



## Database Preparation for Various Substrates

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### Database Preparation for Various Substrates Using the InkMaster Formulation Software

To be successful in formulating inks using the Ink Master software you must first identify the appropriate method for building that Database. Since substrate has such an important impact on a color, proper quantification of that substrate is required. In order to take full advantage of the Ink Master program, it is suggested that you build your Database using the *Multi-Flux* method. This method requires the measurement of your letdowns over both white and black. This can be accomplished by making your prints on a contrast stock (i.e. Leneta substrate). If your substrate is transparent you can make your prints on that substrate and measure them over a white and black ceramic tile (discussed later). If you are unable to obtain a contrast stock that properly characterizes your substrate you have two options. The first is to have your substrate printed with a one to three inch black stripe across it. Unfortunately, this is cost prohibitive for most people. The second option is to enter your Database using the Single Constant method. While this method does allow you to use any substrate, it will not characterize any scattering that may be attributed to your extender or opaque white (if using white). Therefore, the Single Constant method is not recommended for high scattering inks or inks that contain opaque white. The following sections will outline the proper method to be used for your particular substrate.

#### **White Coated Substrates** (Enamel, KromeKote, C1S, etc.).

If you are using opaque inks, or inks that have a high degree of scatter, you will need to build your Database using the Multi-Flux method. In order for you to account for the scattering of your inks, measurements must be made over white and over black. This can be done by printing your Database on Coated Leneta Cards. The heavier Opacity Charts should be used for board, while the Coated Drawdown Sheets should be used for paper.

If you are using transparent inks, simply create your Database on the coated substrate that represents the majority of your work. Other substrates can be dealt with during the formulation process by measuring in the alternate substrate at that time. If you formulate on both paper and board you may want to create two sets, one for each, since the absorption properties of these two substrates can be very different. The method to use for this situation would be Single Constant.

Once you have prepared your Database, according to the Sample Preparation Guide, enter in your information as outlined in the Manual. Make sure to create several cross-mixes in order to check the accuracy of colorant prediction. If you experience trouble with these formulas, contact an X-Rite Applications Specialist.

### **White Uncoated Substrates** (Bond, Bleached Kraft, CIP, etc.).

If you are using opaque inks, or inks with a high degree of scatter, you will need to build your Database using the Multi-Flux method. In order to account for the scattering of the opaque white, measurements must be made over white and over black. This can be accomplished by printing your Database on Uncoated Leneta Sheets.

If you are using transparent inks, simply create your Database on the uncoated substrate that represents the majority of your work. Other substrates can be dealt with during the formulation process by measuring in the alternate substrate at that time. If you formulate on both paper and board you may want to create two sets, one for each, since the absorption properties of these two substrates can be very different. The method to use for this situation would be Single Constant.

Once you have prepared your Database, according to the Sample Preparation Guide, enter in your information as outlined in the Manual. Make sure to create several cross-mixes in order to check the accuracy of colorant prediction. If your formulations are adding extender to mixes that do not contain extender, you may need to adjust your k2 value (with the assistance of an Application Specialist). Typically, for heavy uncoated substrates, you will need to increase this value from 0.600 to 0.900 or higher. Because of the increased absorption of these substrates, the scatter contributed by this absorption needs to be accounted for. Increase your k2 value in 0.025 increments until you reach acceptable results, with respect to strength, during formulation. *Note:* You can only increase the k2 to a value of 0.999. Check your K vs. Concentration curve for each pigment to make sure that you have not gone too far with your adjustment. You should not have any curves that have become concave or flat (very small slope). If you continue to experience trouble with these formulas you may need to send your Database to an X-Rite Applications Specialist for review.

### **White Synthetic Substrates** (PET, PPE, Kimdura, Kivar, etc.).

Unless you can obtain an opaque synthetic substrate with a black stripe (one to three inches), or a transparent version of your substrate, you will need to enter your Database using the Single Constant method. You can try using the Leneta Opacity Chart to load your Database, however, it may not fully characterize your ink due to the non-absorption of the synthetic substrate compared to the properties of the Leneta Card. If you are able to obtain a transparent version of your substrate, see the section on transparent substrates below.

Typically, when using opaque synthetic substrates, you only need to make one Database. The variance in shade of the substrates can be accounted for in the formulation section..

Once you have prepared your Database, according to the Sample Preparation Guide, enter in your information as outlined in the Manual. Make sure to create several cross-mixes in order to check the accuracy of colorant prediction. If you experience trouble with these formulas, contact an X-Rite Applications Specialist.

### **Transparent Synthetic Substrates** (Acetate, Mylar, etc.).

Whether your inks are transparent or opaque you should build your Database using the Multi-Flux method. Most films, whether they have a printed white backing or not, are still transparent

or translucent. For these type of substrates, you will achieve the best results by measuring your prints over white and black ceramic tiles. When taking your measurements, use a few drops of water between the film and the tile so that you do not trap any air between them. This will enable the instrument to measure the true scattering properties of your ink.

Once you have prepared your Database, according to the Sample Preparation Guide, enter in your information as outlined in the Manual. Make sure to create several cross-mixes in order to check the accuracy of your colorant prediction.

*Note:* When measuring prints (standards) on clear film, make sure that you use a stable background (a white tile is recommended). If you experience trouble with these formulas, contact an X-Rite Applications Specialist.

### **Metallized Substrates** (Foil, Aluminum, Tin, etc.)

If you are using opaque inks, or inks that have a high degree of scatter, you will achieve the best results if you build your Database using the Multi-Flux method. In order for this to be effective you will need to obtain a contrast stock that will be representative of your process (both in surface and curing parameters). If you are unable to locate an appropriate substrate, you need to create your own by first “sizing” your substrate with an opaque white and then print a black stripe across it. *Note:* In order for this method to be effective, you must have a uniform print of white, as well as a controlled amount of black on each panel. Your plain substrate can then be measured in during the formulation process.

If you are using transparent inks, you will need to first print an opaque white over your substrate. You can then create your Database over this “sized” substrate using the Single Constant method. You can then enter in your plain substrate during the formulation process to account for the metallized surface. *Note:* You will need to use a sphere instrument in order to be successful. The use of a 0/45 instrument will not measure the surface properly.

Once you have prepared your Database, according to the Sample Preparation Guide, enter in your information as outlined in the Manual. Make sure to create several cross-mixes in order to check the accuracy of colorant prediction. If you experience trouble with these formulas, contact an X-Rite Applications Specialist

**Colored Substrates** (Kraft, Specialty Stock, etc.).

You do not need to create a Database for your colored substrates (non-white). You should use one of the above Databases that best represents the surface and absorption properties of your colored substrate. During the formulation process, simply measure in (or retrieve from your Substrate file) the colored substrate at that time. This will give you the best performance for that substrate because building a Database on colored substrates does not allow full characterization of the pigment with respect to hue and scatter. If you experience trouble formulating on these types of substrates, contact an X-Rite Applications Specialist.

Remember, if you can build your Database using the Multi-Flux method you will get the best performance from the InkMaster software. Please feel free to contact an X-Rite Representative if you have any questions during your Database preparation.