance or TVI graphs.

Analyze Gray Balance

The IDEAlink Curve Gray Balance graph displays the a* (red) and b* (blue) balance of a CMY gray scale from white (left) to 300% (right). *See Figure 4.4.*

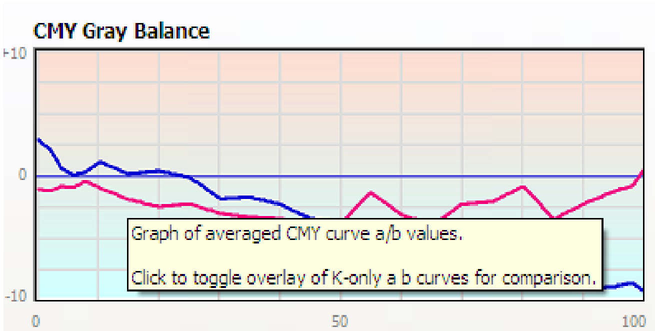


Figure 4.4 *CMY Gray Balance graph (Windows)*

If you click on this graph you can see an overlay of the K-only gray balance curves displayed in blue (b*) and brown (a*). *See Figure 4.5*. Click again to remove the K-only curves.

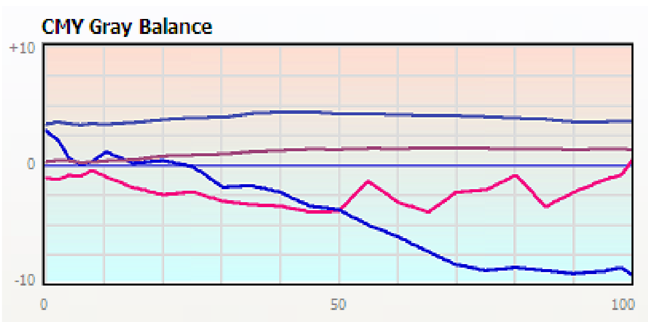


Figure 4.5 *K-only a/b Curves visible (Windows)*

Analyze TVI

IDEAlink Curve provides a TVI (Dot Gain) graph to help evaluate individual ink performance. *See Figure 4.6*.

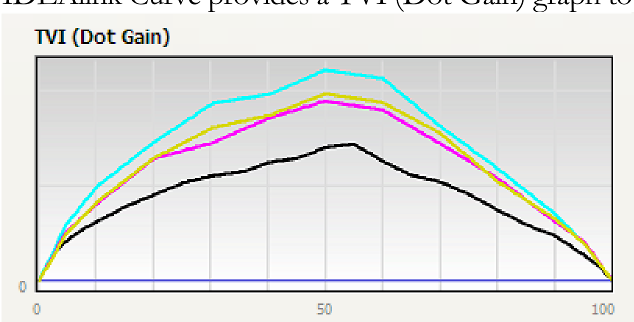


Figure 4.6 *TVI Curve graph (Windows)*

Caution: The TVI graphs shown in IDEAlink Curve are generated using a CIEXYZ formula, not a true Density-based formula. TVI values measured by a traditional densitometer will probably be different (usually higher) than the values indicated in these curves.

5

Calculate Curves

The most important function provided by IDEAlink Curve is the calculation of **Output Curve** values. These are designed to adjust the device being calibrated to meet the G7 NPDC and gray balance specifications. To access this function click on the `Create Curves` tab. *See Figure 5.1.*

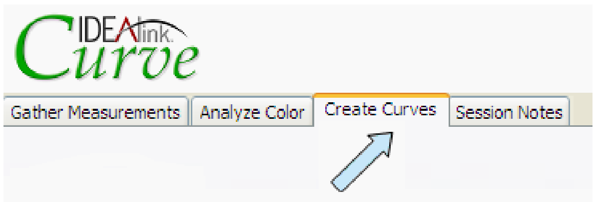


Figure 5.1 The Create Curves tab (Windows)

Create Curves Screen

The **Create Curves Screen** displays Output Curve values and other information. *See Figure 5.2.*

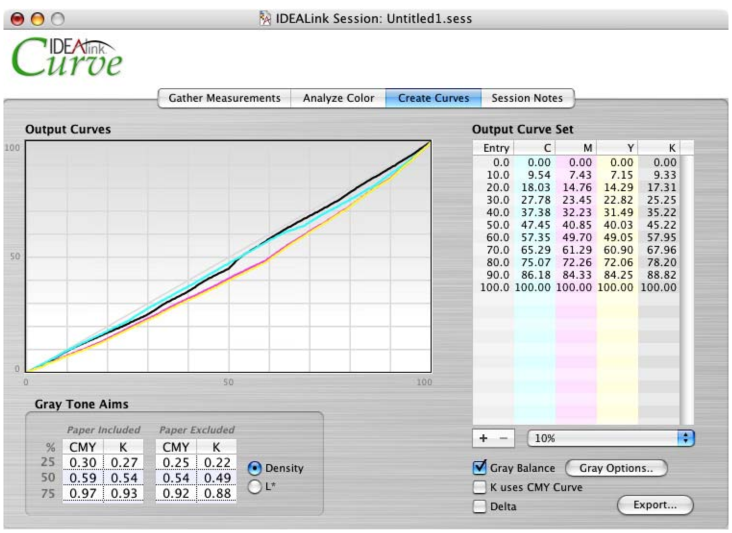
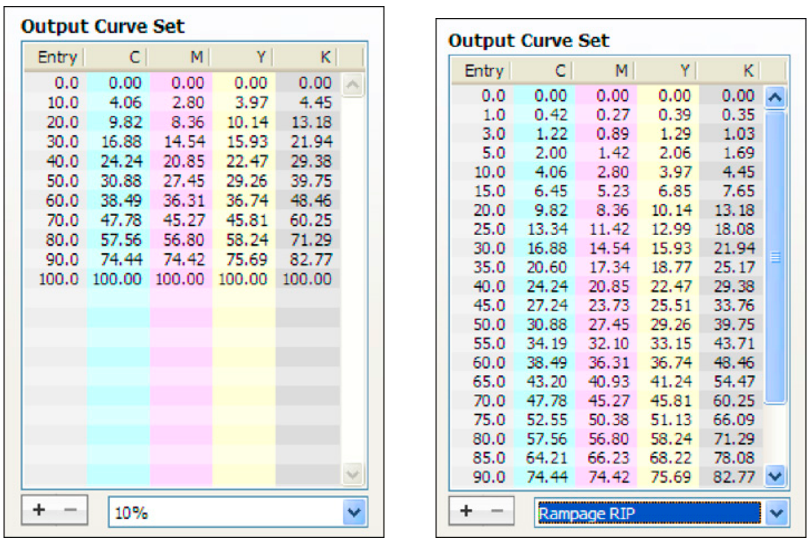


Figure 5.2 The Create Curves screen (Mac)

Choosing Entry Values

The first step is to choose the number of Entry Points, and their percentage values. If your RIP requires specific Entry points, make sure these are visible in the **Output Curve Set** display. If your RIP lets you choose your own Entry points, add enough points to control the wanted curve shape smoothly.

In the pop-up menu below the list you can select curve points every 2%, 5%, 10%, or 25%, or select specific Entry point sets customized for specific RIPs, such as Rampage or Harlequin. *See Figure 5.3.*



Output Curve Set

Entry	C	M	Y	K
0.0	0.00	0.00	0.00	0.00
10.0	4.06	2.80	3.97	4.45
20.0	9.82	8.36	10.14	13.18
30.0	16.88	14.54	15.93	21.94
40.0	24.24	20.85	22.47	29.38
50.0	30.88	27.45	29.26	39.75
60.0	38.49	36.31	36.74	48.46
70.0	47.78	45.27	45.81	60.25
80.0	57.56	56.80	58.24	71.29
90.0	74.44	74.42	75.69	82.77
100.0	100.00	100.00	100.00	100.00

+ − 10%

Output Curve Set

Entry	C	M	Y	K
0.0	0.00	0.00	0.00	0.00
1.0	0.42	0.27	0.39	0.35
3.0	1.22	0.89	1.29	1.03
5.0	2.00	1.42	2.06	1.69
10.0	4.06	2.80	3.97	4.45
15.0	6.45	5.23	6.85	7.65
20.0	9.82	8.36	10.14	13.18
25.0	13.34	11.42	12.99	18.08
30.0	16.88	14.54	15.93	21.94
35.0	20.60	17.34	18.77	25.17
40.0	24.24	20.85	22.47	29.38
45.0	27.24	23.73	25.51	33.76
50.0	30.88	27.45	29.26	39.75
55.0	34.19	32.10	33.15	43.71
60.0	38.49	36.31	36.74	48.46
65.0	43.20	40.93	41.24	54.47
70.0	47.78	45.27	45.81	60.25
75.0	52.55	50.38	51.13	66.09
80.0	57.56	56.80	58.24	71.29
85.0	64.21	66.23	68.22	78.08
90.0	74.44	74.42	75.69	82.77

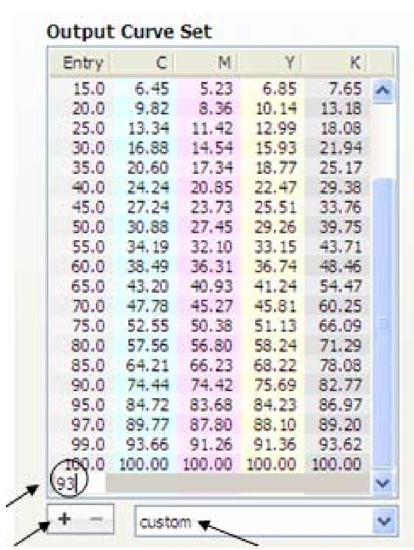
+ − Rampage RIP

Figure 5.3 Choosing Entry Values (Windows)

Adding/Subtracting Entry Values

Add extra Entry points wherever your device NPDC curves bend significantly when compared to the ideal. To add an entry point click on the + (add) symbol at the bottom left of the Output Curve Set window. *See Figure 5.4.*

To delete an Entry point, click on the entry point till it is highlighted, then click the – (subtract) symbol at the bottom left of the Output Curve Set window.



Output Curve Set

Entry	C	M	Y	K
15.0	6.45	5.23	6.85	7.65
20.0	9.82	8.36	10.14	13.18
25.0	13.34	11.42	12.99	18.08
30.0	16.88	14.54	15.93	21.94
35.0	20.60	17.34	18.77	25.17
40.0	24.24	20.85	22.47	29.38
45.0	27.24	23.73	25.51	33.76
50.0	30.88	27.45	29.26	39.75
55.0	34.19	32.10	33.15	43.71
60.0	38.49	36.31	36.74	48.46
65.0	43.20	40.93	41.24	54.47
70.0	47.78	45.27	45.81	60.25
75.0	52.55	50.38	51.13	66.09
80.0	57.56	56.80	58.24	71.29
85.0	64.21	66.23	68.22	78.08
90.0	74.44	74.42	75.69	82.77
95.0	84.72	83.68	84.23	86.97
97.0	89.77	87.80	88.10	89.20
99.0	93.66	91.26	91.36	93.62
100.0	100.00	100.00	100.00	100.00
93				

+ − custom

Figure 5.4 Adding a 93% Entry Point (Windows)

K Uses CMY Curve

The **K Uses CMY Curve** check box (*See Figure 5.5.*) causes the K curve to use the same reference curve as CMY. This produces a black scale that matches the CMY gray scale's neutral density from paper white to 50%, as suggested in the 2005 GRACoL 7 method. Many printers feel this makes press control more intuitive, however as of February 2006 GRACoL recommends calibrating the black channel to a lighter curve, in order to align with current ISO 12647-2 rules. If you select the **K Uses CMY Curve** option the Output Curve Set values and graphs will show higher K values.

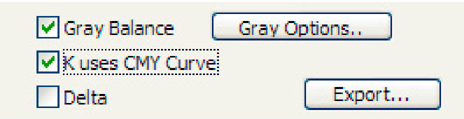
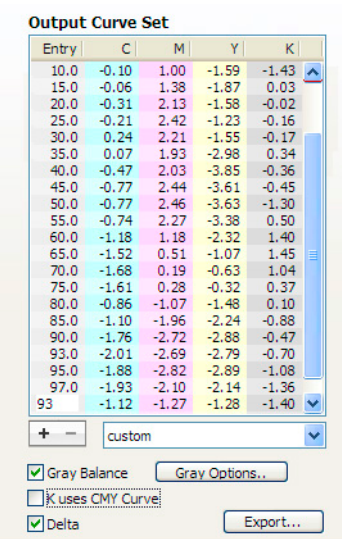


Figure 5.5 The K Uses CMY button (Windows)

Delta Values Vs. Absolute Values



Entry	C	M	Y	K
10.0	-0.10	1.00	-1.59	-1.43
15.0	-0.06	1.38	-1.87	0.03
20.0	-0.31	2.13	-1.58	-0.02
25.0	-0.21	2.42	-1.23	-0.16
30.0	0.24	2.21	-1.55	-0.17
35.0	0.07	1.93	-2.98	0.34
40.0	-0.47	2.03	-3.85	-0.36
45.0	-0.77	2.44	-3.61	-0.45
50.0	-0.77	2.46	-3.63	-1.30
55.0	-0.74	2.27	-3.38	0.50
60.0	-1.18	1.18	-2.32	1.40
65.0	-1.52	0.51	-1.07	1.45
70.0	-1.68	0.19	-0.63	1.04
75.0	-1.61	0.28	-0.32	0.37
80.0	-0.86	-1.07	-1.48	0.10
85.0	-1.10	-1.96	-2.24	-0.88
90.0	-1.76	-2.72	-2.88	-0.47
93.0	-2.01	-2.69	-2.79	-0.70
95.0	-1.88	-2.82	-2.89	-1.08
97.0	-1.93	-2.10	-2.14	-1.36
93	-1.12	-1.27	-1.28	-1.40

By default IDEAlink Curve calculates absolute 'Wanted' values for every curve Entry point. Some RIPs require delta values (wanted changes) rather than absolute 'Wanted' values. If you are working with such a system, enable the **Delta** checkbox. *See Figure 5.6.*

Note: The Delta function is also useful when comparing the calibrated device (after calibration) to the Ideal NPDCs. Delta values less than 1% indicate a good calibration. Delta values of 0% would indicate a theoretically perfect calibration, but are unlikely in real-world practice due to device variations and rounding errors.

Figure 5.6 Delta Values (Windows)

Exporting Values

Clicking on the **Export** button lets you export the Output Curve values list as a data file. Note that you can also cut the values from the curve list and paste them into a document in an application like Microsoft Excel.

Gray Balance Options

Although IDEAlink Curve will calculate gray balance corrections automatically, via different Output Curve values for C, M and Y, there are times when it is better that the CMY calibration curves are identical, for example when an inherently unstable device like an offset press is nearly neutral, or when you know it can be neutralized next time you print by slight adjustments to solid ink densities or other variables.

Switching gray balance off

Gray balance correction can be switched OFF by un-checking the **Gray Balance** button in the Create Curves screen. When Gray Balance is OFF, IDEAlink Curve calculates identical CMY Output Curve values based on the NPDC curve aims.

Switching gray balance on

Gray balance correction can be switched ON (default condition) by checking the **Gray Balance** button in the Create Curves screen. When the **Gray Balance** button is checked, IDEAlink Curve calculates separate Output Curve values for C, M and Y.

When gray balance is on you can control how gray balance will be based by clicking the **Gray Options** button.. *See Figure 5.7.*

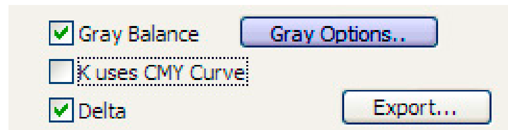


Figure 5.7 The Gray options button (Windows)

Changing the gray balance basis color

Gray Balance can be based on the color of the actual paper the P2P target was printed on by clicking **Gray Options** and checking the **Paper White** button. Alternately, gray balance can be based on an arbitrary paper color (for example the paper color of the characterization data you are trying to imitate) by clicking **Custom White** and entering the a* and b* values manually. The default condition is **Custom White** with values of 0 a* and -2 b*. *See Figure 5.8.*

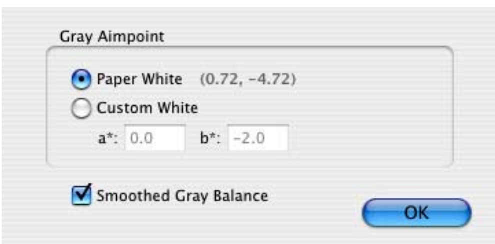


Figure 5.8 Paper White (Mac)

Smoothed gray balance

By default IDEAlink Curve produces smoothed gray balance curves based on an average of the whole CMY gray scale. This minimizes the possibility of unwanted side-effects on devices whose gray balance is unstable - like offset presses. By un-checking the **Smoothed Gray Balance** button you will create more complex CMY gray balance correction curves based on the separate errors discovered at 12.5%, 25%, 37.5%, 50%, 62.5% and 75% cyan values. *See Figure 5.9.*

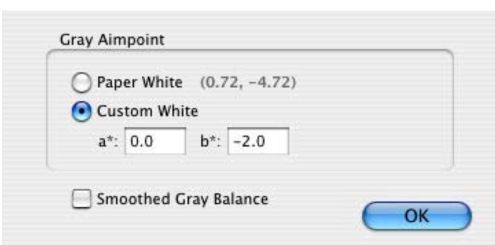


Figure 5.9 Turning Smoothed Gray Balance off (Mac)

Note: Switching Smoothed Gray Balance OFF does NOT switch off gray balance.

Caution: Switching Smoothed Gray Balance OFF is only recommended if the device has stable and repeatable gray balance. It is usually safe to switch smoothed gray balance OFF for ink jet printers and laminate-based pre-press proofing systems. It is usually best to leave Smoothed Gray Balance ON for offset presses.

Gray Tone Aims

The Gray Tone Aims window (*See Figure 5.10*) automatically calculates the neutral gray scale aim values for your particular device at three levels, 25%, 50% and 75%. If patches with these percentage values are included in your press or proofer control bar, the Gray Tone Aim values provide quick and easy aim values by which you can test your device's proper NPDC performance during production.

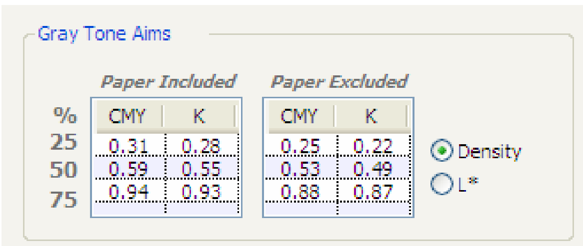


Figure 5.10 Density Gray Tone Aims (Windows)

The 25% aim is equivalent to the G7 **HC** (Highlight Contrast) value, the 50% aim is equivalent to the G7 **HR** (Highlight Range) value, and the 75% aim is equivalent to the G7 **SC** (Shadow Contrast) value

The values shown by default in the Gray Tone Aims chart are **ND** (neutral density) values specific to the condition of your device at the time it was calibrated. The **Paper Excluded** values can be checked by measuring the appropriate patch and subtracting paper density. This two-click process can be reduced to a single click by using **Paper Included** values, but note that these values should be re-calculated if you print on a brighter or darker paper than you used for the device calibration. To calculate new **Paper Included** aims for a new paper of different lightness, simply measure the new paper and add the new paper density to the **Paper Excluded** aim values.

If you prefer to monitor gray tone aims in L* readings, click on the L* button. Note that L* aims are only provided with paper included, as it unwise to make L* readings with paper excluded. *See Figure 5.11.*

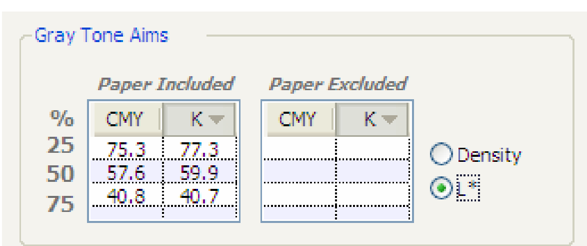


Figure 5.11 L Gray Tone Aims (Windows)*

A

Appendix A: Directions for Measurement

The starting point for using IDEAlink Curve is printing and measuring the P2P target. Those steps are outlined in this Appendix. Further details can be found in the companion document 'Calibrating, Printing and Proofing by the G7 Method' *free at www.gracol.org*.

Printing the P2P Target

For a new calibration, the P2P target should be printed in exactly the same way as normal work, but with no calibration curves present in the device RIP or driver. If calibrating a device with possible unevenness, for example an offset press, print least two targets rotated 180° from each other, let IDEAlink urve average both measurement sets.

If the target will be measured on an X-Rite DTP70 or a GretagMacbeth Eye One, be sure to print the target at exactly the same size as the file. If the target will be measured with a GretagMacbeth SpectroScan or a hand-held device in spot mode, you can re-size or stretch the P2P target size to fit the available area, but each patch must be at least 6mm (1/4 inch) on the shortest dimension.

Make sure nothing is printed on the reverse side of the targets. If back-printing is necessary, either measure with black backing or make sure the reverse image is a flat tint of uniform color and density across the whole P2P target area.

Measuring the Target in GretagMacbeth MeasureTool

- Connect the GretagMacbeth EyeOne, SpectroScan or selected device
- Select the reference file 'P2P23_reference.txt' (or the version number that matches your target
- Measure the target
- Save the file as '.txt'

Measuring the Target in X-Rite ColorPort

Initial installation

- Launch ColorPort
- From the 'File' menu, open 'Target Manager' and Import the 2 .xml files, 'P2P EyeOne_DTP70 Hybrid.xml' and 'P2P DTP70_EyeOne Hybrid.xml'

With the GretagMacbeth EyeOne

- Launch ColorPort
- Click the 'Measure Target' tab
- In the 'Target' pop-up select ... 'P2P EyeOne_DTP70 Hybrid'
- Measure the target
- Save the file as a CGATS document

With the X-Rite DTP70

- Launch ColorPort
- Click the 'Measure Target' tab
- In the 'Target' pop-up select ... 'P2P DTP70_EyeOne Hybrid'
- Measure the target
- Save the file as a CGATS document

B

Appendix B: Applying Output Curve values to a RIP

Mmost professional RIPs and printer drivers provide some form of user-accessible calibration system, but how the calibration system works, and what type of information it will accept from the user, can vary widely. This appendix offers general advice on applying the Output Curve values produced by IDEAlink Curve to the RIP or printer driver. Because calibration utilities differ, no single set of instructions will apply to every RIP, and some experimentation may be necessary to find the best way to enter IDEAlink Curve values into your particular RIP.

Detailed instructions for individual RIPs will be offered as they become available. If your specific RIP is not described, feel free to submit your own notes (with screen images) for inclusion in future versions of this guide, to dkennedy@idealliance.org.

Output Curve Values

The Output Curve values shown in the **Create Curves** window of IDEAlink Curve are the values you want each Entry point to be **after calibration**. For example, if the 50% Entry point has an Output Curve value of 55%, your device should output a 55% value for an original value of 50%,. In other words 50% tones should be darkened by 5%. If you are not sure how to apply the Output Curve values, see your RIP's instruction manual or contact your RIP supplier. If you want to experiment yourself, the following notes on generic calibration principles may help.

Generic Calibration Principles

Calibration Curves

IDEAlink Curve assumes that your printer calibration system controls the behavior of individual CMYK colorants (inks) via 1-dimensional curves or LUTs (look-up tables). If your printer does not use a curve-based calibration system, it may not be directly-compatible with the output values of IDEAlink Curve.

Unit Values and Precision

Most CMYK calibration systems assume that the original pixel values are in halftone dot percentage units from 0 to 100%. Because there are 256 tone values in a typical 8 bit pixel, the calibration system should accept fractional percentage values (e.g. 0.41%, 1.23%, 49.87%, etc.) as produced by IDEAlink Curve. If your system only accepts 'integer' percentages (whole numbers like 1%, 2%, 50%, etc.,) calibration accuracy may be compromised, especially in lighter tones.

Some systems, for example RGB color film recorders, may work in 8-bit digital units ranging from 0 to 255 (8-bit) or 16-bit digital units ranging from 0 to 65,535. In both cases higher values usually mean lighter tones but the opposite may also be true, depending on the system. Output percentages from IDEAlink Curve can be converted to 8-bit or 16-bit digital values in an application like Microsoft Excel. *See 'Calibrating, Printing and Proofing by the G7 Method' - Appendix D.*

A few RIPs accept calibration values in density units, usually with two decimal places. At the moment density values are not generated by IDEAlink Curve.

Curve Entry Points

A calibration system controls the final curve shape via a number of 'Entry points', which may also be called 'control points', 'scale steps', 'starting values', 'index values', or some similar name.

Entry points are usually named for the image values they control (e.g. halftone percentages or digital 0-255 values) but they may sometimes be named in a numerical sequence. For example a device with 25 Entry points may use point 1 to control the 0% image value and point 25 to control the 100% image value.

Some rips have a pre-set number of Entry points. Other RIPs allow the user to vary the quantity and value of each Entry point. IDEAlink Curve contains some pre-set sequences of Entry points. You can also add or subtract Entry points to meet the needs of any specific RIP. *See Section 5, Adding and Subtracting Entry points.*

Understanding 'Measured' and 'Wanted' values

Most RIPs allow the user to enter two values for each Curve Entry point - the 'Measured' value and the 'Wanted' value. Wanted percentages may also be called 'Target' or 'Goal' or 'Aim' percentages. The Output Curve values shown in IDEAlink Curve's Create Curves window are 'Wanted' values.

Note: If you accidentally enter IDEAlink Curve's Output Curve values as 'Measured' values, the calibration will be incorrect.

If your RIP requires you to enter 'Measured' values, make sure each one is the same as the **Entry Point** value, for example, enter 50% as the Measured value for the 50% Entry point. You must then enter the IDEAlink Curve Output Curve values in another list of 'Wanted' percentages, (absolute or delta).

If the RIP does not accept 'Wanted' values

If your RIP only accepts 'Measured' values, with no place to enter 'Wanted' values, try subtracting the delta percentages shown in the Output Curves list from the RIP's Entry point percentages, and entering the resulting numbers as 'Measured' values. Note that the success of this method will depend on which of several possible ways the RIP uses the 'Measured' percentages. Test the RIP first on a stable device like a proofing system, or measure the change on a set of plates to see if subtracting the delta values is accurate, before applying this method to an actual press run. In extreme cases this method may require a 2-pass calibration.

Specific RIP Instructions

As we learn from users or manufacturers how to enter IDEAlink Curve's Output Curve values in specific RIPs or printer drivers, those instructions will be added here for your convenience. Remember that software and devices change over time, so please check with your manufacturer to make sure these notes are still valid.

Artwork Systems Symphony Calibrator

- Measure P2P with (no curves applied to proof or press sheet) and create a text file.
- Add the text file into IDEAlink Curve.
- Export the resulting data from IDEAlink Curve.
- Open the exported file in Excel and extract the required information.
- Place this information in a new Excel document and save as a text file.
- Use the Load Data function in Symphony Calibrator to import the text file.
- Place the Symphony Calibrator Curves in the appropriate AWS Nexus workflow.

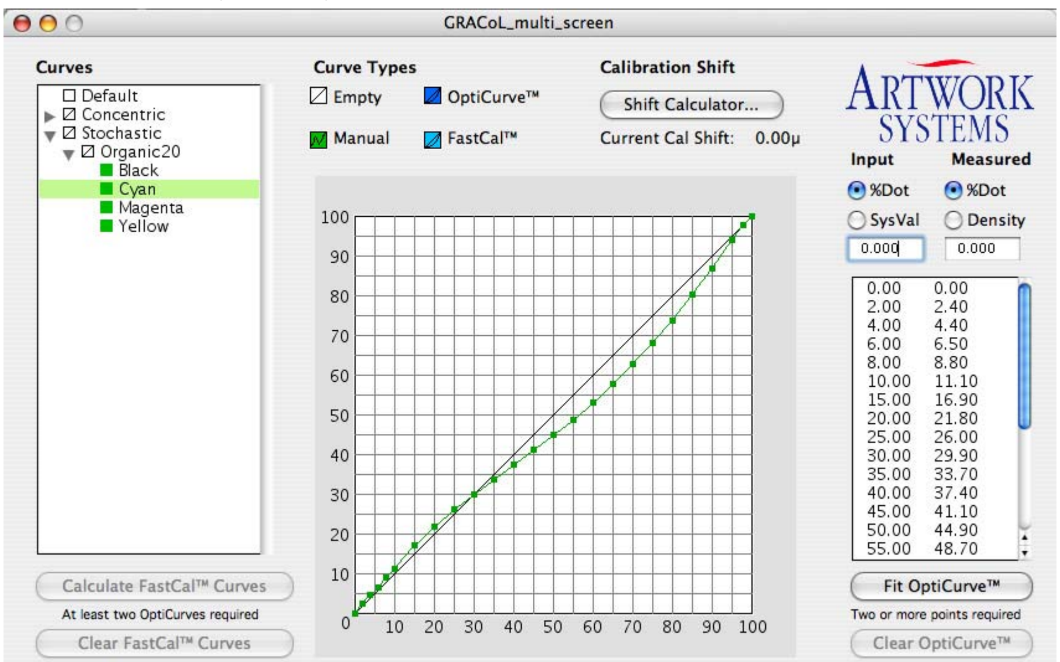


Figure B.1 Artwork Systems Symphony Calibrator (not part of IDEAlink Curve software)

Kodak XP4 Proofer RIP

Unlike most proofing RIPs, the Kodak XP4 proofer requires the user to begin by entering density values, rather than dot percentages, into the Dot Gain Manager. The RIP then calculates the equivalent TVI values as a basis for subsequent curve corrections. This changes the normal RIP entry process slightly, as follows;

- Run an un-calibrated proof on the XP4 to get benchmark dot gain numbers, and measure the C, M, Y and K scales in traditional density, in at least 10% steps, with an additional 5% and 95% step.
- Enter the measured density values for C, M, Y and K into the Benchmark Dot Gain window under the Density Entry … button.
- In the Target Dot Gain window, temporarily enter the same percentages for each channel as the Entry values indicated in the left hand column. This is the same as entering the same Measured value as the Entry point value *(see Entering 'Measured' values).*
- Run a new proof, measure the P2P23 target, and enter the measurement file into IDEAlink Curve.
- Go back to the Target Dot Gain window in Kodak Dot Gain manager and replace the temporary Target values with the new Output Curve values shown in IDEAlink Curve.

Appendix C: Glossary

This glossary is designed to assist you understand IDEAlink Curve User's Guide. A complete Glossary may be referenced in the GRACoL 7 Publication.

calibration, printer	Adjusting a printing device to a known and repeatable condition - typically by using consistent substrate and colorants, and by adjusting tonality, gray balance and other metrics to a constant measurable state
Characterization data	A file of CIELab or CIEXYZ or spectral measurements of a printed target from which, if the corresponding colorant values of each patch (e.g. CMYK percentages) are also known, an ICC profile can be created
CIE	(Commission Internationale de l'Eclairage) an international group formed in the early 20th century (still active) to study and numerically define human color vision. Described as follows at www.cie.co.at/cie; *"..an organization devoted to international cooperation and exchange of information among its member countries on all matters relating to the science and art of lighting. The CIE is a technical, scientific and cultural, non-profit autonomous organization. It has grown out of the interests of individuals working in illumination. Since its inception 90 years ago, the CIE has become a professional organization and has been accepted as representing the best authority on the subject and as such is recognized by ISO as an international standardization body."*
CIEXYZ	A standard CIE color space expressed in variables X, Y and X, corresponding to the 'visual matching functions' derived from the original CIE color vision experiments
CIELab (CIEL*a*b*)	A standard CIE color space derived from CIEXYZ where L* = Lightness, a* = the green-red vector and b* = the blue-yellow vector in a mathematically cubic space
CMY	Cyan, Magenta and Yellow
CMYK	Cyan, Magenta, Yellow and Black
Colorimetric	Based on CIE color science (as opposed to densitometry)
CtP	Computer to Plate - a plate making system which eliminates the need for intermediate positive or negative films
D-50	Industry - standard viewing light color expressed as a complete spectral energy distribution curve

Delta-E (Delta-E*, ΔE^*_{ab})	Standard CIE formula for expressing a color difference between CIELab readings. Several improvements exist, including ΔE^*_{94}, ΔE^*_{CMC} and ΔE^*_{2000}, but the original formula; $\Delta E^*_{ab} = (\Delta L^{*2} + \Delta a^{*2} + \Delta b^{*2})^{0.5}$ is simplest to calculate and adequate for the purposes of this document.
Density	Log_{10} (1 / reflectance)
Dot Gain	See 'Tone Value Increase'
Fogra	www.fogra.org - German Graphic Technology Research Association whose purpose is to promote research into, and the development and application of printing technology, and to make the results available to the printing industry.
G7	The GRACoL7 calibration and press control method. 'G' denotes the focus on 'Grays', while '7' refers to the seven colorimetric ink values of Cyan (C), Magenta (M), Yellow (Y), Black (K), Red (M+Y), Green (C+Y), and Blue (C+M).
GRACoL	www.gracol.org - Subsidiary group under IDEALliance - stands for General Recommendations for Applications in Offset Lithography
GRACoL 7	Seventh edition of the GRACoL document and specifications
Gray (Grey)	A tone or image element without any visual chroma or color. The universally-accepted spelling 'Gray' is adopted in preference to the equally-acceptable 'Grey' due to simple phonetic logic. (Samuel Johnson has a lot to answer for!)
Gray Balance	1. The relationship of C, M and Y percentages or necessary to make a theoretically neutral gray - usually defined for C = 50, (e.g. 50Cm 40M, 40Y) but also given for other gray scale steps in this document - (see Appendix E: Gray Balance) 2. The colorimetric definition of gray in CIE units - (typically zero a* and zero b* but depends on lighting conditions and personal preference) 3. The condition in which a color or image is said to be 'neutral' or uniformly gray (with no apparent coloration) when viewed under standard lighting
HC	See Highlight Contrast
Highlight Contrast (HC)	A quick process control check of NPDC in lighter tones. Density of a 25% patch minus paper density.
Highlight Range (HR)	A quick process control check of NPDC in mid-tones. Density of a 50% patch minus paper density.
HR	see 'Highlight Range'
IDEAlliance	www.idealliance.org - International Digital Enterprise Alliance - US graphic industry organization that has been developing, educating and validating best practices in publishing and information technology for 40 years
ISO	International Standards Organization
ISO 12647-2	A standard for "Graphic technology - Process control for the production of half-tone colour separations, proof and production prints - Part 2: Offset lithographic processes".
Lab (CIELab)	See CIELab
ND	Neutral Density, or the density of a neutral gray (colorless) sample (see 'Density'). Calculated in GRACoL 7 as Log_{10} (1 / CIEXYZ_Y) where $0 < Y < 1.0$, or as Log_{10} (100 / CIEXYZ_Y) where $0 < Y < 100$.
NPDC	The relationship between measured neutral density and original halftone percentages on a gray scale.

Number 1 sheet	High quality coated white commercial offset paper having nominal colorimetry values of 95 L*, 0 a* and -2 b*
P2P Target	See 'Press2Proof Target'
Press2Proof Target	(Also known as 'P2P Target') - a compact target used for analyzing NPDC and other variables during the calibration process
RGB	Red, Green and Blue - the so-called 'primary colors' of light. Also the abbreviations given to two-color solid ink patches, namely R = Magenta and yellow, G = Cyan and Yellow, B = Cyan and Magenta.
RIP	Raster Image Processor
SC	See Shadow Contrast
Shadow Contrast (SC)	A quick process control check of NPDC in neutral shadow tones. Optional replacement for Print Contrast measurement. Density of a 75% patch minus paper density.
SiCo	Abbreviation of the Sin / Cosine formula used to calculate basic G7 NPDC curves
Spectro-densitometer	A combination Spectrophotometer and Densitometer convenient for measuring the quality of press sheets and/or proofs
Tone Value	Percentage dot area or halftone value on a scale of 0% (no ink printing) to 100% (maximum ink printing)
Tone Value Increase	Tone Value Increase (formerly known as 'Dot Gain') - the reflection halftone percentage measured on a printed sample minus the original halftone percentage file value that produced it
TV	See Tone Value
TVI	See 'Tone Value Increase'

D

Appendix D: Index