This document was created to help determine the cause of, and to resolve inaccurate color matches using ColorDesigner software and hardware.

This document assumes a good working knowledge of your color matching software. If this is not the case, please review your operator's manual, or visit our training website at www.measureitrite.com.

Verifying correct database

The first step, which should have been checked by customer service before this document was sent to you, is to verify that you have the latest version of your paint database. You will also want to make certain that your inventory is current. If for example a change is made to a base or colorant in a particular line and you have the latest database, but inventory from before the change was made, inaccurate matches would be expected.

You will probably want to record your database information below for future reference. Go to housekeeping/Updates, and click on Paint Databases. The alphanumeric code before the first slash is the database ID Number, the number after the first slash is the version, and the description will follow the second slash. You may have more than one database.

Example: CFL703-657/1.40/Example Database.

In this case the database ID Number is CFL703-657, the version is 1.40, and the description is Example Database.

Record your database information below:

Database ID number	Version No.	Name

Verifying spectrophotometer accuracy

This section assumes that you have a CF57 or CFS57 benchtop style instrument. Both of these look like the instrument shown to the left.

You are going to verify instrument accuracy by measuring the color of the white calibration tile, and comparing these values to the known values for the tile that shipped with your instrument. We have provided a place to record these values below.

	X	**Y**	**Z**
Values from bottom of instrument			
Test #1			
Test #2			
Test #3			

Begin by locating the X, Y, and Z values for your instrument and recording them in the first row on the above chart. The values will be located near the bottom of a label located on the bottom of your spectrophotometer.

Now you are going to measure the XYZ values of the white calibration tile. To do so, remove the dark gray cap from the calibration tile and close the sample arm. To measure the tile go to House Keeping/System Test, then click on XYZ/L*a*b* values, and then measure sample. Both XYZ and L*a*b* values will appear on screen. Record the XYZ values on the second row of the above chart, to the right of Test #1.

The next step is to calibrate your instrument as you normally do and repeat the above measurement of the calibration tile. Record the measurements on the third row of the above chart, to the right of Test #2.

Now we are going to calibrate again. Before doing so locate a clean lint free cloth, a small quantity of denatured alcohol, and the cap from a flat black spray paint can.

Remove the dark gray cap from the calibration tile. Using the clean lint free cloth, and a small amount of alcohol, thoroughly buff the white tile. Make sure that the tile is completely clean and dry. Do not touch the tile after cleaning.

Calibrate the instrument again. This time when you are performing the open port portion of the calibration, open the sample arm and place the flat black spray paint can lid over the optics (measurement hole) of your spectrophotometer. Position the lid so that it is centered over the optics and in such that you are measuring into the inside of the lid.

Again you will need to repeat the above measurement of the calibration tile. Record the measurements on the forth row of the above chart, to the right of Test #3.

Compare the readings in the row labeled Test #4 to the readings in the "Values from bottom of instrument" row.

The X and Y values should be within +/- 0.1 units from each other and the Z value should be within +/- 0.15 units from each other. In other words, if the value for X on the bottom of your instrument is 84.85, the X value in the bottom row should fall between 84.75 and 84.95. If the value for Z on the bottom of your instrument is 102.09, the Z value in the bottom row should fall between 101.94 and 102.24. **If they do not, please fax page 1 and 2 of this document, along with the cover sheet (last page of this document) to 616-534-7722, after filling in all of the information.** Mark the fax to the attention of applications and include your help desk number on the coversheet. You should have received this from the customer service rep that you talked to.

If the values in the bottom row are within this tolerance but either of the other rows were not, this was most likely your problem. Continue to clean the white tile, and to use the black cap on a regular basis when calibrating. This will probably fix your problem. If not continue on to the next steps.

Choosing the correct matching technique

There are many ways that you can get paint formulas from your ColorDesigner system. The appropriate method depends upon what your customer is expecting you to match. Sometimes, there is more that one way that could be used to achieve a formula. When this is the case, there is usually one method preferred over the others. The most common methods of getting paint formulas from your system are by using "Formula Book", "Fandeck", and "Custom Match".

The **formula book** option is used when a customer wants you to match a color from your own paint line. Because the color is not measured, you will not see any indication of the color appear on-screen. You can search for the colors by name or by number. Formula book is the option that you are likely to use most often. In theory you would expect to always get good matches using the formula book option. However, if you do not get a good match using formula book, it is possible the chip that you are comparing your drawdown to may have been altered. Many factors can affect the color of sample chips including age, temperature, and light exposure. It may be best to measure the chip using the Custom Match option.

The **fandeck** option is used when a customer wants you to match a color from one of your competitor's paint lines. *However*, if they have an actual color card from the competitor it may be best to measure the chip using the Custom Match option. Fandeck is used if they only know the competitors color name or color number. It would also be the best choice if they have a competitor's color card that is not in good condition.

The **Custom Match** option is used when a customer has a physical sample of a color that needs to be matched. After choosing the custom match option from the main screen, you will measure the sample using your spectrophotometer.

Types of materials that you may measure include:

- Fabric
- Metal
- Wood
- Vinyl siding
- Carpeting
- Wallpaper
- Ceramic tile
- Stucco
- Ceiling tile
- Old color cards which may have faded or be in poor condition (but the color on the card is what the customer wants)
- Any other physical sample

Choosing the proper illuminant

The color of a painted surface is affected by the lighting conditions (illuminant) under which we view it. ColorDesigner software allows you to choose the illuminant under which a customer will view their paint. Making a correct choice here is critical to obtaining an accurate color match. ColorDesigner provides three illuminants from which you can choose: daylight, incandescent, and fluorescent.

The daylight option should be used for all exterior applications, as it mimics sunlit conditions. Interior paint applications could be either incandescent or fluorescent. You should ask your customer which type of lighting is present in the room they intend to paint.

In some cases, where large windows or skylights are present, you may also want to use the daylight option for internal spaces. Some people in fact report good success by simply choosing daylight for all matches.

You also have the option to choose Auto illuminant. When this is done ColorDesigner uses daylight for exterior formulations and incandescent for interior formulations.

Viewing the sample

It is critical that you view your sample using the same light source that was chosen when formulating your match. If you chose incandescent lighting, you need to compare the sample and the drawdown under an incandescent light source. If you chose daylight, you need to compare the sample and the drawdown under daylight conditions.

Choosing the base

Most paint lines will have several bases which can be chosen. The appropriate base for a given match depends on a number of factors such as sheen, application, and the amount of pigment required to generate a match. It is almost always preferable to allow the software to automatically choose the base. An exception would be if you did not have the required base in stock. In this case you could manually force the software to use a different base.

Averaging

Averaging should be used any time you are attempting to match a sample that is not perfectly uniform in color. Examples would include stucco, ceiling tiles, fabric, wood, or any other material that is not perfectly smooth or uniform. The averaging option allows you to take multiple readings of the sample you are attempting to match. You simply take as many measurements as you feel necessary, and then click on the "Accept averaged measurements" button.

You can also use this feature when customers want a color that falls between two fandeck chips. Simply turn on averaging and measure each chip one time. The formulation generated will fall right between your two measurements.

Changing software settings

You can configure ColorDesigner software to allow averaging or to always choose the appropriate illuminant, and/or base. From the main menu click on the housekeeping icon, enter your password, then click on setup and features. Simple click on the box in front of any desired features to turn them on. Doing this will place an **x** in the check box to confirm activation.

Proper sample targeting

The sample that you are measuring should be large enough to fill the opening in the metal retainer ring. If not, you should place something white, like an un-ruled index card, behind the sample you are measuring. Your paint formula may be too light, but you can always add a little more colorant to reach the desired color.

When measuring fan-deck cards, try to avoid areas which contain text or bar codes on the back side.

Translucent samples

Very often samples that appear to have complete hide (opaque) actually allow light to pass through them (translucent). This may not always be obvious. Try making a black mark on the back side of a light fandeck card and then hold it up to a light. If you can see the mark through the card, it is translucent.

If the sample that you are measuring is translucent, you should place something white behind it. White un-ruled index cards work well for this purpose. In rare cases you may get a match that is slightly light, but this is correctable and therefore better than a match that is too dark.

In the case of fabrics, it works well to fold the material over itself, several times if possible, to increase the concentration of the color.

Large or oddly-shaped samples

Large or oddly-shaped samples may not fit into the sample holder. In these cases you can open the holder completely and hold the object securely against the sample port. If this does not work, you may remove the sample arm by loosening the two thumb screws. When holding a sample for measurement yourself, remember to keep the sample perfectly still. The sample surface needs to rest completely flat against the sample port, preventing any light from entering the measurement area. A curved, or other non-flat surface will create shadows, leading to poor color matches.

Wallpapers

When measuring a small spot of color on wallpaper samples, find desired area of color before holding it up to the spectrophotometer port. The color that you want to measure should be the only color presented to the spectrophotometer port. If other colors are at the port, they may darken or lighten the measurement and the formulation may need to be adjusted. Layer the sample several times so that no light shows through the sample.

Paint

Verify that the paint sample is opaque (no light showing through) before measuring the sample. White unlined 3x5 cards are recommended when preparing a sample from a can of paint. Never Measure Wet Samples!

Carpeting

When measuring carpeting, hold it lightly against the port. Pushing it against the port can cause inaccurate formulations. Note: Due to the carpet pile/texture, matches may be too dark. To avoid a mismatch dispense a quarter of the formula at first (ex. dispense a quart formula into a gallon of base). This will give you a formulation 75% lighter and enables you to darken the paint mix in increments, a quarter at a time.

House siding

Wash the sample before measuring it. Average your measurements on several locations of the sample. Do not measure the back side. Even though it may be smooth, the color may be different on the back than on the front.

Proper drawdowns

Prepare samples for evaluation very carefully. You want smooth drawdowns with sufficient coverage that no substrate shows through.

Carefully dry your samples - Two reasons: [1] we don't want to get paint into the measuring device and [2] wet "looks" different. Do this experiment - - Place a drop of clear water on a tabletop or counter. Notice that the wetted area "looks" darker. Wet pavement looks darker too. The smoother the surface (wet vs. dry) the darker the appearance. If you are trying to match paint to a fandeck or a customer sample you MUST dry the paint to realize its final color.

Temperature, Humidity and such... - This may be out of your control but it's science none-the-less: hotter surfaces are MORE colorful! Can't be helped it's pure physics and there's a fancy two-dollar word for the effect - "thermochromism". Roughly translated - "Hotter is brighter". This effect is quite strong with some pigments and dyes and rather weak with many others. To be on the safe side... let your sample cool (if you've been force-drying it with a hair-dryer).

Care for your dispenser

This tool too must be in perfect trim if you are to assure good first shot matches. Take the time to inspect each nozzle removing dried paint as required.

Ensure that you have the right stuff and enough of it to do the job. Check each cylinder. Note that you should take care in filling so that air bubbles are minimized. Suspended air bubbles can cause severe dispensing errors.

Ensure that your colorants are from the same vendor and of the same product description. Colorants from vendor "A" are almost guaranteed to differ from the same item of vendor "B".

Make certain that the dispenser is cleaned, calibrated, and all cylinders are kept agitated per the dispenser manufacturers specification.

I've done all of the above but continue to have problems

Option 1 –

Send to us:
- The object that you measured
- The drawdown that does not match
- The formula you obtained including the paint line, illuminant, and base used
- If possible, the XYZ values of the object as measured with your instrument. See page 2 to review the procedure. Simply measure the object instead of the calibration tile
- Any special information, i.e. did you average multiple measurements, is the object large and the sample arm was removed, a white index card was placed behind the sample, etc

We will analyze your samples, and load a system with the same configuration that you have and attempt to duplicate what you have done.

Note: The more information we have to work with, the better we can analyze your problem. Therefore, the best scenario is to complete both option 1 and option 2.

Option 2 –

Option 1 is desirable, but in some cases may not be possible. If so:

Locate a fan deck card from your display that approximates the color you were attempting to match. In addition select four additional cards, a bright blue, a bright pink or red, a strong green and a medium dark gray.

Using the **custom match** option, measure each of these colors.

Measure the XYZ values of each card. See page 2 to review the procedure. Simply measure the cards instead of the calibration tile.

Send to us:

- The cards
- The formula you obtained from your system including the paint line, illuminant, and base used (you can simply print a label for each color)
- The XYZ values that you measured

We will load a system with the same configuration that you have and attempt to duplicate what you have done.

Option 3 –

If for some reason neither option 1, nor 2 are possible, continue to follow all of the suggestions put forth in the beginning of this document. If you continue to have poor matches, send us samples following the option 1 procedure above.

If sending samples to us, be sure to include your company name, contact information and your help desk number. Send to:

X-Rite, Incorporated
3100 44th Street SW
Grandville, MI 49418
Attn: Applications

800-572-4626

Fax

To:	X-Rite Application Support	**From:**	
Fax:	616-534-7722	**Date:**	

Help Desk Number:

•**Comments:**