
Datacolor TOOLS

Datacolor TOOLS^{QCX}

Datacolor TOOLS^{WORKSTATION}

User Guide



Datacolor TOOLS™ User Guide (Part No. 4220-0927M, Rev. 3, January, 2008)

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Introduction to Datacolor TOOLS™

Welcome

Datacolor TOOLS™ is a powerful quality control system that defines the standard for color control software. There are three offerings of Datacolor TOOLS:

Datacolor TOOLS™. This is a comprehensive color quality control package that includes complete tolerancing options, color evaluations for all color difference equations, plot options, whiteness, yellowness and staining indices, statistical analysis, and sample search capability, among other features. It also includes the option to customize the desktop layout and forms displayed on the screen and/or sent to the printer.

Datacolor TOOLS^{QCX}. Offers basic color quality control functions including tolerancing options, fundamental color difference evaluation options and plot options. Also includes the capability to measure samples.

Datacolor TOOLS^{WORKSTATION}. Offers all color quality control functions available with Datacolor TOOLS™, but does not offer the capability to measure samples.

Program Overview

Historically, color control software was based on the fixed format available with conventional programming methods. Generally, this fixed software did not conform to the procedures encountered in most lab and production environments. In most cases, you had to change your methods to accommodate the software rather than the software changing to accommodate your needs. Today, Datacolor TOOLS represents the state-of-the-art in color control technology, providing you with a system that is

easy to operate, has powerful options to solve color problems, and can be configured to your specific needs.

The establishment of pass/fail tolerances may be the single most important step in setting up a color quality control process. One of the most powerful features of Datacolor TOOLS is the AI (artificial intelligence) tolerance determination. This feature allows you to visually determine the acceptability of your batches and have the program calculate the pass/fail tolerances. This tolerance is called AI Pass/Fail, and can be used alone or in conjunction with CMC or LCH tolerances. The artificial intelligence feature is also used with the AI Shade Sorting option.

Datacolor TOOLS is also unique because the user interface is composed of forms. Forms are display areas that contain the text and data for an evaluation. There are screen forms for displaying data in a window on your video screen, and there are print forms for sending that same data to your printer. There are also file forms that send your data to ASCII files that can be accessed by other programs. All of the forms that you use in Datacolor TOOLS can be easily customized to your needs. Most importantly, the use of forms offers the power of creating a user interface to non-programmers and requires only a fundamental knowledge of Windows and basic computer skills to customize the form.

Datacolor TOOLS makes use of standard Windows conventions for navigating inside the program. It employs the Menu Bar, Toolbar, and Button Bar features that you find in other Windows-based applications.

Product Components

The product includes two programs:

- **Datacolor TOOLS.** Datacolor TOOLS (Datacolor TOOLS.exe) is a Windows-based program that is delivered fully configured, and can be used immediately for a wide range of QC applications. In addition, the program offers many options that enable the user to customize both the user interface and the database.
- **Form Editor.** Included with the product is a separate program called Form Editor (Form Editor.exe). This is a stand-alone program used to customize the Datacolor TOOLS user interface. The user interface consists primarily of forms which display text, command buttons and data. The Form Editor allows you to create and edit existing forms, and to create custom fields to be included on forms and added to the database. This program is a powerful tool for customizing the program operation and output to your needs.

To successfully use this program, you should have a basic understanding of Windows and be able to execute various mouse procedures such as clicking and dragging.

Installing the Form Editor program is part of the program installation. Documentation for this program is provided in a PDF file, *Datacolor TOOLS Form Editor.PDF* on the program CD.

NOTE

The Form Editor is not available with Datacolor TOOLS^{QCX}.

Documentation

Documentation is provided in the following formats:

- **Datacolor TOOLS Online Help.** This is accessed from the Help Menu and Help icon on the program toolbar. It contains the information found in the Datacolor TOOLS User's Guide, Datacolor TOOLS Form Editor, and Datacolor TOOLS Technical Reference.
- **Datacolor TOOLS User's Guide.** A physical copy of this guide is provided with the system. An electronic copy is also included on the Datacolor TOOLS program CD, in PDF file format (Datacolor TOOLS User's Guide.PDF).
- **Datacolor TOOLS Form Editor.** This documents the companion program, Form Editor. It is a PDF file included on the Datacolor TOOLS program CD (Datacolor TOOLS Form Editor.PDF).
- **Datacolor TOOLS Technical Reference.** This documents system functions such as making a complete backup of the database. It is a PDF file included on the Datacolor TOOLS program CD (Datacolor TOOLS Technical Reference.PDF).

System Requirements

The system requirements shown below are the minimum configuration needed to operate the Datacolor TOOLS software.

Component	Description/Comments
Microprocessor	Pentium III 450MHz processor required.
RAM	128MB minimum 128 MB is recommended for Win XP, and for generally increased performance.
Hard Disk	6.4 GB hard disk, minimum of 500 MB free disk space. 1 GB free of free disk space is recommended to install Datacolor TOOLS and use it effectively.
CD ROM drive	Required.

Component	Description/Comments
Video Monitor/ Graphics	4 MB, high-resolution graphics card. Color patch displays require 800x600 (small font) or better.
Printer	Windows supported printers: Ink Jet, Laser Printers. Dot matrix printers are not supported.
Mouse	Required. Accelerator keys can be defined to perform some QC functions.
Microsoft Windows	Windows 2000 Professional, WIN XP Pro.
Network	Networks that are 100% windows compatible. Datacolor TOOLS operates on networks compatible with the Microsoft Windows operating systems by using the application layer of the network operating system.

Contact Us

If you have any questions or problems regarding product installation or licensing, please contact our service department by telephone or email:

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Launching Datacolor TOOLS

Overview

There are two program configurations for Datacolor TOOLS. Whether you are a *Pigment* or *Textile* user determines the configuration. Read this topic very carefully, since each procedure uses different desktop icons, logins and passwords.

NOTE

The login and passwords provided in this explanation are the defaults that ship with the system. Your System Administrator may have changed these after installing the program.

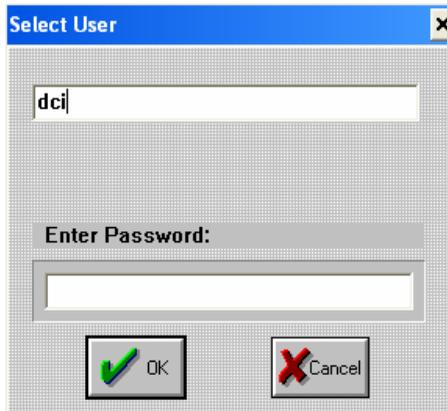
Login/Password for Textile Users

For textile users, do the following:

1. Double-click the **Datacolor TOOLS icon**.



The Select User dialog box displays.



2. Enter a **login** and **password**.

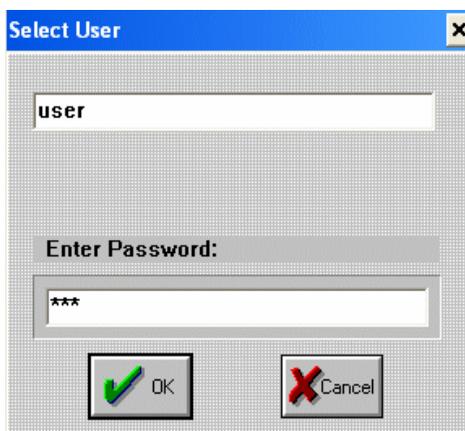
- In the top field, enter the user name. The default login is **DCI**. It is not case-sensitive.
 - In the *Enter Password* field, enter your password. For the default setup, no password is required.
3. Click the **OK** button. The Datacolor TOOLS splash screen displays, and the program opens to the Datacolor TOOLS desktop.

Login/Password for Pigment Users

1. Double-click the **Datacolor TOOLS icon**.



The Select User dialog box displays.

A screenshot of the 'Select User' dialog box. The title bar is blue with the text 'Select User' and a close button (X). The dialog has a light gray background with a grid pattern. It contains a text input field with the text 'user' entered. Below this is a label 'Enter Password:' followed by a password input field containing three asterisks '***'. At the bottom, there are two buttons: 'OK' with a green checkmark icon and 'Cancel' with a red X icon.

NOTE

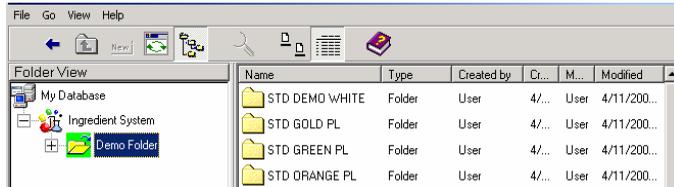
If Datacolor MATCH^{PIGMENT} is installed on the system, and you have launched it, you are not required to login to run TOOLS. This screen will not be displayed, and the program will open directly to the TOOLS desktop.

2. In the top field, enter your **user name**. The default is *user*. It is not case-sensitive.
3. In the *Password* field, enter your **password**. The default is CC3.
4. Click the **OK** button. The Datacolor TOOLS splash screen displays, and the program opens to the Datacolor TOOLS desktop.

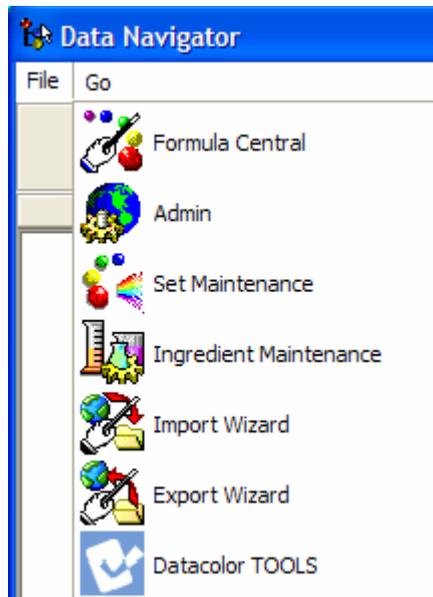
Launching Datacolor TOOLS via the Navigator

If you have both Datacolor TOOLS and Datacolor MATCH^{PIGMENT} installed on your system, you can also launch Datacolor TOOLS from the Navigator program.

1. Open the Navigator program:



2. To open Datacolor TOOLS, click **Go** (menu). The menu below displays:

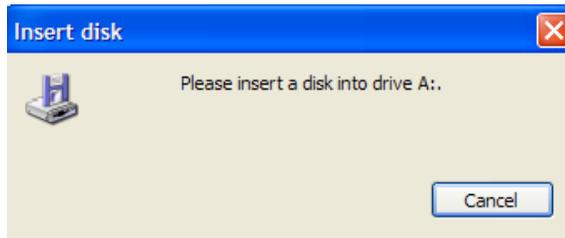


3. Click **Datacolor TOOLS**. The Datacolor TOOLS desktop opens.

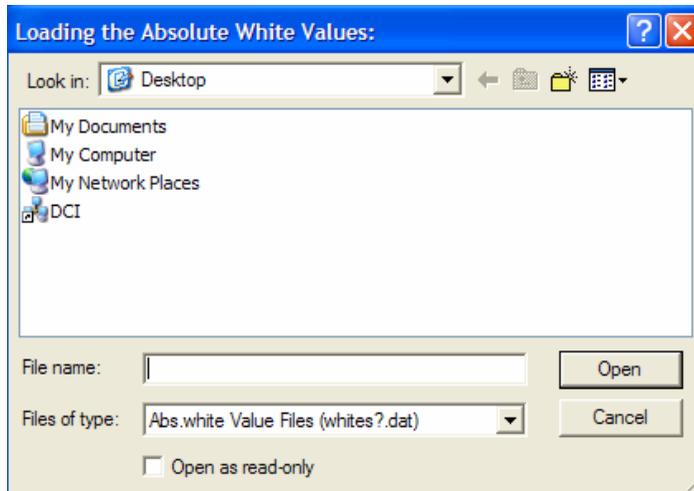
Instrument Calibration Data Installation

If this is a new system or a new instrument, you will need to install the calibration data. The calibration data can be found on a diskette or CD included with the calibration tiles.

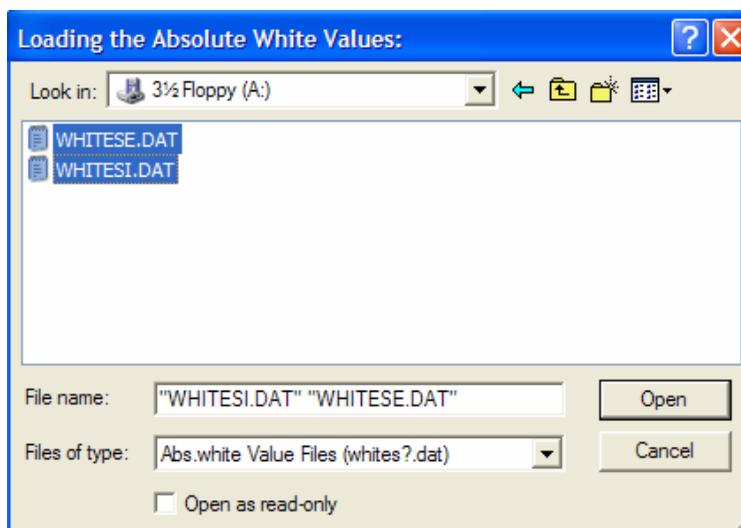
1. When you complete the instrument configuration and select **Save Setup**, the program prompts you to place the diskette or CD, containing the calibration data, in the appropriate drive. When you do this, the dialog box below is displayed:



2. The program defaults to the diskette. If you are using the CD, click **Cancel**. The dialog box below is displayed:



- Browse to the drive containing the CD. A list of *.dat files is displayed:



- You must load ***both*** files. Highlight both file names, and click ***Open***. The files will be transferred to the system. When the transfer is completed, the program will prompt you to calibrate the instrument. Complete the calibration procedure. *See also Instrument Calibration for instructions to complete the procedure.*

Replacing the White Tile

If you have received a replacement white tile, a diskette and/or CD will be provided along with the new tile. It contains the values unique to the new white tile. ***You must replace the white tile values stored on the system.*** Use the installation procedure described above to install the new white tile data.

Tutorials

Below are step-by-step instructions for running the basic Datacolor TOOLS program options. While there are a wide range of program options, these tutorials cover the most fundamental and the most frequently used features, including instrument calibration, sample measurement and basic color evaluations.

Instrument Calibration

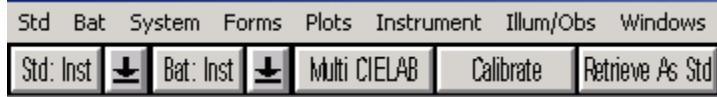
Instrument calibration is a function that you perform on a daily basis. This routine compensates for any changes to the instrument that can affect the accuracy of the measurement. You must calibrate the instrument separately for each condition you use. This includes changes to the aperture size, and reflectance/transmittance modes.

NOTE

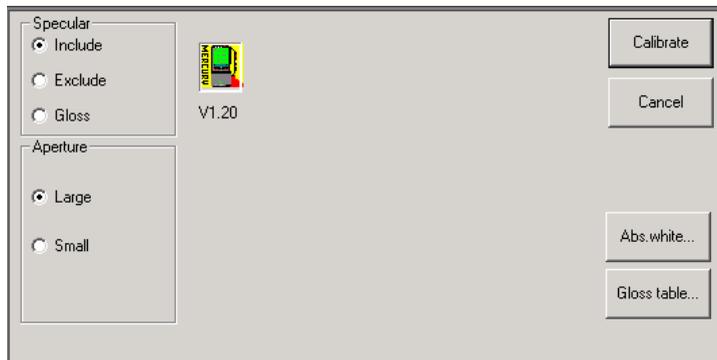
For Datacolor TOOLS^{WORKSTATION} users, the instrument calibration feature is disabled.

To start the calibration routine:

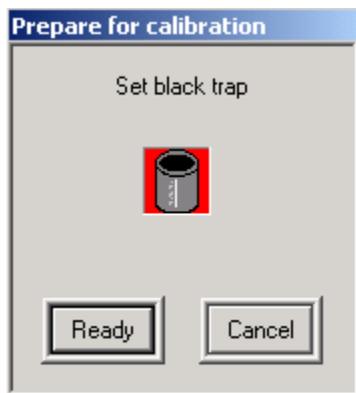
1. On the button bar, click the **Calibrate** button ~or~ from the menu bar, select **Instrument Menu, Calibrate**.



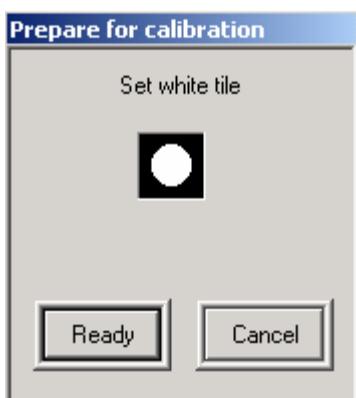
The current calibration conditions are displayed:



2. Click **Calibrate**. The Prepare for Calibration dialog box displays.



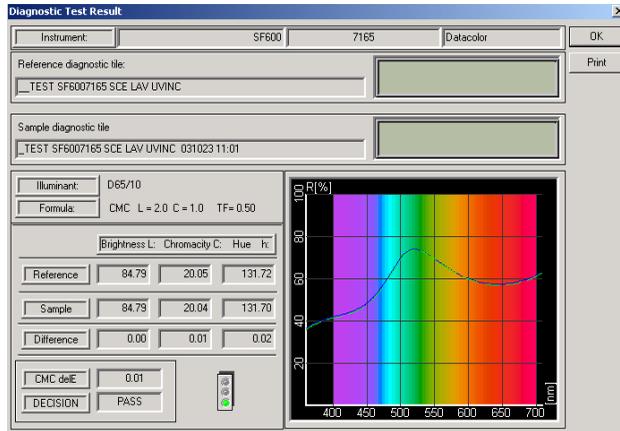
3. Place the black trap over the measurement port, and click the **Ready** button. If the instrument does not have a black trap, clear the port of any obstruction and click the **Ready** button. The Prepare for Calibration window redisplay when the measurement is completed.



4. Place the white calibration tile over the measurement port, and click the **Ready** button.
5. Click **OK**. If you have the diagnostic (green) tile test enabled, the program will prompt you for the diagnostic tile.



- Place the green tile at the port and click **Ready**. When the measurement is complete, the results of the diagnostic tile test will be displayed.



- The *DECISION* should be "Pass". Click **OK** to close the instrument.

NOTE

The program configuration determines whether the green tile test will be included in the calibration routine. When it is disabled, the window below displays following the measurement of the white tile:

CONTROL MEASUREMENT			
400nm :	82.951	600nm :	90.235
410nm :	85.285	610nm :	90.286
420nm :	86.613	620nm :	90.317
430nm :	87.512	630nm :	90.364
440nm :	87.820	640nm :	90.339
450nm :	88.173	650nm :	90.459
460nm :	88.737	660nm :	90.571
470nm :	89.063	670nm :	90.601
480nm :	89.375	680nm :	90.692
490nm :	89.582	690nm :	90.836
500nm :	89.839	700nm :	90.953
510nm :	89.973		
520nm :	90.018		
530nm :	90.144		
540nm :	90.194		
550nm :	90.169		
560nm :	90.099		
570nm :	90.034		
580nm :	89.993		
590nm :	90.085		

Measuring Samples

The procedure is similar for measuring a standard or a batch.

NOTE

Datacolor TOOLS^{WORKSTATION} users cannot measure samples using an instrument. The sample data must be on the desktop, stored in a folder in the database, or input from the keyboard.

For standards, do the following:

1. Click the **New Std** button on the desktop. This clears the *Name* field, and places the cursor in the field:



QC INPUT - CIE Color Difference

Standard Name 0 of 0

↑ [] ↓

New Std Retrieve Std List Std Store Std

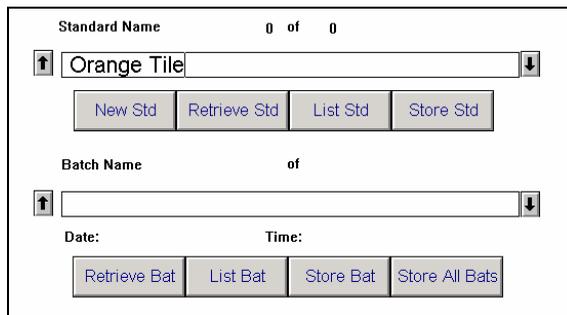
Batch Name 0 of 0

↑ [] ↓

Date: Time:

Retrieve Bat List Bat Store Bat Store All Bats

2. Enter a name for the sample.



Standard Name 0 of 0

↑ Orange Tile ↓

New Std Retrieve Std List Std Store Std

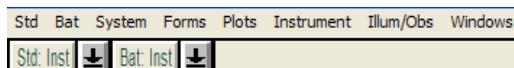
Batch Name of

↑ [] ↓

Date: Time:

Retrieve Bat List Bat Store Bat Store All Bats

Sample data can come from the instrument, the database or the keyboard. On the desktop there are two buttons that identify the origin of the standard and batch measurements. The measurement method is set independently for each sample type. In this example, both the standard and the batch measurement come from the instrument (*Inst*).



Std Bat System Forms Plots Instrument Illum/Obs Windows

Std: Inst ↓ Bat: Inst ↓

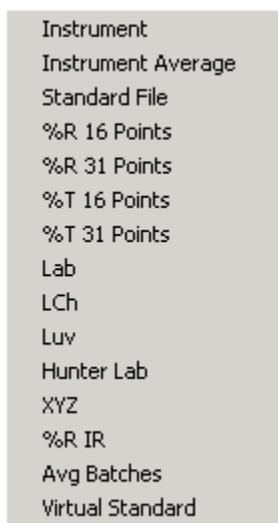
3. Place the standard at the instrument port, and click the **Std:Inst** button to start the measurement. The sample just measured becomes the current standard on the desktop. Data fields on the desktop will be updated to display the data for the sample just measured.

NOTES

- When you measure a new standard, the batch field is emptied. You have not yet associated any batches with this standard.
- To measure a batch, a standard must be on the desktop.
- The procedure for measuring a batch is similar to measuring a standard. However, you must click the **Bat:Inst** button.
- When using a portable instrument, position the sample so that it completely covers the opening on the probe or port.

To change the measurement method for either the standard or batch:

1. Click on the down arrow to view the measurement methods:



2. Click on the method to be used. The button will refresh, and display the measurement method selected. In the example below, the standard measurement method has been changed to %R 31 points.



- The next time you measure a standard, a window will open, and prompt you to enter 31-point spectral data for the standard.

Color Evaluations

Once you have selected a standard or batch, there are numerous color evaluations you can perform. The color evaluation displayed is based on the form that is opened on the desktop. Typically, the Datacolor TOOLS desktop includes several color evaluations including color differences, pass/fail, color plots etc. The color evaluation displayed is always based on the current standard and batch data on the desktop. *See also Working with Forms for instructions to open forms. See also Appendix, Screen Forms for a list of all screen forms provided with the program, and the evaluations included on each form.*

Pass/Fail Evaluation

Below is an example of a pass/fail evaluation:

Standard Name		6 of 6		Today's Date: 12-Aug-04			
↑	STD GREEN PL	↓					
			List Std				
Batch Name		56 of 63		Pass			
↑	E8	↓	Pass / Fail DE = 0.74				
Date: 11-Apr-02		Time: 09:06:50		Batch is : lighter more saturated more yellow			
			List Bat				
	<u>Ill/Obs</u>	<u>DL*</u>	<u>Da*</u>	<u>Db*</u>	<u>DC*</u>	<u>DH*</u>	<u>DE*</u>
	D65 10 Deg	0.31	-0.06	0.44	0.25	-0.36	0.54
	A 10 Deg	0.33	-0.51	0.57	0.67	-0.37	0.83
	F02 10 Deg	0.31	-0.36	0.52	0.57	-0.27	0.70

- Color Difference (DL*, Da*, Db*, DC*, DH*, and DE*)**. These are the color differences between the batch (E8) and standard (STD GREEN PL). This example includes differences between the samples on each individual parameter (DL*, Da*, Db*, etc.) as well as DE*, the composite color difference. *See Applications Technology, Interpreting Color Differences for a detailed discussion of color difference output.*
- Illuminant/Observer (Ill/Obs) Condition** (D65/10 deg, A/10 Deg, and F2/10 Deg). These are the Illuminant and Standard Observer selections being used for the evaluation. The color differences between the standard and the batch are provided for each Illuminant/Observer condition. The color differences between the samples do not remain the same when the illuminant or observer is changed.

- **Pass/Fail Determination.** If the batch color difference is within the tolerances set for the standard, the program will display PASS. If outside the tolerances, the batch FAILS. *See Applications Technology Acceptability Tolerances for a detailed discussion of pass/fail tolerances.*
- **Descriptors** (*Batch is lighter, more saturated, more yellow*). Translates the numerical color differences into a qualitative description of the color differences for the first Illuminant/Observer condition. In this example the Illuminant/Observer is *D65/10deg*.

Selecting Color Evaluations for Display

If the color evaluation you need is not displayed, there are several ways to select a color evaluation:

- If a button containing the preferred color evaluation displays on the screen (i.e. plot, pass/fail, etc.), point and click on the button. The selected color evaluation displays.
- If the color evaluation you want to perform is not displayed on the desktop, select *Forms, Screen Forms*. This displays all of the forms available for display on the desktop. They are labeled based on their content. Select the appropriate color evaluation option from this list, and the new evaluation is displayed. *See also Appendix, Screen Forms for information about each screen form available.*
- You can add buttons or edit existing buttons on the top and bottom button bars to include the functions and the forms you use frequently. *See System Menu, Edit Button Bars in this guide for instructions to customize the button bars on the Datacolor TOOLS desktop.*

Program Features

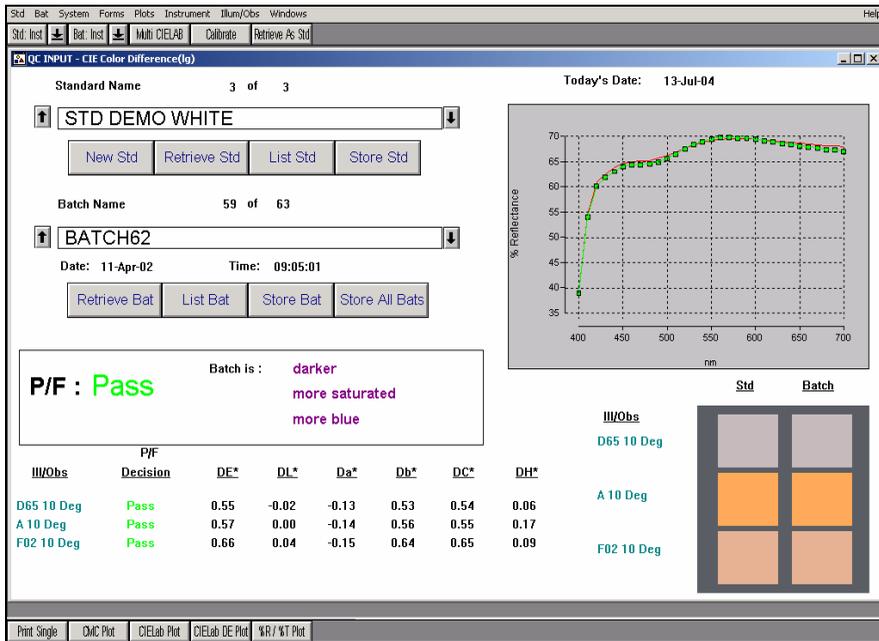
Overview

This section provides an explanation of the following:

- The Datacolor TOOLS desktop (the user interface)
- The Datacolor TOOLS database
- Software options that are commonly used in QC evaluations
- Specific program features unique to Datacolor TOOLS

The Datacolor TOOLS Desktop

The desktop concept from Windows has been adapted for use within the Datacolor TOOLS program. When the program opens, the default screen contains fields that include the Standard Name, and Batch Name, as well as selected spectral and colorimetric data such as DE. It also contains buttons that execute specific functions that you perform regularly, such as measuring the standard and batch. Below is an example of the desktop:



You can think of the desktop as your temporary working area. You never leave the desktop, as long as the program is open. You can perform any function available in this program from the desktop, either by selecting menu options, icons, or buttons that appear on the screen. When you are finished with an individual color evaluation, you can move the data from the desktop into a folder for permanent storage.

Standards/Batches

The desktop is the work area for the program. When a standard color is measured, it is added to the list of standards on the desktop. We refer to these standards as *desktop standards*. The desktop standards and batches are automatically stored in a desktop file on the hard disk. Standard and batch data are not automatically deleted from the desktop. All of the samples that you work with remain on the desktop until you delete them, even when you turn off the computer.

You begin every color evaluation by selecting a standard from the desktop. When you open the program, a name may appear in the *Standard* field. You can either select a standard from the desktop, or measure a new standard.

Although all standards that you measure are saved on the desktop, this desktop storage is not meant to be long term or archival storage. In order to keep the desktop orderly, move any data you wish to save into a permanent folder in the database, and periodically delete the standards from the desktop. If you do not, over time the number of samples on the desktop grows to a size that no longer makes the desktop a useful tool. By moving samples to folders for permanent storage, you ensure that your important sample data is not permanently lost, if it is accidentally deleted from the desktop.

Batches differ from standards in that they are associated with a standard. The program always associates the new batch with the standard that was on the desktop, when the batch was measured or recalled. Each desktop standard can have multiple (desktop) batches associated with it. These desktop batches are also automatically stored in the desktop file. For long-term storage, batches should also be stored in folders. They can easily be retrieved at a later date for analysis.

Finally, you can change the appearance of the desktop by customizing the screen form displayed at startup. The Datacolor TOOLS Form Editor program is a separate, stand-alone program that you can use to customize all of the forms used by the program. It allows you to customize both the appearance of the screen, and the options that are displayed.

Managing Samples

Over time, you can make and store thousands of measurements. However, on any given day, you may only need to work with a small number of the samples, both new samples and samples that you have previously used. In the same way that you remove a physical sample from the file for today's color evaluation, the desktop allows you to move those samples for today's work between the Datacolor TOOLS desktop, and a permanent folder in the computer. This saves you the trouble of sorting through multiple folders containing hundreds of entries each time you change samples. You can perform all of your normal activities on the desktop, ideally working only with those samples that relate to the evaluation at hand. You can add new standards and batches to the desktop. When you have finished, you can then move any/all of the sample data you have generated from the temporary desktop to a permanent folder for future use, and "clean up" the desktop by deleting all of the working standards and batches.

Button Bars

The default screen display contains buttons that initiate program commands, display evaluations on the screen, and send print forms to the printer. These buttons are user configurable and they can be customized. *See also System Menu, Edit Button Bars for instructions to customize the button bars.* The appearance of specific command buttons depends upon the screen form selected.

NOTE

Datacolor TOOLS^{QCX} users cannot edit button bars.

The following examples include the buttons provided for the default configuration of Datacolor TOOLS.

Top Button Bar

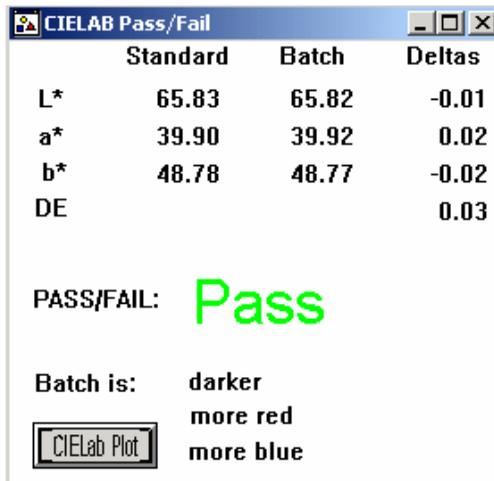
Below are the default selections for the top button bar:



NOTE

This is the default configuration for Datacolor TOOLS. See also the Appendix for the toolbar configuration for Datacolor TOOLS^{QCX}.

- **Std: Inst.** Identifies the measurement method for the standard. It is currently set to make a spectral measurement from the instrument. The data (%R or %T) is assigned to the Standard.
- **Bat: Inst.** Identifies the measurement method for the standard. It is currently set to make a spectral measurement from the instrument. The data (%R or %T) is assigned to the Batch.
- **CIE P/F.** Output form displaying a CIELab Pass/Fail evaluation, color differences, and descriptors. Includes a button that displays a CIELab plot.



- **Multi CIEL*a*b*** Displays CIEL*a*b* color difference for multiple batches.

Standard Name		CIE L*a*b* Color Difference					
DJW01 Blue reference		D65 10 Deg					
Batch Name	DL*	Da*	Db*	DC*	DH*	DE*	
DJ001 Blue 1	-0.67	0.25	-0.24	0.24	0.25	0.75	
DJ002 Blue 2	-0.40	0.31	-0.33	0.34	0.30	0.60	
DJ019 Blue 19	-1.05	0.17	-0.03	0.04	0.17	1.07	
DJ008 Blue 8	-0.06	0.11	-0.20	0.20	0.10	0.23	
DJ009 Blue 9	-0.64	0.38	-0.61	0.63	0.36	0.97	
DJ010 Blue 10	-1.14	0.43	-0.60	0.61	0.41	1.36	
DJ011 Blue 11	0.08	0.19	-0.19	0.19	0.19	0.28	
DJ012 Blue 12	-0.66	0.17	0.11	-0.11	0.17	0.69	
DJ003 Blue 3	-0.17	0.33	0.19	-0.18	0.33	0.42	

- **Calibrate.** Starts the procedure to calibrate your spectrophotometer.



- **Statistics.** Displays statistical data for multiple batches.

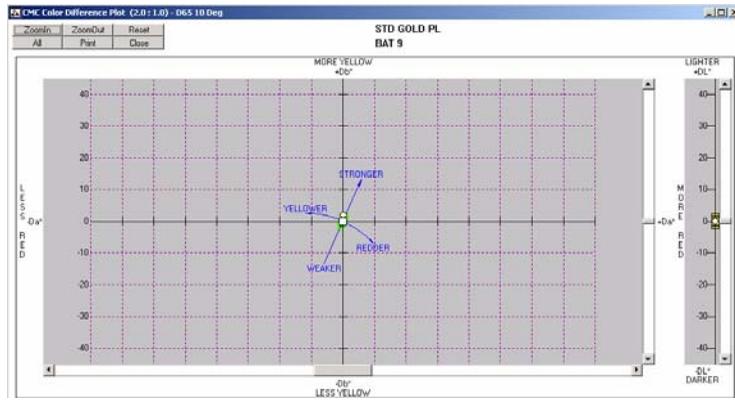
DJW01 Blue reference		D65 10 Deg		
DESCRIPTOR	50	BATCHES	STD. DEV.	AVERAGE
CIE DL			0.44	-0.53
CIE Da			0.15	0.35
CIE Db			0.21	-0.29
CIE DC			0.21	0.30
CIE DH			0.15	0.34
CIE DE			0.31	0.80

Bottom Button Bar

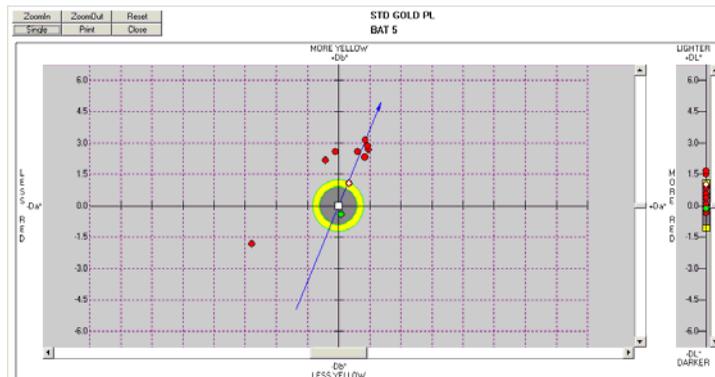
Below is an example of the bottom button bar:



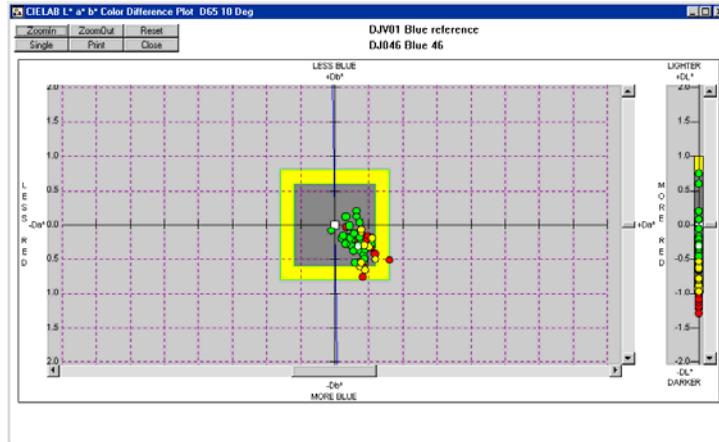
- **Print Single.** Prints a form with color difference and pass/fail data for the current desktop batch.
- **CMC Plot.** Displays a CMC color difference plot, with a print option.



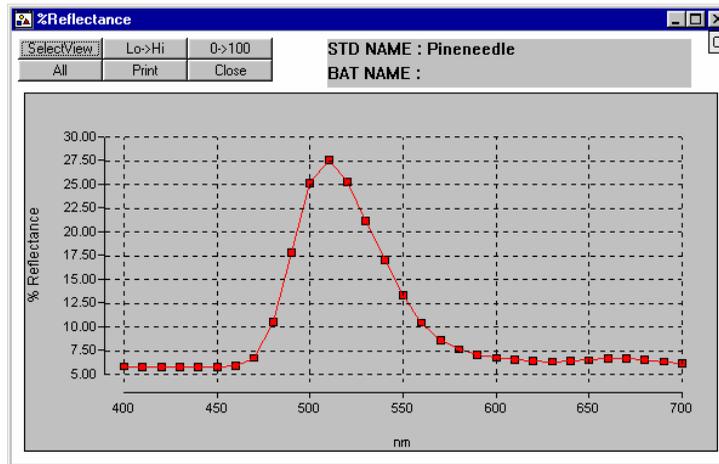
- **CIE Lab Plot.** Displays a CIE Lab coordinate (absolute) plot, with a print option.



- **CIELab DE Plot.** Displays a CIE L*a*b* color difference plot, with a print option.



- **%R/%T Plot.** Displays a reflectance or transmittance plot of current desktop standard and current batch, with a print option.



Data Export

The data on the desktop can be exported to an ACSII file. All fields available in the program can be exported using the command button, **Export Desktop**. This button can be added to a form or on a button bar. *See also Working with Forms for a discussion of the file export option. See also Applications Technology, Exchanging TOOLS Data with Other Users for a detailed discussion of the options available to send and receive TOOLS desktop data.*

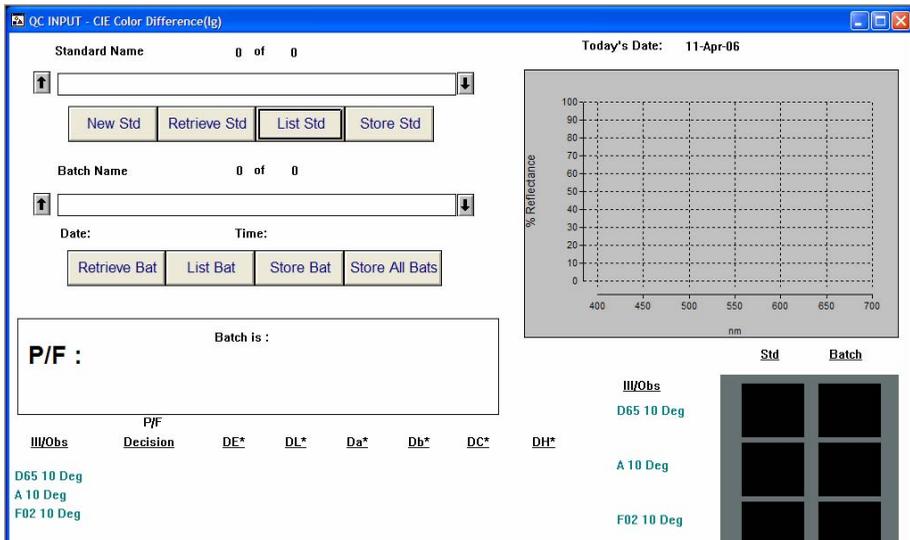
Working with Forms

Forms are the basis of the Datacolor TOOLS user interface. All of the information displayed by the program, both input and output, is displayed on a form. Many of the buttons on the TOOLS button bars open forms for you.

Three types of forms are used by Datacolor TOOLS:

- **Screen Forms.** Controls the display of information on the computer monitor.
- **Printer Forms.** Controls the contents of the printed data.
- **File Forms.** Controls the information exported to ASCII files for examination outside of the Datacolor TOOLS environment.

The information displayed on the screen is controlled by the selection of a screen form. When you launch the program a default screen form is opened:

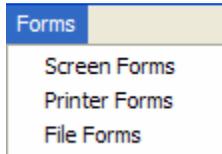


The name of the form is displayed in the title bar. In this example, the active form is QC INPUT – CIE Color Difference (lg). An extensive selection of forms is provided with the program. The name of the form provides information regarding the form contents. See also *Appendix, Screen Forms* for an itemized list of all screen forms provided with the program.

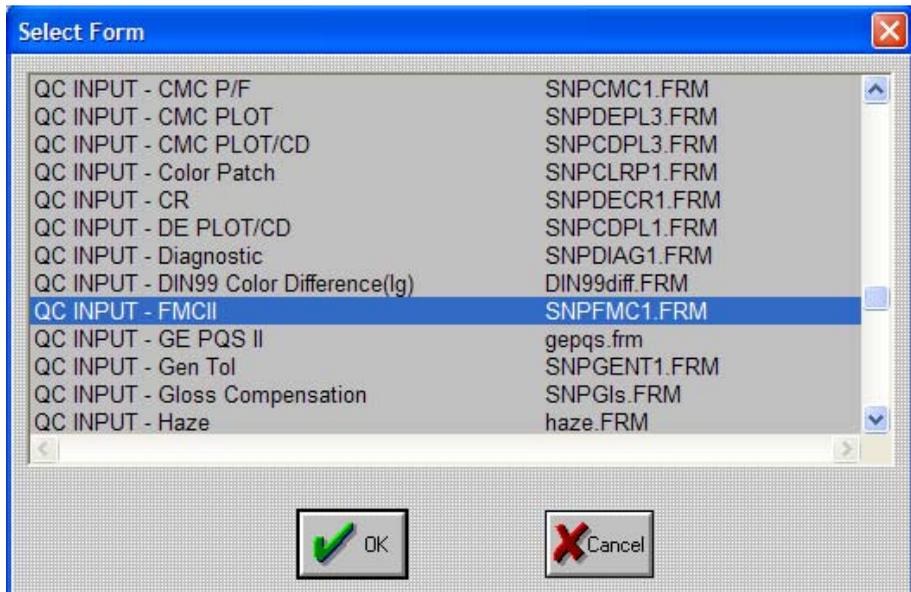
All forms work with the active standard and batch data on the desktop. You can have several forms open on the desktop at the same time.

Accessing Forms

Forms are accessed from the Forms Menu.



When you select one of the form options, a list of forms is displayed:



Use the scroll bar to view all of the forms, and highlight the form you want to use. The form will immediately be placed on the desktop, and the data displayed is based on the active standard and batch on the desktop.

Displaying Multiple Forms

Below is an example of two screen forms displayed simultaneously:

Standard Name 1 of 1 Today's Date: 11-Apr-06
STD GREEN PL
Strength Adj OFF Strength Adj ON Strength Defs
New Std Retrieve Std Store Std List Std
Batch Name 63 of 63
F6
Date: 11-Apr-02 Time: 09:06:49
Std Max WI: 550 nm Fixed
Bat Max WI: Status:
Strength: 94.29 %
Batch is : Noticeably saturated

III/Obs	DL	DCRG	DCYB	DC	DE
D65 10 Deg	2.17	-4.57	1.36	4.77	5.24
A 10 Deg	1.63	-6.74	0.16	6.74	6.94
F02 10 Deg	1.53	-4.85	0.90	4.94	5.17

The form *QC INPUT – FMC II* has been opened, and is on top of the *QC INPUT – CIE Color Diff (Ig)*.

Moving and Resizing Forms

The forms can be moved by placing the cursor in the form title bar and dragging it to the desired location on the desktop.

The forms can also be resized. To resize:

- Float the cursor over one border of the window until an arrow displays:



- Locate the cursor over one of the arrow heads, and drag in that direction. The window size will expand or contract based on the orientation of the arrowhead you have selected.

Customizing Forms

You can customize forms to exactly meet your requirements. Forms are created and edited using a separate program, the Form Editor, which is included with Datacolor TOOLS. This program installation includes an option to install the Datacolor TOOLS Form Editor. *See also Datacolor TOOLS Form Editor for detailed instructions to use the Form Editor.*

The Datacolor TOOLS Database

Data can be stored and retrieved from either the desktop or the database. All samples on the desktop are automatically saved at the time of measurement. If you exit the program and turn the off computer, the standards and batches remain on the desktop, and are available the next time you open the program. The desktop, however, was not intended for long-term storage of your color data, and quickly becomes cluttered with many standards and batches. This complicates and slows your operation. We recommend that you store important sample data into permanent folders in the database. The data can be retrieved instantaneously to the desktop.

For database management, Datacolor TOOLS uses an interface similar to Windows Explorer. It employs a relational database format called Sybase. This database format provides many benefits including easy modification, and access by other third-party programs. Most other color software packages use proprietary database structures that prevent you from accessing your data for use with other programs. The Sybase format makes your data more portable and allows more possibilities for data analysis.

The database management screens and tools used by the textile and pigment program configurations vary slightly. Each is fully documented in *Applications Technology*. *See also Applications Technology, Data Management for details on each.*

Two Database Structures

The specifics of the Sybase database structure used depends on the program setup you select at the time of installation. You have the option to create a database structure that can be shared with other programs used for pigment applications or textile applications. **Datacolor MATCH^{PIGMENT}** is the formulation software used by pigment applications such as coatings, inks and plastics. **Datacolor MATCH^{TEXTILE}** is the formulation software used by textile applications.

NOTE

This database selection is critical to insuring that you can share data with other Datacolor products. If you did not purchase a formulation package, you will need to consider your application type before selecting the database structure to use. If you are unsure regarding this selection, contact Datacolor Technical Support before you install the program.

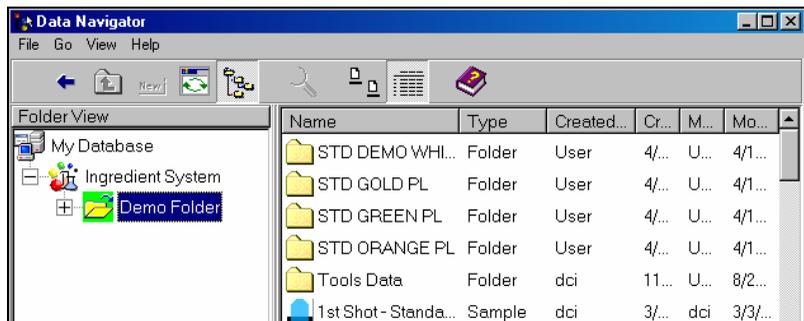
Textile Database Structure

When the program is configured to use the textile database structure, it is launched from the Datacolor TOOLS icon on the Windows desktop. See also *Getting Started for detailed instructions to launch the program.*

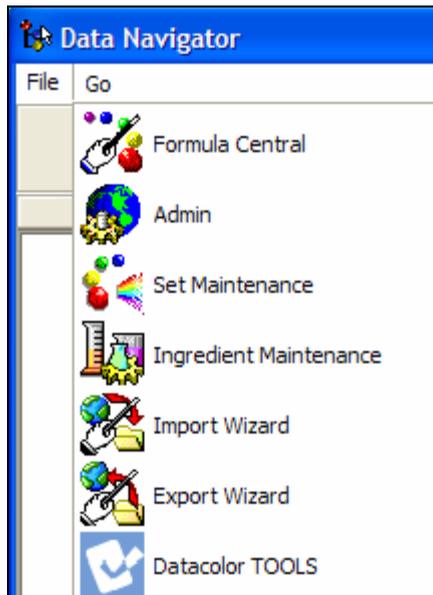
Pigment Database Structure

When the program is configured for a pigment database, the program is launched using one of two methods. It can be launched from the Datacolor TOOLS icon on the desktop. If Datacolor MATCH^{PIGMENT} is loaded, Datacolor TOOLS can also be launched from a menu option in the Navigator program.

1. Launch Datacolor MATCH^{PIGMENT}. The Navigator window opens.



2. Click on **Go Menu, Datacolor TOOLS** to launch the Datacolor TOOLS program.



Database Management Features

As you are working in Datacolor TOOLS, you will need options to store and retrieve data, and to create and delete folders. The database is accessed by selecting either a *Store* or *Retrieve* option. The data management features are fundamentally the same for both database structures. Those used in routine program operation include:

- **Standard Data Maintenance.** Standard folders contain all of the data for standards. This includes the standard name, reflectance values, and other related data. You can create multiple standard folders for standard data. The size of a folder is unlimited and grows as needed. Standard folders should be organized based on your needs and the way that you want to work. You may separate them by product line, by customer, by ingredient system, or some other characteristic. If you prefer, you can store both standards and batches into a standards folder.
- **Batch Data Maintenance.** Batch folders contain the data related to batches. This includes the batch name, batch date, batch time, reflectance values, and other data. The size of a batch folder is unlimited and grows as needed.
- **Sample Data Maintenance.** All data stored in Datacolor TOOLS are usually identified as either *Standard* or *Batch* data. However, the Datacolor formulation programs do not mark samples as *standards* or *batches*. *Std Menu, File and Batch Menu, File* options including a feature to *retrieve sample*. These options are used when you want to retrieve data stored through the formulation programs. They are also useful when you want to compare batches to one another, or standards to one another. You will be able to retrieve standards as *batches*, batches as *standards* and samples as *either standards or batches*.
- **Default Folder Maintenance.** You can specify one default standard folder and batch folder, for the purposes of storing and retrieving data while you are working in Datacolor TOOLS. When you store data, it prompts you for a folder name, and automatically provides the default folder name. The Datacolor TOOLS default folder setup can be quite useful if you only need to use a few folders. The default folder option is accessed through the **System Menu, Default File Setup**.

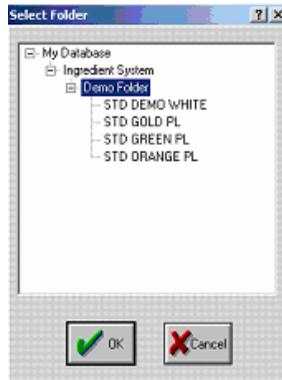
Folder Maintenance

Folder Maintenance includes folder creation, viewing and retrieving folder contents and deleting folder contents.

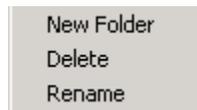
Creating Folders

When you are storing or retrieving sample measurements, you have the option to create new folders. The procedure is as follows:

1. Decide which existing folder will be the *parent* of the new folder, and click to highlight the folder name. In this example, the parent folder is *Demo Folder*.



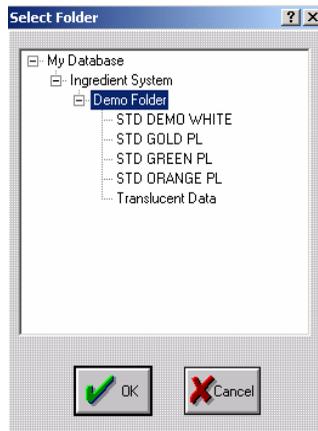
2. Right-click on the highlighted folder name. The menu below displays:



NOTE

For the *Textile* setup, the menu includes the option *New root folder*. This creates a new folder at the same level as the *All Data folder*.

3. Click on **New Folder/New Root Folder**. A dialog box displays requesting a folder name is displayed. Enter the folder name.
4. Click **OK**. The dialog box will close, and the Navigator window will display the new folder:



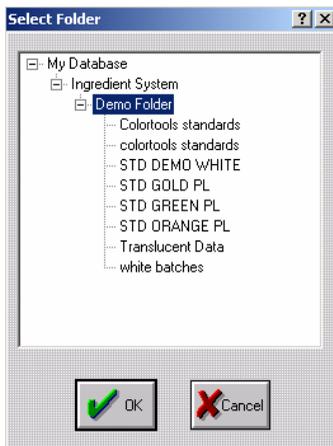
To view the contents of the new folder:

- Choose a Retrieve option (**Retrieve Std** or **Retrieve Batch** buttons on the desktop).
- Click on the new folder name.

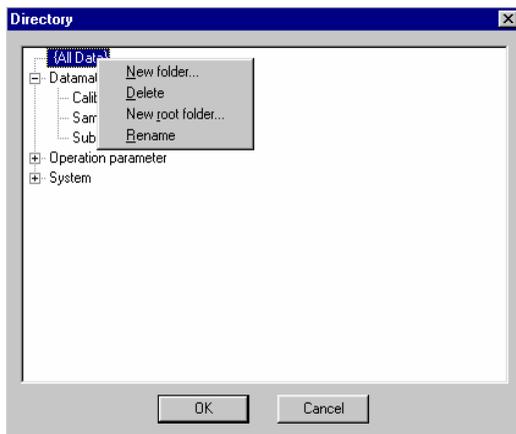
The window refreshes and the samples stored in the folder will be displayed.

Deleting/Renaming Folders

1. Access the **Select Folder** window. This can be done using any *store* or *retrieve* option.



2. Right-click on the folder name to display the Edit menu.



3. To rename a folder:
 - Select the **Rename** option from menu. The current folder will be highlighted.
 - Enter the new folder name in the highlighted box.
 - Click **OK**.
4. To delete a batch folder:
 - Select the **Delete** option from the menu.
 - A confirmation dialog box displays, prompting you to select either Yes to delete the folder, or No to cancel the delete command.

NOTE

A folder cannot be deleted if samples are stored in it.

Storing/Retrieving Data

When moving data to and from the Datacolor TOOLS database, the screens and procedures for the following functions are identical regardless of the database structure used:

- Creating new folders
- Storing standards and batches
- Retrieving standards and batches
- Renaming standards, batches and samples
- Deleting samples and folders
- Sorting data

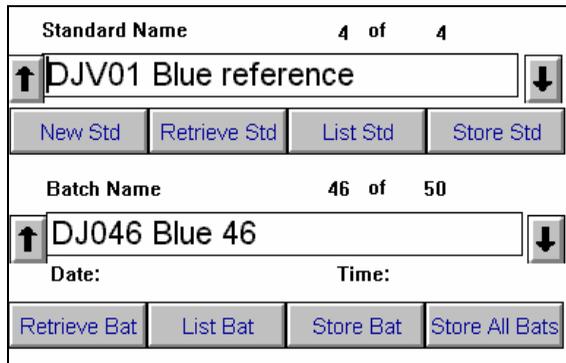
Below are instructions for performing routine data management functions while you are working with the program. The procedures in this section remain the same regardless of the database structure used.

Storing Samples

When you store measurements into the database, a sample type is assigned. The sample is identified as either a standard or batch.

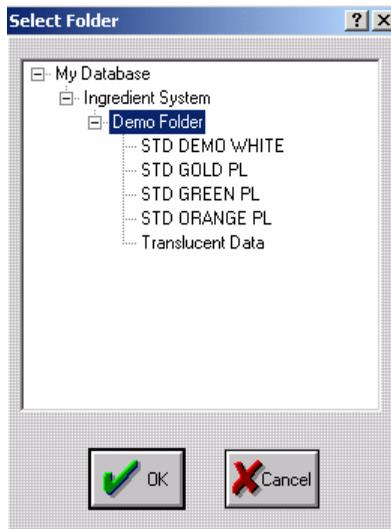
Storing Standards

1. On the TOOLS desktop, click the **Store Std** button.



The screenshot shows a software interface with two main sections. The top section is titled 'Standard Name' and shows '4 of 4' items. It contains a text input field with 'DJV01 Blue reference' and a dropdown arrow on the right. Below this are four buttons: 'New Std', 'Retrieve Std', 'List Std', and 'Store Std'. The bottom section is titled 'Batch Name' and shows '46 of 50' items. It contains a text input field with 'DJ046 Blue 46' and a dropdown arrow on the right. Below this are two labels, 'Date:' and 'Time:', followed by four buttons: 'Retrieve Bat', 'List Bat', 'Store Bat', and 'Store All Bats'.

2. In the Select Folder dialog box, a list of folders is displayed.



3. Highlight the desired folder, and click **OK**. The standard is stored in the folder selected.

Storing Batches

The procedure for storing batches into the database is the same as that for storing standards.

- Click the **Store Bat** button. See *Storing Standards for detailed instructions to complete this procedure.*

Standard Name		4	of	4
↑	DJV01 Blue reference			↓
New Std	Retrieve Std	List Std	Store Std	
Batch Name		46	of	50
↑	DJ046 Blue 46			↓
Date:		Time:		
Retrieve Bat	List Bat	Store Bat	Store All Bats	

NOTE

Store All Bats will store all batches associated with the std on the desktop into a folder. If you only want to store the active batch, select *Store Bat*.

Retrieving Samples

Samples stored into the database can be used at a later time as either standards or batches. The guidelines below control the sample identification upon retrieval.

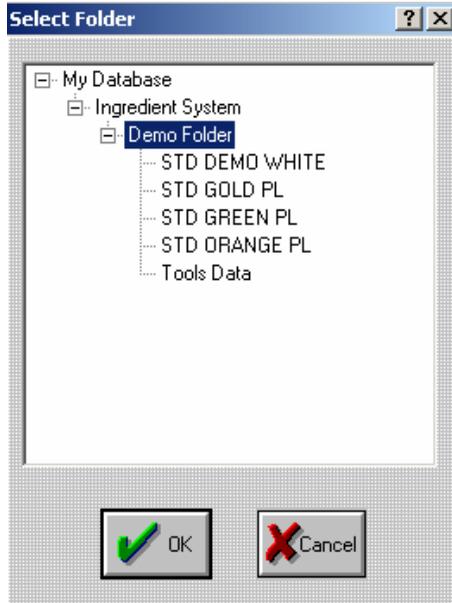
- **Retrieve Standard.** Only standards are displayed. The items selected become standards on the desktop.
- **Retrieve Batch.** Only batches are displayed. The items selected become batches on the desktop.
- **Retrieve Samples.** All samples in the database are displayed. If this selection is made from the Std Menu, the selected item(s) become a standard on the desktop. If the selection is made from the Batch Menu, the selected item(s) become a batch on the desktop.

For sample retrieval, the windows vary slightly, depending on the database structure that you are using. See **Std Menu, File** or **Batch Menu, File** in this guide for instructions that contain sample retrieval instructions specific to each database.

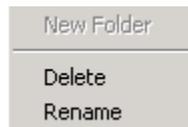
Deleting/Renaming Samples

To delete or rename samples:

1. Access the Select Folder window. This can be done using any *store* or *retrieve* option:



2. Double-click on one of the folders. All of the samples stored in the folder will be displayed on the right.
3. Click to highlight a sample in the list.
4. Right-click on the highlighted sample. The Edit Menu displays.



5. Click **Delete** to delete the sample currently highlighted.

NOTES

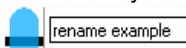
- The system automatically deletes the entry without any further warning or confirmation.
- You can select multiple items to be deleted.
- An item cannot be deleted if it is included as part of another data item. For example, a sample cannot be deleted if it is also stored with a Daticolor MATCH^{PIGMENT} formula.

6. **Rename.** You can rename a folder or an individual sample. When selected, this feature renames the sample currently highlighted.

- Click **Rename** to execute. The current name of the sample will be highlighted:



- Place the cursor in the highlighted area.
- Use the *Backspace* key on the keyboard to remove the current letters.
- From the keyboard enter a new name.



- When you are finished, click anywhere in the window. The sample name will be updated immediately.

NOTE

Rename is not available when a range of items is selected.

Demo Data

Default data is provided with the program to allow you to begin using Daticolor TOOLS immediately. It is stored in the Demo Folder.

Other Data Management Features

Ongoing, routine management of the Daticolor TOOLS database, including the management of data objects and data folders, is fully documented in *Applications Technology*. The screens and tools used for performing routine maintenance of the database vary slightly between the textile and pigment program configurations. Each includes advanced options for sorting, searching and filtering the database contents. See also *Applications Technology, Data Management for details*.

Pass/Fail Tolerances

A pass/fail tolerance sets an acceptability limit on specific colorimetric parameters. The color difference between the standard and the batch is compared to the acceptability tolerances for that standard, and the program displays a Pass/Fail report.

Datacolor TOOLS provides two tolerancing methods. You can establish tolerancing systems using traditional approaches, largely based on numeric descriptions of the color. A second tolerancing option, Artificial Intelligence (A.I.) Tolerancing takes into account your visual evaluation of the samples when generating tolerance limits. This tolerancing method often reduces the number of disagreements between instrumental and visual assessments of the batch acceptability.

Traditional Tolerancing Methods

Datacolor TOOLS provides you the ability to establish tolerancing systems based on numeric descriptions of the color. You typically begin by identifying the color difference equation (e.g., CMC, CIEL*a*b*, etc.) to be used, and a single tolerance value, DE, to define the acceptability of the color match. When additional parameters, such as DL*, Da*, Db*, DC*, and DH, are added to the tolerance, the tolerance becomes more refined, and will yield instrumental pass/fail evaluations that more closely agree with your visual evaluation of the color.

Datacolor Tolerance

Included in the color difference equation choices available is a proprietary equation, the Datacolor Tolerance formula. This tolerancing option is similar to A.I. tolerancing, in that you can create a custom tolerance, based on the batches on your desktop. You will generate a *tolerance block* based on physical samples that have been previously accepted, offering a better correlation between the visual and instrumental pass/fail evaluations of the samples.

The major difference between A.I. Tolerancing and the Datacolor Tolerance Formula is that the custom 'tolerance blocks' generated with the Datacolor Tolerance can be based on multiple standards and their associated batches. A.I. Tolerancing is based on batch data for a single standard. Because of this, the Datacolor Formula allows you to generate a single tolerance block based on a wide variety of colors and is useful when, for example, you have gathered a large collection of samples for the same substrate (i.e. fabric), or if you supply the same customer with a variety of colors.

NOTE

Datacolor Tolerancing is not enabled for Datacolor TOOLS^{QCX}.

See also Applications Technology, Acceptability Tolerances, and Datacolor Tolerance for a comprehensive discussion of traditional tolerancing methods.

A.I. Pass/Fail Feature

A.I. P/F incorporates your visual assessments of the samples into the creation of acceptability tolerances. A.I. Pass/Fail evaluations are distinct because they more closely correlate with your visual evaluation of the sample. In addition, these tolerances may not always be symmetrical around the standard. *See also Applications Technology, Artificial Intelligence Tolerancing for a detailed explanation of the concept and operation of this feature.*

NOTE

A.I. Pass/Fail is not enabled for Datacolor TOOLS^{QCX}.

Shade Sorting

Shade sorting is a feature that is useful to applications whose finished product is assembled from various batches of the same color. It helps to insure color consistency across a finished product, and is commonly used in textile applications for example, to assemble finished pieces of wearing apparel. A shirt may be assembled from different lots of fabric that match that standard. The collar may be cut from one lot and the sleeves from another. The challenge during assembly is to maintain the consistency of the color across the finished shirt.

In this situation, all of the batches available for use are acceptable matches to the standard. However, the lots may vary significantly from one to another. One lot may be more yellow than the standard, while another may be bluer. When these two lots of material are laid side-by-side, they may appear to be a mismatch.

Shade sorting allows you to sort all of the acceptable batches into boxes. You can then select all of the batches you need to complete a finished product from the same box, or from adjacent boxes. This reduces any lot-to-lot variation within the finished product.

Datacolor TOOLS provide two different shade sorting options. One is the traditional 555 Sort, and the other is A.I. (Artificial Intelligence) Shade Sorting.

NOTE

No Shade Sorting options are enabled for Datacolor TOOLS^{QCX}.

555 Shade Sort

The traditional 5-5-5 shade sorting option is based strictly on an instrumental evaluation of the batches. You define the standard using three colorimetric coordinates; for example, L*, a*, and b*. You then determine the minimum and maximum value for each coordinate, based on the batches that are acceptable. From the measurement of these batches, you can manually identify the lowest and highest values for each of the three coordinates, and these values define the acceptability range around the standard. The range along each parameter is subdivided equally

into 9 symmetrical boxes, with the standard located in the center box. The standard is typically assigned a sort code of 5 for each coordinate, resulting in the code 5-5-5.

555 Sort Tolerances can be assigned to individual standards, or a single tolerance can be applied to all standards. Creating/editing 555 Sort Tolerances is included as part of the procedure for creating tolerances.

See also Applications Technology, Shade Sorting for a detailed explanation of this option.

NOTE

555 Shade Sort is not enabled for Datacolor TOOLS^{QCX}.

A.I. Shade Sorting

A.I. Shade Sorting is based on the CIE L*C*H* coordinates of the batches. It calculates the sort tolerances based on the A.I. P/F tolerance, and tries to include all of the batches you have provided within the L*C*H* color solid it generates. Unlike traditional shade sorting the boxes, or bins, are not typically symmetrical in shape. This results in tolerances that better correlate with your visual evaluation of the sample, and identify batches that are anomalies based on their colorimetric properties.

A.I. Shade Sort also offers the option of a tapered sort. The batches in each bin are sorted from best to worst in terms of their proximity to the standard.

See also Applications Technology, A.I. Shade Sorting for a detailed discussion of this feature.

NOTE

A.I. Shade Sorting is not enabled for Datacolor TOOLS^{QCX}.

Working/Master Standard Correlation

It is often the case that only one sample of the master standard, agreed upon by both vendor and supplier, physically exists. This sample is usually isolated in order to protect it from loss or physical damage. A working standard(s) is usually substituted for the use in day-to-day color evaluations. Multiple working standards may be in use, depending on the number of locations involved in laboratory and production activities.

The working standard(s) are very close in color to the master standard, but in practice, there is usually a color difference between them. There is also a small difference in performance from one instrument to another. This option is used to create a numerical correlation between a working standard and a master or 'reference' standard. It compensates for color differences between the standards, and performance differences between instruments.

See also *Applications Technology, Master and Working Standards* for a detailed explanation of this feature.

NOTE

The Working/Master Standard correlation option is not enabled for Datacolor TOOLS^{QCX}.

Auto Select Standard from Group

This option is used to automate the batch measurement process. Instead of selecting the standard from the list of desktop standards, the batch is measured and the correct standard is selected automatically from the standards on the desktop. *Autoselection* of the standard is based on the color difference between the measured batch and the standards on the desktop.

This option is intended for applications in which there are a limited number of standards on the desktop, and these standards are not similar in color. For example, in textile printing or wall covering applications, a floral pattern may be printed on a substrate. The pattern may include several different petal colors (i.e., red, yellow, etc.), and other colors that are used in the pattern.

See Standard Menu/Auto-Select Setup for instructions to set the maximum color difference used by Auto-Select to match the batch to the standard.

To use this option, the standards to be considered for selection must be on the desktop. When **Autostandard** is enabled, the operator does not need to select each standard before measuring a batch for comparison. The batch is measured and the program finds the standard that matches it. By eliminating the need to recall each standard, this feature reduces the time required to evaluate the colors in the pattern. This is especially helpful in a production environment.

This feature is not designed to select a standard from among several samples that are close in color. It is meant to be used to select from a series of standards with distinctly different colorimetric properties. For example, the standards on the desktop could be limited to the colors in a particular pattern, such as red, yellow, blue, green and brown. In contrast, if you have several white standards in a file that vary slightly from one another, this feature may not select the correct standard and is not meant to be used in this situation.

*See also **Std Menu, Standard Defaults, Auto Select from Group** for details to configure this program option.*

NOTE

Autoselect Standard is not enabled for Datacolor TOOLS^{QCX}.

Virtual Standard

A virtual standard is a collection of properties or data characteristics used as a target measurement. The properties may or may not be colorimetric data. For example, a CIE Y value, or R457 Brightness, or possibly a Delta value for opacity can be included in a virtual standard. It is a feature used mainly by the paper industry, and "Grade" is the term usually applied.

A property included in a virtual standard is a collection of data characteristics specific to a given product. This option lets you create or edit the existing properties of a virtual Standard (Grade) on the desktop. For the virtual standard, some of the properties must be defined while others are optional:

Below are the properties that can be included in a virtual standard specification:

- [REQUIRED] Illuminant/Observer Combination
- [REQUIRED] Instrument Condition (UV Included, UV Filter 420, etc.)
- [OPTIONAL] Target Value (the aim point)
- [OPTIONAL] Low Tolerance Value
- [OPTIONAL] High Tolerance Value
- [OPTIONAL] Low Warning Value
- [OPTIONAL] High Warning Value
- [OPTIONAL] Target Value (the aim point)
- [OPTIONAL] Low Tolerance Value
- [OPTIONAL] High Tolerance Value
- [OPTIONAL] Low Warning Value
- [OPTIONAL] High Warning Value

NOTES

- Creating a virtual standard requires that a *Generic* tolerance be stored with the virtual standard. This is included in the step-by-step procedure provided below.
- The Virtual Standard option is not enabled for Datacolor TOOLS^{QCX}.

Below are the steps involved in creating and using a virtual standard:

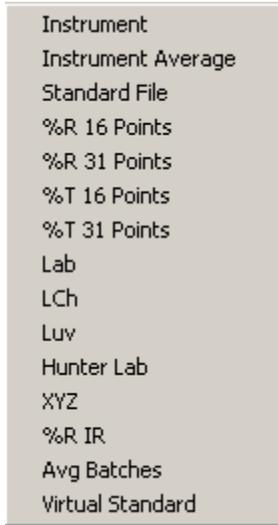
1. Create a generic tolerance and assign it to the virtual standard.
2. Retrieve the form containing the generic tolerance output.
3. Retrieve the virtual standard to the desktop.
4. Measure/retrieve the batch to be compared to the virtual standard.

Creating a Virtual Standard

1. Click on the down arrow in Std Measurement Method.



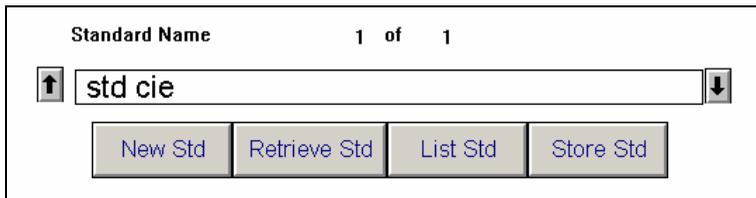
2. Highlight **Virtual Standard**.



The default measurement method for the Std becomes **Virtual**.



3. On the desktop, click **New Std**, and enter the name of the virtual std in the std name field:



Standard Name 1 of 1

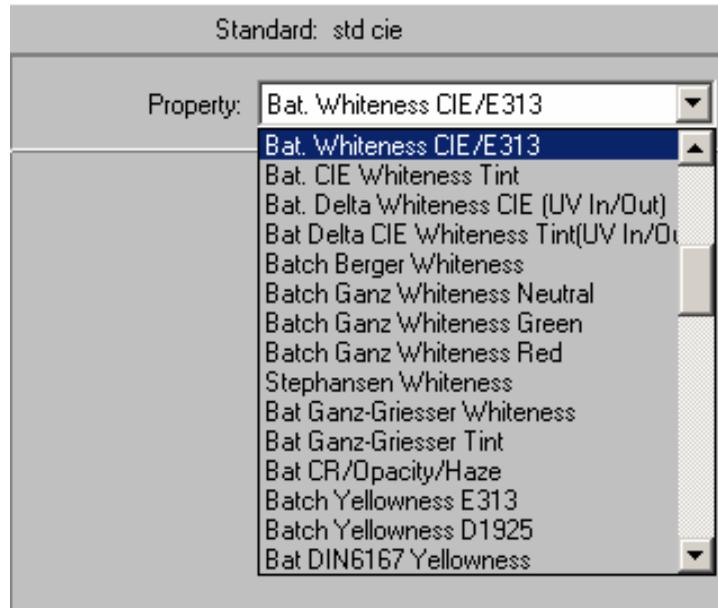
↑ std cie ↓

New Std Retrieve Std List Std Store Std

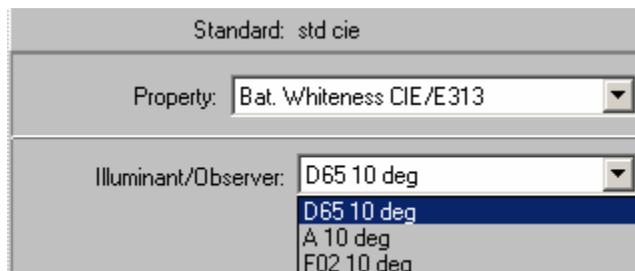
- Click on the standard measurement button.



The window below displays:



- Click on the property to be included in the virtual standard specification, and click on the **Add Property** button.
- Select the correct *Illuminant/Observer* condition to be used. You are required to identify an *Illuminant/Observer*.



7. For single measurement evaluations, accept the default for *Instrument Condition*.

NOTE

If you need to create a virtual standard that requires 2 measurements (*such as CIE Whiteness*), and each measurement requires a different instrument condition, contact your Applications Specialist for detailed instructions.

8. Enter the target value for the property. You ***must*** enter a target value for the virtual standard.

Standard: std cie

Property: Bat. Whiteness CIE/E313

Illuminant/Observer: D65 10 deg

Instrument Condition:

Target Value: 49.0

Current Properties for Standard:

- 1: Bat. Whiteness CIE/E313
- 2:
- 3:
- 4:
- 5:
- 6:
- 7:
- 8:
- 9:
- 10:

9. When you are finished, click on the ***Add Property*** button. The property displays in the right column.
10. Click **OK** to complete the specification.

NOTE

The program does not currently recognize *Warn* or *Fail* limits entered into this screen. To attach *Warn* and *Fail* limits to a virtual standard, you must include them in the *Generic* tolerance.

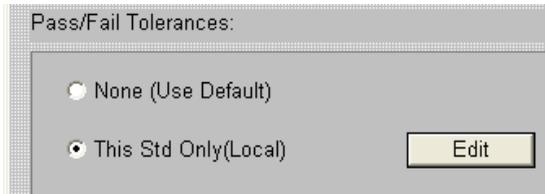
Creating a Generic Tolerance

After you have created the virtual standard on the desktop, you need to assign a generic tolerance to the virtual standard.

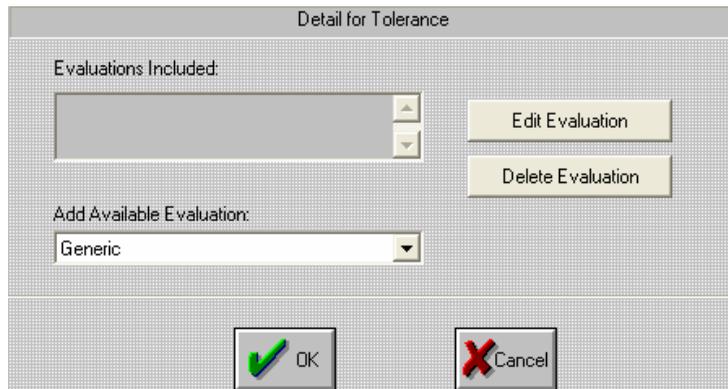
NOTES

- For the best use of this option, you will probably need to create a tolerance specific to the standard. To do this, you will assign a local tolerance to the virtual standard.
- You can select a generic tolerance to be plotted on a trend plot. There is a selection for #1 to #5 that corresponds to the generic pass/fail slots.
- Generic Tolerancing is not enabled for Datacolor TOOLS^{QCX}.

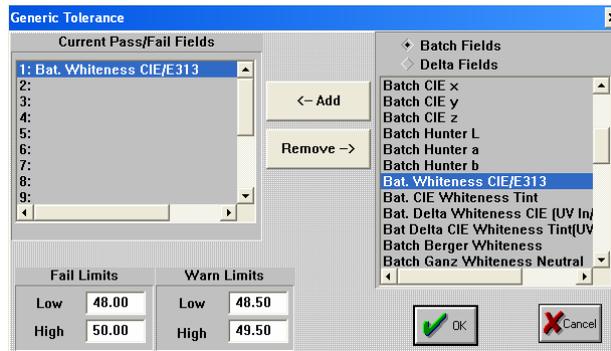
1. Click **Std Menu, Tolerances**. The window below displays:



2. Click **Std, This Std Only (local), Edit**. In the *Add Available Option* field, click on the down arrow, and select **Generic**.

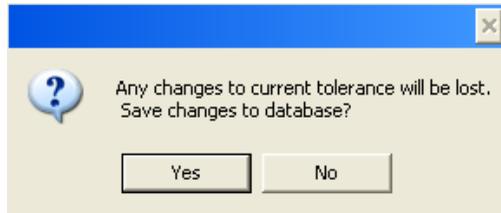


3. The generic tolerance screen is displayed for this standard.



4. Choose the field to which tolerances are to be assigned. In this example, a tolerance will be assigned to Bat Whiteness (CIE/E#13).
5. Enter fail and warning limits for virtual standard.

- Click **OK**. You must confirm the generic tolerance, and store it with the standard:



Using a Virtual Standard

To perform an evaluation using a virtual standard, you must have a form that includes the generic tolerances. You can use the QC INPUT – Gen Tol form or customize a form using the Datacolor TOOLS Form Editor.

NOTE

The Datacolor TOOLS Form Editor program and user's guide can be found on the program CD.

- Set the std measurement method to **virtual std**.
- Recall the virtual std to the desktop.
- Measure or input the batch to be evaluated.
- From the Forms Menu, select screen form, **QC INPUT – Gen Tol**.
- Measure/retrieve the batch to be compared to the standard.

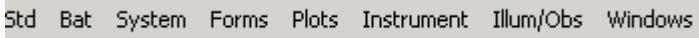
Below is an example of the results generated using a virtual standard and the screen form QC INPUT-Gen Tol:

Description	Low	Value	High	
Bat. Whiteness CIE/E313	48.00	43.59	50.00	Fail

Program Menus

Overview

This section provides a detailed explanation of every option that displays in each menu included in the program. It is presented in the same order that the menus appear on the Datacolor TOOLS menu bar:



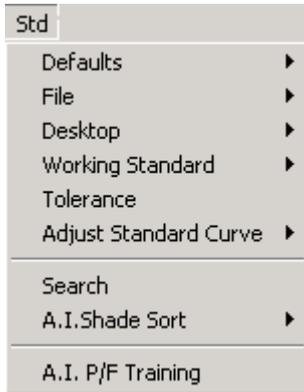
Std Bat System Forms Plots Instrument Illum/Obs Windows

Standard Menu

Menu Options

The Standard (*Std*) menu options control naming conventions for the standard, the method for standard input, the display of standards on the desktop, and various other defaults for the standard, specific to particular color evaluation options.

From the main Datacolor TOOLS window, move to the menu bar, and click **Std**. A drop-down list displays with the list of menu options. To select an option, simply click on it. The right-facing arrow next to an option indicates there is a secondary list of submenu options (e.g., *Std, Defaults, Standard Defaults*).



Defaults

Defaults are responses used automatically by the program. By setting up defaults you automate the operation of the program, making it easier and faster to run. Defaults exist for naming, measuring, storing and retrieving standard data. Defaults are also set for colorimetric properties, which are then used to perform basic QC evaluations such as raw materials strength.

- From the menu bar, click on **Std, Defaults**.



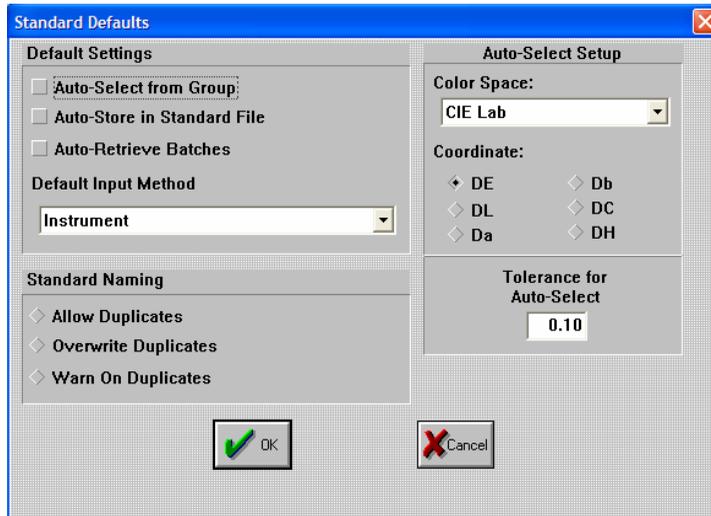
- **Standard Defaults.** Standard defaults include general settings for naming, measuring and storing standards.
- **Strength Defaults.** Strength Defaults are settings for the standard used specifically for strength evaluations.

Standard Defaults

- Click on **Standard Defaults**.



The Standard Defaults dialog box displays.



Default Settings

- **Auto Select from Group.** Enables the Auto-Select Option.
 - Click in the box to enable the feature. A check displays.
 - Click in the box again to remove the check and disable the option.

See *Auto-Select Setup* below for instructions to setup this feature. See also *Program Features, Auto Select Standard* for an explanation of this feature.

NOTE

Autoselect Standard is not enabled for Datacolor TOOLS^{QCX}.

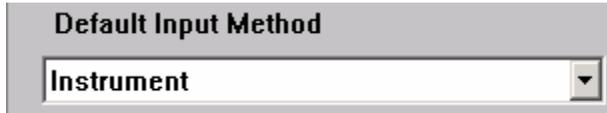
- **Auto Store in Standard File.** All standards added to the desktop will be automatically stored in the default standard file.
 - Click in the box to enable the feature. A check displays.
 - Click in the box again to remove the check and disable the option.

See also **System Menu, Default File Setup** to confirm the default standard file being used.

- **Auto-Retrieve Batches.** All batches associated with the standard are retrieved when a standard is retrieved.
 - Click in the box to enable the feature. A check displays.
 - Click in the box again to remove the check and disable the option.

Default Input Method

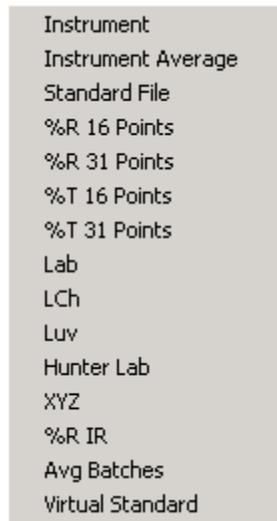
Default Input Method determines the method for the standard measurement. The *method* is the type of data input for the standard. The most common is measurement from the instrument. You can also input data from the keyboard in many different formats.



NOTE

Users of Datacolor TOOLS^{WORKSTATION} cannot measure samples.

1. Click the drop-down list arrow shown at the end of the field, and select one of the following methods:



NOTES

The same selections are available using drop-down list arrow that displays next to the standard or batch measurement button, on the desktop button bar:



The button bar options allow you to change the standard measurement method while running the program. This change is not permanent. When you exit the program, the setting returns to the selection made in Standard, Defaults.

- **Instrument.** Standard data comes from the instrument. The measurement defaults to a single scan of the standard. *This option is not enabled for Datacolor TOOLS^{QCX}.*
- **Instrument Average.** Takes multiple reads of the standard from the instrument, and then averages them. The number of reads is based on the selection made in *Instrument Menu, Instrument Setup, General Options, Multiple Measurements*. *This option is not enabled for Datacolor TOOLS^{QCX}.*
- **File.** Retrieves sample data from a folder. When retrieving a standard, the default folder is identified in *Std, Standard Defaults*. When retrieving a batch, the default folder is identified in *Bat, Batch Defaults*.
- **%R.** User enters reflectance data from the keyboard for the standard.
 - 16 pt. User enters data in 20 nm increments from 400–700m.
 - 31 pt. User enters data in 10 nm increments from 400–700m.
- **%T.** User enters transmittance data from the keyboard.
 - 16 pt. User enters data in 20 nm increments from 400–700m.
 - 31 pt. User enters data in 10 nm increments from 400–700m.

Colorimetric Data. User enters colorimetric coordinates from the keyboard.

- **Lab.** User enters L*,a*,b* values calculated from CIEL*a*b* color difference equation.
- **LCH.** User enters L*,C*,H* values calculated from CIEL*a*b*(C*H*) color difference equation.
- **Luv.** User enters L*,u*,v* values calculated from CIEL*u*v* color difference equation.
- **Hunter Lab.** User enters L, a, b, values from Hunter Lab color difference equation.
- **XYZ.** User enters CIE X, Y, Z values.

NOTE

All colorimetric data is specific to an Illuminant/Observer condition. Please confirm the Illuminant/Observer selection before entering the data.

- **%R IR.** User enters reflectance data from the keyboard. This data includes wavelengths in the infrared region of the spectrum (710nm-1100nm).
- **Avg Batches.** Creates a new standard on the desktop by averaging all of the batches attached to the current standard.
- **Virtual Standard.** A virtual standard is a collection of properties for a sample that serve as the standard measurement. These properties may or may not be colorimetric data. This feature is frequently used by the paper industry for whiteness and opacity evaluations. *See also Virtual Standard. This option is not enabled for Datacolor TOOLS^{QCX}.*

Standard Naming

These selections are used to handle naming standards on the desktop.

Standard Naming	
<input type="checkbox"/>	Allow Duplicates
<input type="checkbox"/>	Overwrite Duplicates
<input type="checkbox"/>	Warn On Duplicates

- **Allow Duplicates.** Allows duplicate standard names on the desktop.
- **Overwrite Duplicates.** When a new standard measurement is made, the program automatically overwrites the data for current standard, without requiring a new standard name. This is a feature commonly used when measurements are made in production situations, using a hand-held instrument. You can re-measure easily without retyping a standard name.
- **Warn On Duplicates.** When you try to measure a standard without entering a new standard name, you will receive a warning. It will ask if you want to overwrite the standard, enter a new name, or cancel the operation.

Auto Select Setup

This option is used with the **Auto-Select Standard From Group** option. It controls the tolerances to be used when the program automatically selects a standard from the desktop to associate with a batch. See also *Program Features, Auto-Select Standard* for an explanation of this feature.

NOTE

This option is not enabled for Datacolor TOOLS^{QCX}.

Auto-Select Setup	
Color Space:	
<input type="text" value="CIE Lab"/>	
Coordinate:	
<input type="checkbox"/> DE	<input type="checkbox"/> Db
<input type="checkbox"/> DL	<input type="checkbox"/> DC
<input type="checkbox"/> Da	<input type="checkbox"/> DH
Tolerance for Auto-Select	
<input type="text" value="0.10"/>	

You must specify a color difference equation, a tolerance, and a coordinate associated with the tolerance.

- **Color Space.** Click on the down arrow to view the choices, and highlight one.
- **Coordinate.** Click on the coordinate to be associated with the tolerance. It does not have to be DE.
- **Tolerance for Auto-select.** Enter a value representing the maximum difference between the batch and the standard.

In the example above, a tolerance of 0.10 DE CIELab has been set. The program will sort through all of the standards on the desktop and select those that have a DE of less than .10 units from the batch

NOTES

When multiple standards on the desktop satisfy the tolerance, (e.g., less than 0.10 DE CIEL*a*b* units of the batch) they are displayed in a list, and you must select one.

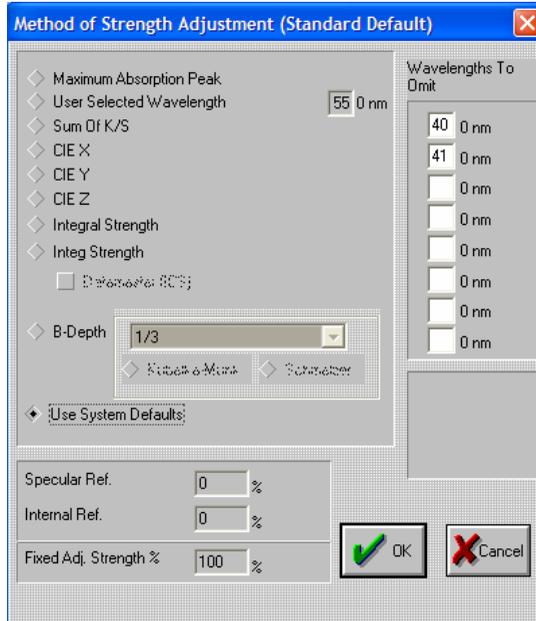
The default setting for this option is off. To enable the option, click on the box next to the option in the Standards, Default dialog box. A check mark displays in the box.

Strength Defaults

This option sets the defaults for the standard to be used in the strength determination option. The strength defaults selected override the system strength defaults.

See also Applications Technology, Strength Evaluation for a complete discussion of strength evaluations, including all of the program options that are used to perform a strength evaluation.

- From the Std Menu, Defaults submenu, click on **Strength Defaults**. The *Strength Defaults* dialog box displays.



Maximum Absorption Peak

The strength evaluation is based on the spectral data for a single wavelength, the wavelength of maximum absorption. It is the wavelength with the lowest %R value (the highest K/S value). This is the area of the spectrum where the colorant absorbs the most light and is a valid indicator of strength. This is one of the most common methods used for strength comparisons. The wavelength selection is made by the program, and is based on the reflectance or transmittance curve of the standard.

User Selected Wavelength

The strength evaluation is based on the spectral data for a single wavelength. This method is similar to the wavelength of maximum absorption, except that the user determines the wavelength to be used for evaluation.

Sum K/S

This method calculates strength based on the sum of the K/S values across the visible spectrum.

CIE X, Y, and Z

This method calculates the strength by using a single tristimulus value (X, Y or Z) for the standard and batch. This method is often used when trying to compare the strength of similar, but not identical, materials.

Colorimeters can only report tristimulus values, and this method is used when a history of strength evaluations generated from colorimeters has been collected for a colorant.

The tristimulus value used in the evaluation should correspond to the band of the spectrum where the colorant has the greatest absorption. Typically, you would use X to evaluate blues and greens, Y to evaluate reds, and Z to evaluate yellows and some oranges. The tristimulus value used should correspond to a wavelength band where the colorant exhibits the greatest absorption.

NOTE

Colorimetric data is specific to an Illuminant/Observer condition. You should verify that the Illuminant/Observer condition you are using matches the conditions used to collect comparable data from a colorimeter.

Integral Strength

This strength method uses K/S weighted at each wavelength by the standard observer \bar{x} , \bar{y} , and \bar{z} bar function.

- Residual Color Difference is the adjusted color difference using the integral strength value and is independent of concentration changes.
- By weighting the K/S values by the Standard Observer functions, the results may better correlate with your visual evaluation of the sample than does Sum K/S.

Integ Strength

Similar to Integral Strength, this method uses K/S weighted at each wavelength by the integrated Illuminant/Observer data. Separate Integ values are calculated for the standard and batch.

By weighting the K/S values by the Standard Observer functions and the Illuminant, the results may better correlate with your visual evaluation of the sample than does either Sum K/S or Integral Strength methods.

- **Datamaster (ICS).** Uses the same Integ Strength calculation used by the Datamaster program offered by ICS. This option is provided to ensure consistency with legacy products.

B Depth

(DIN Specification 53235/1)

Color depth is a measure of the intensity of a color sensation that increases with increasing saturation and decreases generally with increasing brightness. This approach assumes that samples made at the same color depth appear to the observer as though they were made with the same concentrations of colorant of the same color intensity. There are two adjustment methods available for this option.

- The Kubelka-Munk method calculates strength by adjusting concentrations until the individual B values reach 0.
- The Schmelzter method calculates strength by adjusting concentrations until the Delta B reaches close to zero.

Each of these B-Depth methods has a menu choice for the degree of adjustment.

Use System Strength Defaults

Rather than inputting a set of strength values to be applied to the standard, the system strength defaults will be used. *See also System Menu, Strength Defaults for instructions to create and edit system strength defaults.*

Specular & Internal Ref

Specular Ref. This is a correction factor used to adjust the spectral data for index of refraction differences. The specular reflectance value represents the amount of light that is refracted at the sample surface and never penetrates the sample.

- For resin systems most commonly used in opaque paint and plastics applications, and for translucent plastics applications measured in transmission mode, a value of 4.0 may be used.
- For evaluating dyes in solution (transmittance mode), or dyes on a substrate (reflectance mode), a value of 0 is recommended.

Internal Ref. A second correction factor is used to adjust for index of refraction differences. The internal reflectance value represents the amount of light that is scattered inside the sample and never emerges.

- For opaque paint and plastics applications using reflectance measurements, a value of 60.0 may be used.
- For translucent plastics using transmittance measurements, a value of 0 is recommended.
- For dyes in solution or dyes on a substrate, a value of 0 is recommended.

Fixed Adj. Strength

This option is used to determine the effect of adjusting the strength of the batch to a value other than 100% strength of the standard. This is useful in cases where it is not physically possible or practical to adjust the strength of the batch to 100% of the standard. Often physical properties of the samples or the processing technique impose this limitation.

Enter a number representing the target strength you want to use as the basis for comparison.

Wavelengths to Omit

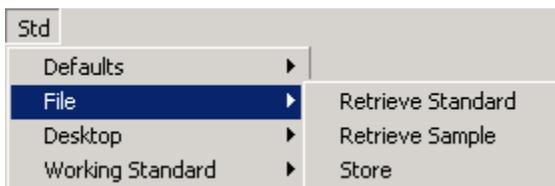
This option allows you to omit specified wavelengths for use in the strength calculation. For example, in pigment applications in which the samples are mixtures of colorant and white, the maximum absorption wavelength may occur at 400 nm. In this case, the absorption is due to the white pigment, not the colorant. For this situation, the evaluation of the strength of this colorant at 400nm is not valid.

- Enter the first 2 digits of the wavelength—e.g., for 400 nm you enter 40.

File

This submenu includes options to store and retrieve standards.

- From the menu bar, click on **Std, File**. The menu below displays. A right-facing arrow indicates there is a submenu for the option.



Retrieve Standards

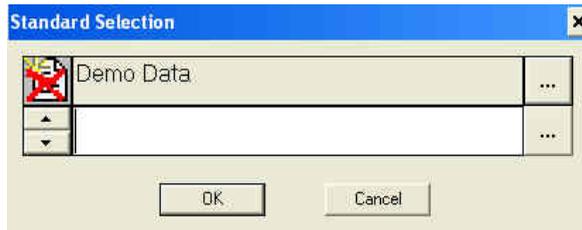
This function allows you to retrieve standards to the desktop. When you select this option, only samples marked as “standards” display in the data list.

NOTE

The actual procedure varies slightly, depending on whether you are using a textile database or a pigment database. *See also Program Features, Database Structure for an explanation of the textile and pigment database types.*

Retrieve Standards from Textile Database

1. On the desktop, click the **Retrieve Std** button. The Standard Selection dialog box is displayed.



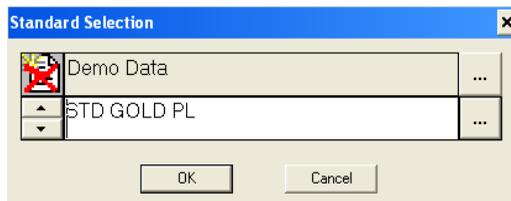
2. A **Browse** button is located at the end of the each line.



Click the **Browse** button located at the end of the **second** line, to display the Browse dialog box.



3. Under the *Folder* heading, click on one of the folders. Under the *Sample* heading, a list of standards is displayed.
4. Use the up/down scroll bar shown along the right-hand side of the dialog box to move through the list of standards until you locate the desired standard. Then click **OK**. (At any time, click **Cancel** to close the dialog box.)
5. When you return to the Standard Selection dialog box, the selected standard now displays in the second field.

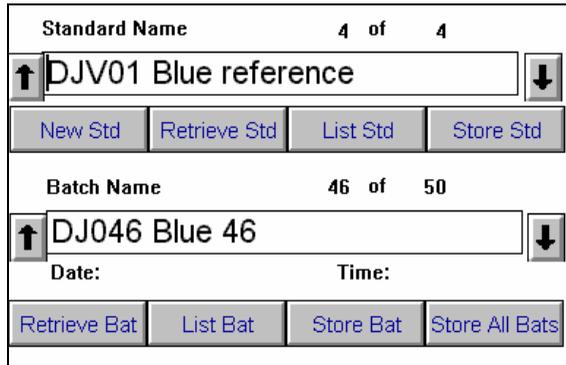


6. Click **OK**. When you return to the desktop, the selected standard displays in the *Standard* field.

Retrieve Standards from Pigment Database

To retrieve samples identified as "Standards":

1. Select **Retrieve Standard**.



Standard Name 4 of 4

↑ DJV01 Blue reference ↓

New Std Retrieve Std List Std Store Std

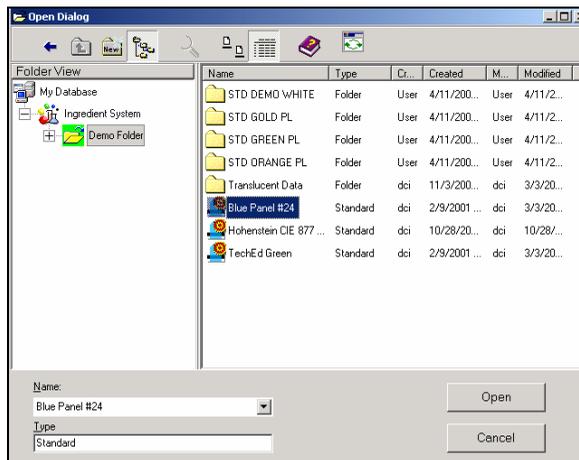
Batch Name 46 of 50

↑ DJ046 Blue 46 ↓

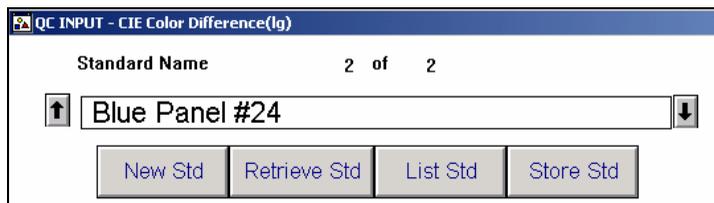
Date: Time:

Retrieve Bat List Bat Store Bat Store All Bats

2. A window will open, displaying all of the standards stored in the folder selected. Click on the standard to be retrieved.



3. Click on the **Open** button at the bottom of the window. The *Open Dialog* window will close, and the standard you highlighted will be displayed as the standard on the desktop.



QC INPUT - CIE Color Difference(Ig)

Standard Name 2 of 2

↑ Blue Panel #24 ↓

New Std Retrieve Std List Std Store Std

Retrieve Sample

In the Datacolor formulation packages, you can store samples types other than *standards* and *batches*. In contrast, Datacolor TOOLS requires that samples be marked as *standard* or *batch*. *Retrieve Sample* allows you to retrieve any sample type in the database, and convert it to a standard or batch for use with Datacolor TOOLS. This enables you to interchange samples as standards or batches to expand your evaluation capabilities.

Store

Saves the current desktop standard to a folder, and designates it as a standard. There are two procedures for storing standards:

1. Click on **Std Menu, File, Store**.

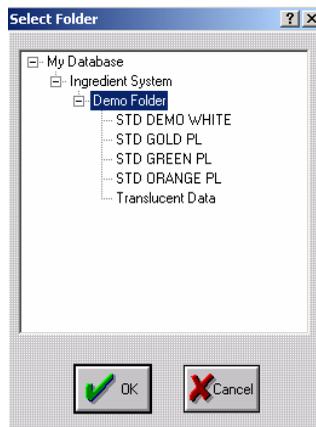


...OR...

Click on the **Store Std** button on the desktop.



The Select Folder dialog box displays, containing a list of folders.



2. Highlight the folder that will hold the standard, and click **OK**. The standard is stored in the designated folder.

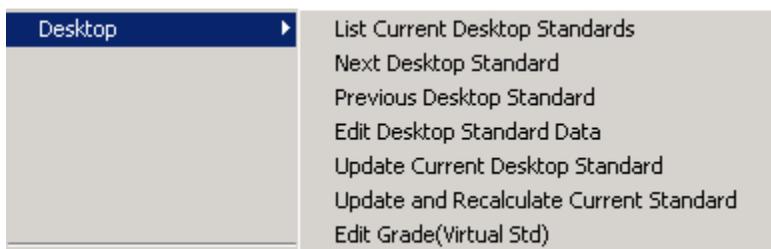
NOTES

- Your desktop button bar may contain buttons that perform storage and retrieval functions. *See also System Menu, Edit Button Bars for instructions to add/change buttons on forms and button toolbars.*
- The procedure is the same for storing batches to a folder.
- You can also create a new folder for the samples being stored. The new folder should be named in a way that easily identifies its contents. The folder name can include a maximum of 50 characters.

See Program Features, Storing and Retrieving Data, Folder Maintenance for instructions to create a new folder.

Desktop

The *Desktop* menu options provide functions for the selection and maintenance of standards on the desktop, and are used to manage the standards on the desktop



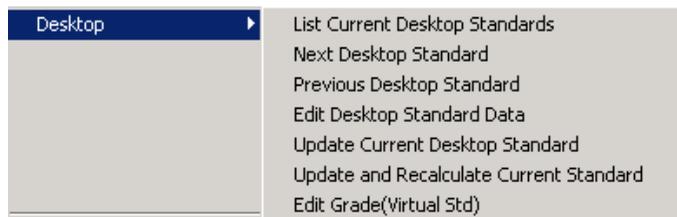
NOTE

Your desktop may contain buttons that perform these functions. *See also System Menu, Edit Button Bars for instructions to add/change buttons on the button bar.*

List Desktop Standards

This function lists the current desktop standards. It also provides options for enabling/disabling standards on the desktop, and for deleting standards from the desktop.

1. From the menu bar click on **Std, Desktop, List Desktop Standards**.

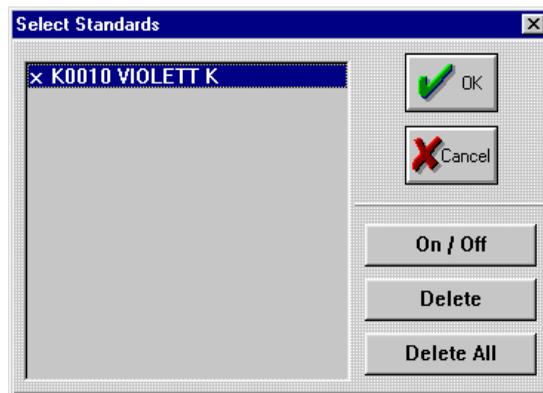


...OR...

Click the **List Std** button on the desktop.

The screenshot shows a software interface with two main sections. The top section is titled "Standard Name" and shows "4 of 4" standards. A text box contains "DJV01 Blue reference" with up and down arrow buttons on either side. Below this are four buttons: "New Std", "Retrieve Std", "List Std", and "Store Std". The bottom section is titled "Batch Name" and shows "46 of 50" batches. A text box contains "DJ046 Blue 46" with up and down arrow buttons. Below this are two labels, "Date:" and "Time:", followed by four buttons: "Retrieve Bat", "List Bat", "Store Bat", and "Store All Bats".

The Select Standards dialog box displays.



- **On/Off.** This feature allows you to exclude a sample from the current desktop evaluation, without deleting it from the desktop. At a later time it can be *included*, and will appear on the desktop. To enable/disable a standard:
 - o Highlight the standard to be enabled/disabled.
 - o Click the **On/Off** button.
 - o Click the **On/Off** button a second time to reverse the command.
- **Delete.** To delete a standard, highlight it on the list, and click **Delete**.
- **Delete All.** To delete all of the standards shown, click **Delete All**.

2. Click **OK** to close the dialog box.

NOTE

These delete options only delete standards from the desktop. If the standard is also in a folder in the database, it remains in that folder.

Next Desktop Standard



This function makes the next standard in the list the active standard on the desktop. Performs the same function as the down arrow shown at the right of the standard name.

Previous Desktop Standard



This function makes the previous standard in the list the active standard on the desktop. Performs the same function as the up arrow shown at the left of the standard name.

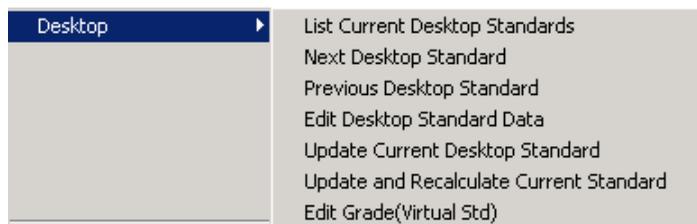
Edit Desktop Standards

This function allows you to edit the **spectral** values of the standard.

NOTE

The spectral data is the most basic data describing the standard. Changing this data can have a significant impact on future color evaluations made using the standard.

1. From the menu bar, click on **Std, Desktop, Edit Desktop Standard Data**.



The spectral data is displayed:

400:	8.57	480:	5.80	560:	3.89	640:	22.25
410:	9.28	490:	5.17	570:	5.19	650:	28.30
420:	9.79	500:	4.67	580:	7.31	660:	35.32
430:	10.24	510:	4.01	590:	8.96	670:	43.36
440:	10.24	520:	3.53	600:	10.61	680:	51.44
450:	9.27	530:	3.63	610:	11.96	690:	58.44
460:	7.97	540:	3.86	620:	13.95	700:	64.75
470:	6.81	550:	3.87	630:	17.49	Sum:	489.93

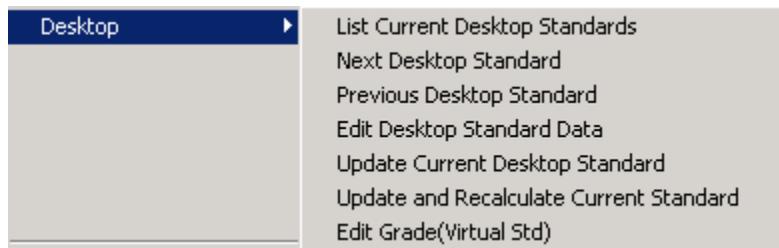
Buttons:

- To change an existing entry in any field, click in the field, and type the new data.
- When all selections/entries are made, click **OK**.

Update Current Desktop Standard

This option updates changes to standard name. You should always use this feature if you have changed standard information on the desktop to ensure the changes will be available in the future. To update the current desktop standard:

- Click on **Std, Desktop, Update Current Desktop Standard**.



The changes to the standard information will be updated to the temporary desktop file.

NOTE

This updates the standard information in the temporary desktop folder. If the sample is stored in the database, the changes must also be made to the permanent record in the database. This is done by clicking the **Store Std** button on the desktop.

Update/Recalculate Current Standard

When you add or change any **input data fields** for a desktop standard, you must select this option to execute the change. When data fields are added, the Recalculate function generates the data for the new fields. It also ensures that the changes are stored with the standard in the temporary desktop folder.

NOTE

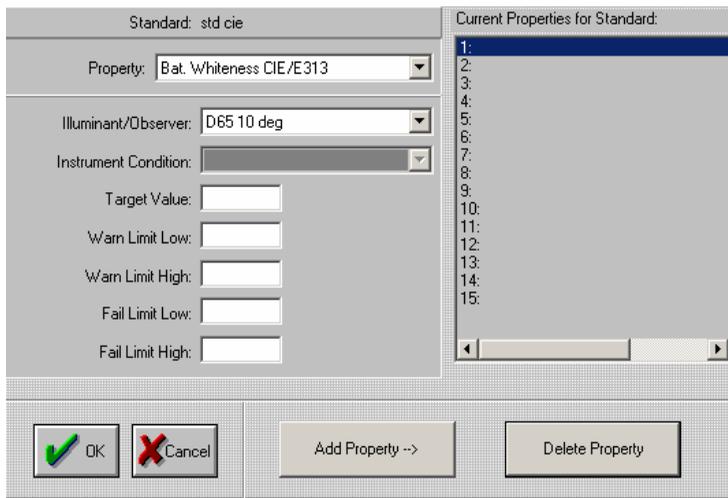
This updates the standard information in the temporary desktop folder. If the sample is stored in the database, the changes must also be made to the permanent record in the database. This is done by clicking the **Store Std** button on the desktop.

Edit Grade (Virtual Std)

This option lets you edit the existing the properties of a Virtual Standard (Grade) on the desktop. It is used primarily by the paper industry.

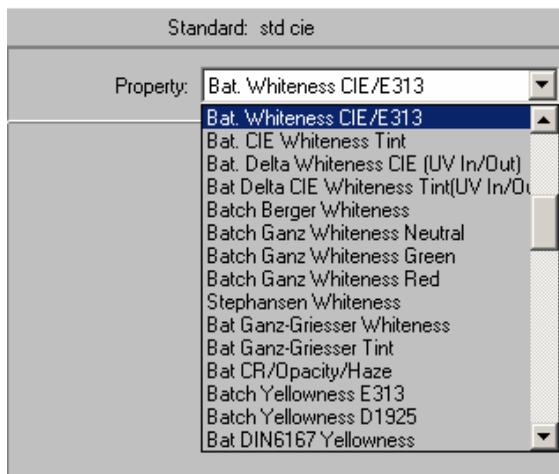
NOTE

The Virtual Standard option is not enabled for Datacolor TOOLS^{QCX}.

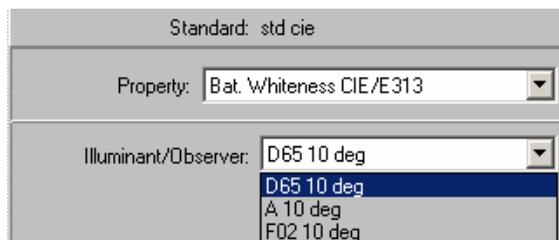


For the virtual standard, some of the properties must be defined while others are optional:

- [REQUIRED] Illuminant/Observer Combination
- [REQUIRED] Instrument Condition (UV Included, UV Filter 420, etc.)
- [OPTIONAL] Target Value (the aim point)
- [OPTIONAL] Low Tolerance Value
- [OPTIONAL] High Tolerance Value
- [OPTIONAL] Low Warning Value
- [OPTIONAL] High Warning Value



1. Select the property to be defined. In this example the CIE/E313 Whiteness value will be included in the virtual standard.
2. Select correct *Illuminant/Observer* condition to be used. You are required to identify an Illuminant/Observer.



3. Select the instrument condition to be used. For single measurement evaluations, accept the default for *Instrument Condition*.

NOTE

If you need to create a virtual standard that requires 2 measurements (*such as CIE Whiteness*), and each measurement requires a different instrument condition, contact your Applications Specialist for detailed instructions.

4. Enter the target value for the property. You ***must*** enter a target value for the virtual standard feature.

- When you are finished, click on the **Add Property** button. The property displays in the right column.

Standard: virtual white std

Property: Bat. Whiteness CIE/E313

Illuminant/Observer: D65 10 deg

Instrument Condition:

Target Value: 49.00

Warn Limit Low:

Warn Limit High:

Fail Limit Low:

Fail Limit High:

Current Properties for Standard:

- 1: Bat. Whiteness CIE/E313
- 2:
- 3:
- 4:
- 5:
- 6:
- 7:
- 8:
- 9:
- 10:
- 11:
- 12:
- 13:
- 14:
- 15:

OK Cancel Add Property --> Delete Property

- Click **OK** to complete the specification.

NOTE

The program does not currently recognize warn or fail limits entered into this screen. To attach warn and fail limits to a virtual standard, you must create generic tolerances, and store them with the standard.

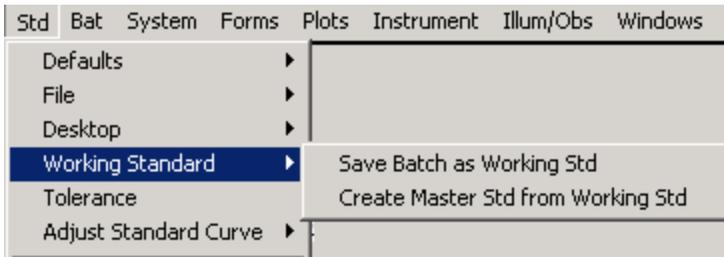
See also *Program Features, Virtual Standard* for step-by-step instructions to create and use a virtual standard.

Working Standard

This feature creates offset data that captures the differences between the measurements of the master and working standards, made on the central instrument. This offset data is sent to the remote location, along with the working standard, and is applied to the measurement of the working standard made on the remote instrument. The adjusted measurement of the working standard simulates the master standard, as measured on the remote instrument. See also *Applications Technology, Master and Working Standards* for a detailed explanation of this feature.

NOTE

The Working Standard option is not enabled for Datacolor TOOLS^{QCX}.



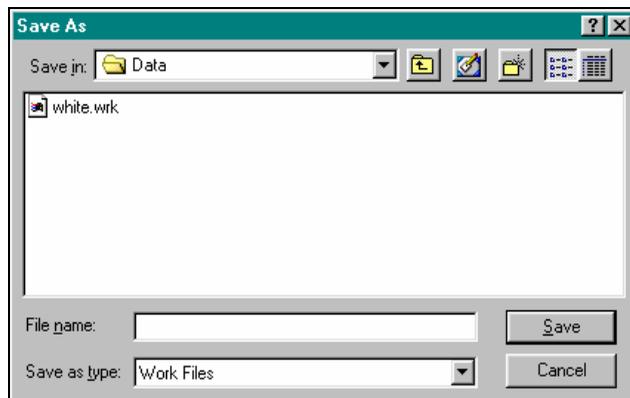
Save Batch as Working Std

This option is used by the central location to save the measurement of the working standard, made on the instrument at the central location. In addition, the program will store the offset data calculated from the measurement of the *Master Standard* and the *Working Standard*.

The offset data is stored on a disk and sent to a remote location, along with the physical working standard.

The procedure below details how to save the working standard to a floppy disk inserted into the A: drive on your system.

1. Measure or recall the master standard. This measurement should become the current desktop standard.
2. Measure the working standard as a batch. This measurement should become the current desktop batch. The color difference displayed is the color difference between the working standard and the master standard.
3. From the menu bar, select **Std, Working Standard**.
4. From the submenu, click on **Save Batch as Working Std**. The Save As dialog box displays.



5. Enter the destination location and file name for this file. The file name must not be more than 8 characters. This option creates a file with the .WRK extension for the offset data. Any valid DOS file name can be used. In addition to specifying the file name, you must also specify the location on which you want to save the file—e.g., your hard drive (C:), a floppy (A:), etc. For example, to assign the file name “XFER”, in the *File name* field, type **A:XFER**. This creates a file called XFER.WRK on the diskette.
6. Place a diskette in the disk drive, and click the **Save** button. The offset data is copied and saved to the floppy as a file called XFER.WRK. This floppy can now be sent to the remote system. At that location, the *Create Master Std From Working Std* option can be used to recreate the master on the remote system.

Create Master Standard from Working Standard

This option is used at the remote location to apply the offset data from the central location to the measurement of the working standard at the remote location. This recreates the master standard on the remote system.

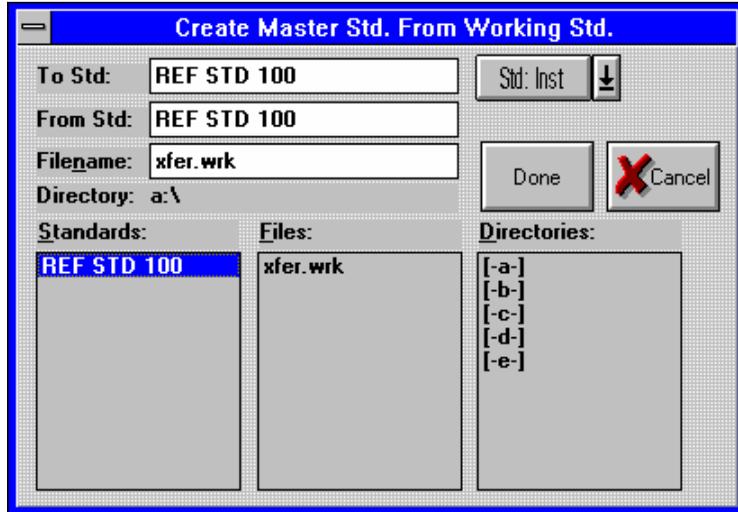
NOTES

Before you use this option, calibrate the instrument at the remote location to ensure the accurate measurement of the working standard in the second part of procedure.

You must first save a batch as a *working std* to create a *master std*.

You cannot test the accuracy of the procedure if *instrument correlation* is enabled.

1. Move to the menu bar, and select **Std**.
2. From the drop-down list of options, click **Working Standard**.
3. From the submenu, click on **Create Master Std from Working Std**. A dialog box displays requesting a file name. The file that is requested is the .WRK file that contains the offset data sent from the central location.
4. Place the diskette in the disk drive. The file "XFER.WRK" displays in the files list box.
5. Double click on the XFER.WRK file to list the contents of the file. The working standard (REF STD 100) displays in the list of standards. That is the only standard in the XFER.WRK file. To select the standard, click on the standard name.



6. The name of the working standard stored in the file displays in both the “From” and “To” input boxes.
7. Enter the name of the working standard. This is done by entering the name in the *To Std* input box.
8. Place the working standard on the instrument and click the **Std:Inst** (measure) button.
9. Click the **Done** button. This creates the new master standard and places it on the desktop. It also exits the dialog box.

The standard “REF STD 100” on the desktop is the newly created master standard. The offset differences from measurement of the master standard at the central location have been applied to the reflectance values of the working standard just measured on the remote instrument.

NOTE

To verify the data, the working standard can be measured as a batch and compared to this new “master”. The color difference should be the original (offset) color difference between the working standard and the master standard.

WARNING

The verification test **is not valid** if you have enabled instrument correlation.

Tolerances

Two types of tolerances can be assigned to a standard:

- Pass/Fail (acceptability) Tolerances
- Sort Tolerances

Pass/Fail Tolerances

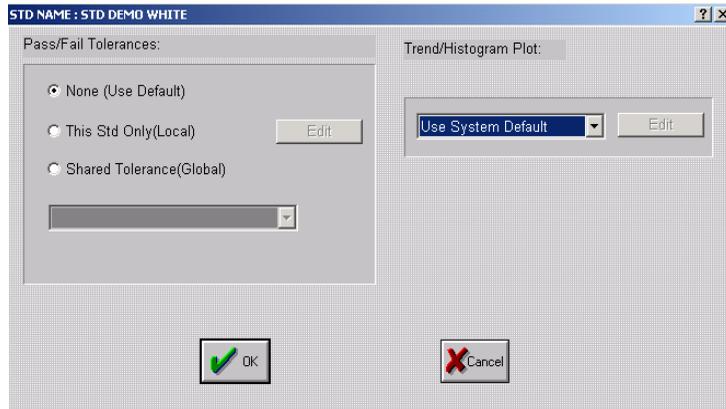
Datacolor TOOLS gives you the ability to create and edit tolerances for each standard on the desktop. The tolerances set an acceptability limit for the *differences* between the batch and the standard on specific color difference parameters. When the batch color difference is less than the acceptability limit *for all of the parameters defined*, we say that the batch *Passes*. If the batch color difference is greater than the limit *for any single parameter defined*, we say that the batch *Fails*. When the batch color difference is greater than 75% of the tolerance limits defined for any of the parameters, a *Warning* is displayed.

See also Applications Technology, Tolerances for a detailed explanation of acceptability tolerances.

Creating/Editing Standard Pass Fail Tolerances

To assign tolerances to a standard:

- From the menu bar, select **Std Menu, Tolerances**. The window below displays:

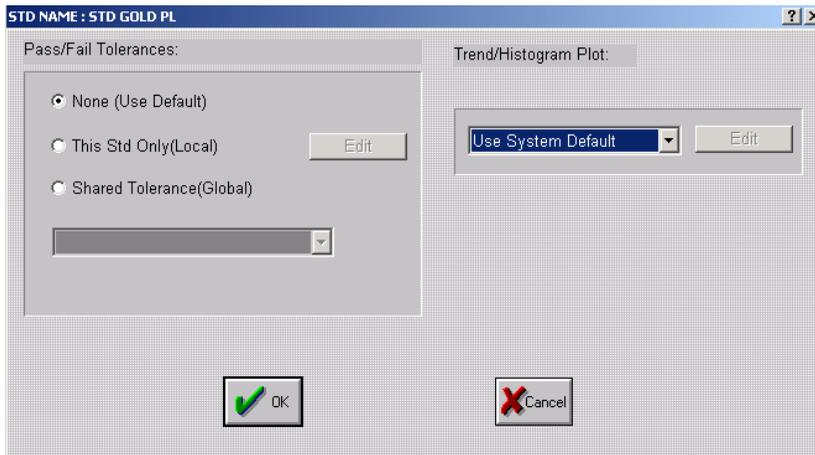


You can assign one of three types of tolerances to a standard:

- **None (Use Default).** The default system tolerance is assigned to the standard. The System Tolerance can be created/edited only from *System Menu/Tolerances*. See also *None (Use Default)*.
- **This Std Only (Local Tolerance).** This is a unique tolerance created for the current standard. It cannot be assigned to more than one standard. Local tolerances can be created and edited only from *Standard Menu, Tolerances, Local*. See also *This Std Only (Local)*.
- **Shared (Global) Tolerance.** This is a tolerance that can be applied to more than one standard. However, it may not be the default tolerance for the entire system. Shared Global Tolerances can only be created/edited from **System Menu, Tolerances**. See also *Shared Tolerance (Global)*.

None (Use Default)

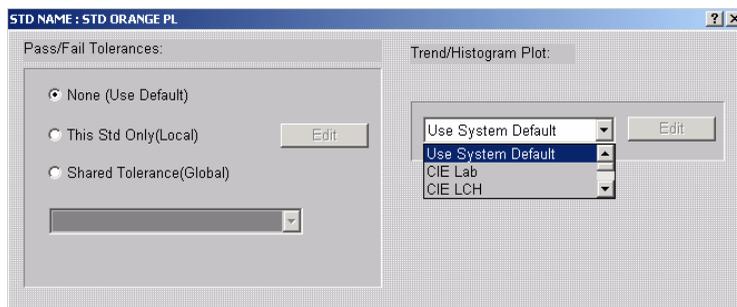
This option assigns the default system tolerance to the current standard on the desktop.



NOTE

The **Edit** buttons are only activated when you assign a local tolerance (This Std Only) to the standard. To edit any system/global tolerances (either pass/fail tolerances or trend/histogram plot tolerances), you must select **System Menu, Tolerance**.

1. From the menu bar, select **Std Menu, Tolerances**.



2. Click in the radio button next to **None (Use Default)**.
3. The fields on the right side of the window are applied to the display of Trend/Histogram plots. Click on the drop-down arrow to view/select the tolerance to be applied to these plots.
4. Click **OK**. If the standard has not been stored in the database, you will be prompted to store the standard in a folder.

This Std Only

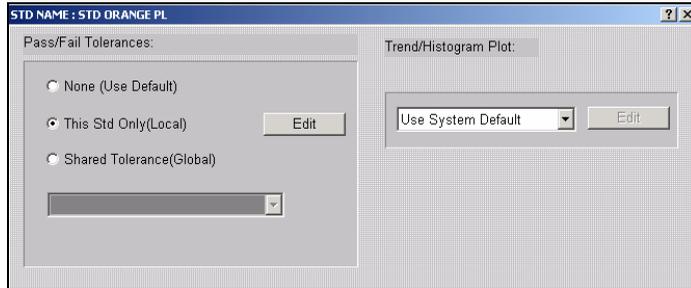
Select this tolerance option to define a unique tolerance for the current standard. This option names the tolerance *Local*, and limits its use to the current standard.

NOTES

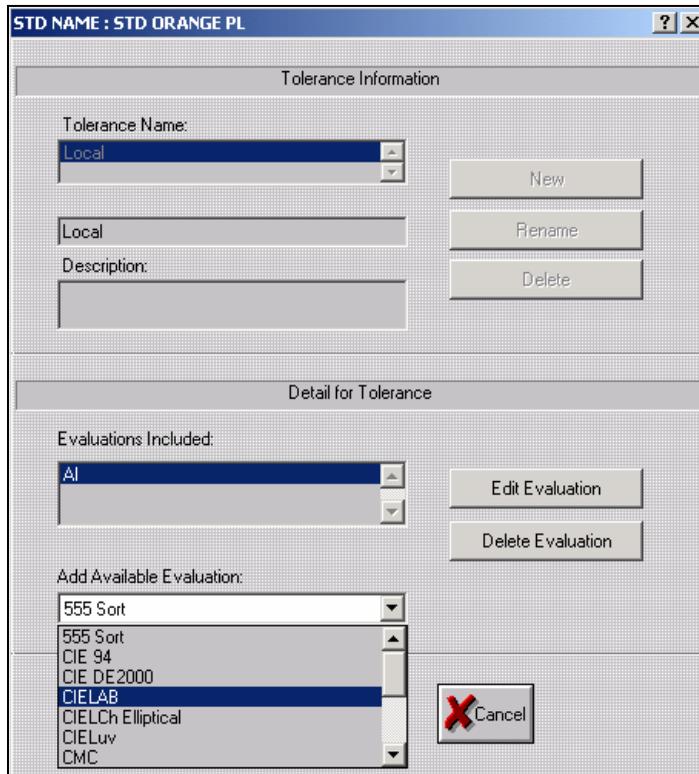
- The tolerance created using this option is restricted to the current standard, and cannot be assigned to any other standard.
- You can string together several different color difference equations into a single tolerance. For example you can include CIELAB and CMC tolerances in this tolerance. When this happens the batch will have to satisfy all of the tolerances in order to receive a *Pass*.
- You can include sort tolerances as part of the tolerance. This procedure is included in the steps provided. *See also Applications Technology, Shade Sorting and Applications Technology A.I. Shade Sorting for a detailed explanation of the shade sorting tolerances.*

To create/edit a local tolerance:

1. Click on the radio button for **This Std Only**.



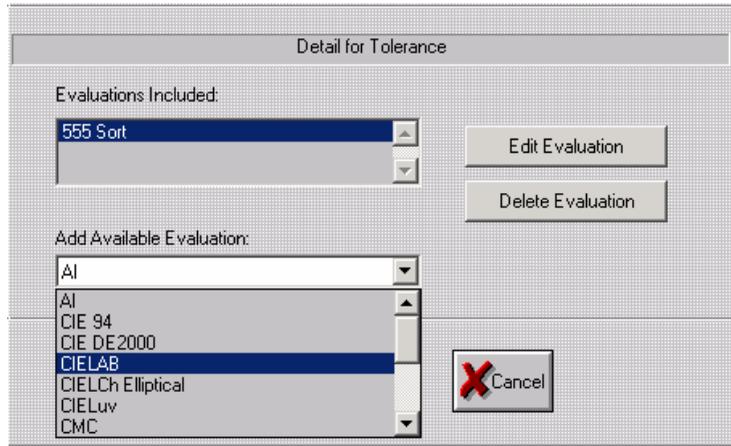
2. The **Edit** button becomes active. Click on it. The window below displays:



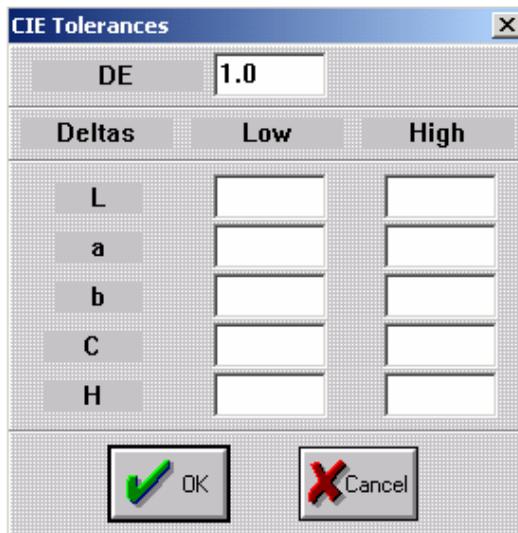
Evaluations Included

Displays the evaluations currently included in the *local* tolerance. In this example, the local tolerance is currently using the AI (pass/fail) tolerance. You can edit the existing A.I. tolerances, replace it with another tolerance, or add more evaluations to the tolerance.

1. To add a different tolerance, click on the down arrow and select a different equation in the *Add Available Evaluation* field. In the example below, a CIELAB tolerance will be added:



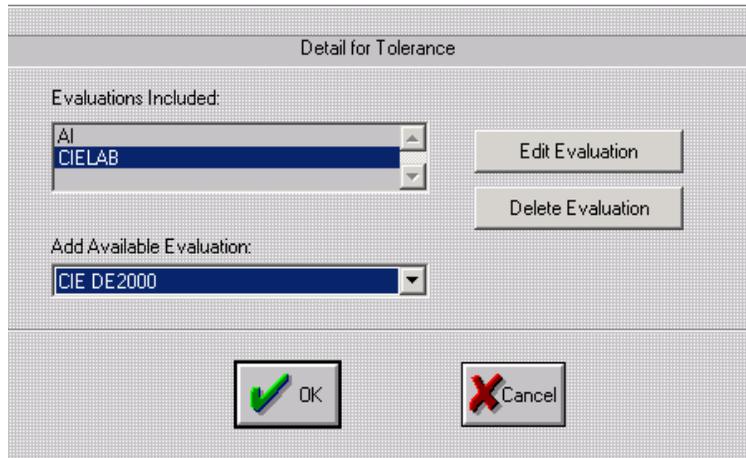
2. When you add an evaluation, the tolerances dialog box displays.



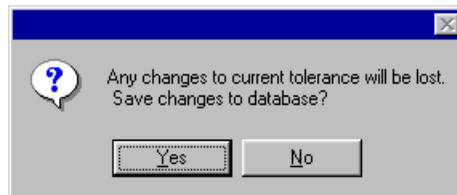
NOTE

When you select **Edit Evaluation** a similar screen displays, containing the current tolerances for the evaluation.

3. Enter the tolerances for each parameter, and then click **OK**. The tolerance window will reappear. In the *Evaluations Included* field, the new tolerance (CIELAB) displays:



4. You can add more evaluations to this local tolerance by repeating steps 2 – 4.
5. To delete one of the evaluations:
 - Highlight the evaluation to be deleted.
 - Click **Delete Evaluation**.
6. When you have completed customizing the local tolerance, click **OK**. The program responds with the following dialog box:



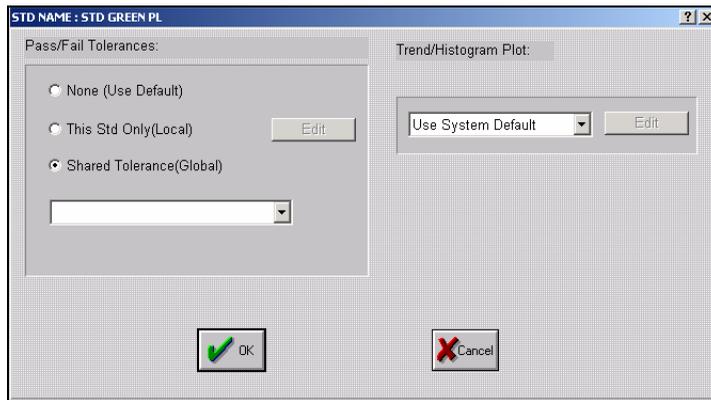
7. Click **Yes** to save the standard and tolerances to a folder in the database. If the standard has not been stored into the database, this action stores the standard *and* the tolerances into the database. If the standard has already been stored, this action updates the tolerances stored with the standard.

Shared Tolerances

Shared (Global) Tolerances are defined from **System Menu, Tolerance**. Default global tolerances are provided with the program for the color difference equations that are frequently used. New global tolerance can be added at any time.

Select this tolerance option if you want to assign one of the *Shared Global Tolerances* as the standard tolerance.

1. Click on **Std Menu, Tolerance**.
2. Click on the radio button for **Shared Tolerance (Global)**.
3. Select a shared (global) tolerance from the drop-down list box that displays.



NOTE

Shared tolerances are only those tolerances created as *global* tolerances. Local tolerances created for any individual standard do not display in the global tolerance list.

Sort Tolerances

Sort tolerances are included in the list of *Available Evaluations*, and can be included as part of a standard tolerance. They will be applied when a shade sorting feature is run. Similar to pass/fail tolerances, these can be assigned to an individual standard, or a system-wide tolerance can be used.

NOTE

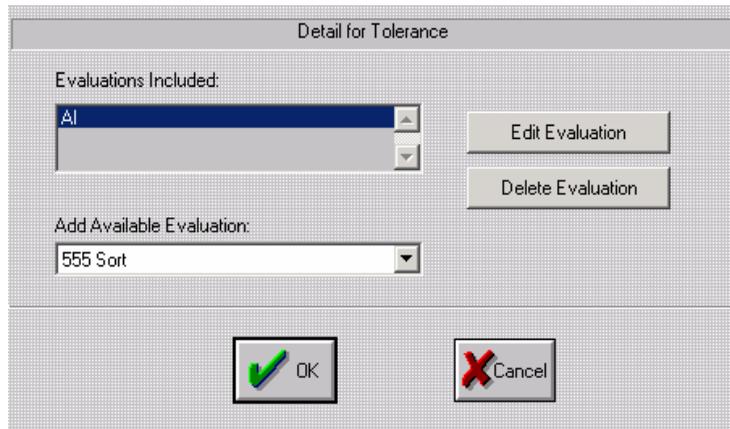
Shade Sorting is not enabled for Datacolor TOOLS^{QCX}.

See also *Std Menu, Creating Sort Tolerances* for detailed instructions to create sort tolerances.

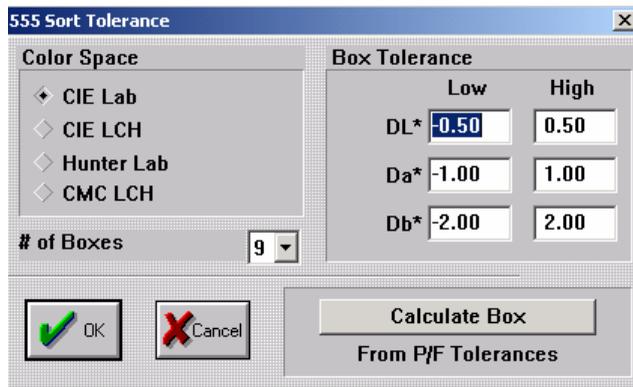
See also *Applications Technology, Shade Sorting* for a detailed explanation of shade sorting. See also *Applications Technology, Acceptability Tolerances* for a detailed discussion of tolerances.

Creating Sort Tolerances

1. Highlight 555 Sort in the *Add Available Evaluation* field, and click **Edit Evaluation**.



The window below is displayed:



- **Color Space.** Four color differences equations are offered:
 - CIE L*a*b*.** Boxes are set up based on DL*, Da*, and Db*.
 - CIE L*C*H*.** Boxes are set up based on DL*, DC*, and DH*.
 - Hunter Lab.** Boxes are set up based on Hunter DL, Da, and Db.
 - CMC LCH.** The CMC 5-5-5 sort uses the CMC parameters DL*/SL, DC*/SC, and DH*/SH to define the 5-5-5 boxes. SL, SC, and SH represent the acceptability tolerance (semi-axis) of the CMC ellipsoid. The factor "l" is included in SL and the factor "c" is included in SC.

NOTES

CMC sorting always uses the batch DL*/SL, DC*/SC, and DH*/SH values to perform the 5-5-5 sort.

- **Low/High Tolerance.** The low and high tolerance value for each parameter defines the box size. It also determines whether the 5-5-5 box contains the standard. For example:

A low DL* of -.5 and a high DL* of +.5 produces a box with the DL* dimension of 1.0.

A low Da* of -1.0 and a high Da* of +1.0 produces a box with the Da* dimension of 2.0.

A low Db* of -2.0 and a high Db* of +2.0 produces a box with the Da* dimension of 4.0.

The actual 5-5-5 box is 1x2x4. The box 5-5-5 contains the standard.

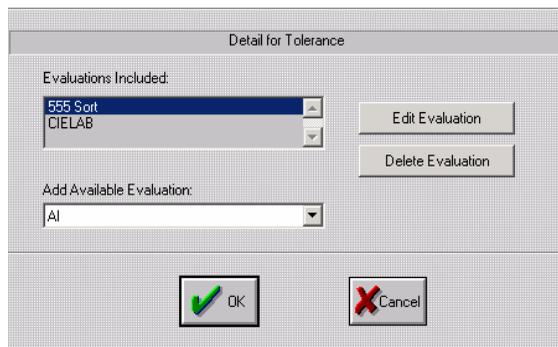
If the lower limit is negative and the upper limit is positive and they are symmetrical, the box 5-5-5 is placed around the standard.

If the input box tolerance values are not symmetrical, box 5-5-5 can be placed at any position, and does not necessarily include the standard. For example:

The low DL* is +.25 and the high DL* is +.75 produces a box size of .5. The L* range of Box 5-5-5 is defined as +.25/+ .75.

- **# of Boxes.** This defines the number of boxes available for each sort parameter. If 9 is entered, 9 boxes would be available for each parameter. The standard is always located in the middle box (box #5 out of 9) for each parameter, and the batches would be sorted into boxes 1-9 based on each their values. The 5-5-5 sort code could range from 1-1-1 to 9-9-9.

2. Enter the tolerances for each parameter, and then click **OK**. The tolerance window will reappear. In the *Evaluations Included* field, 555 Sort has been added.

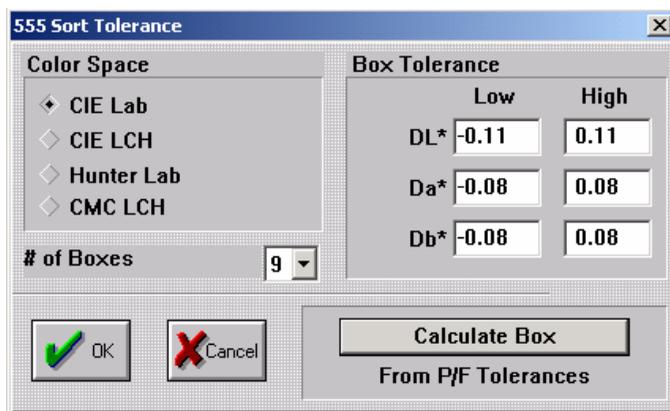


3. Click **OK** to save the new tolerances.
 - **Calculate Box Tolerances.** This option automatically calculates the box tolerances, using the default pass/fail tolerances and the value assigned to the *Number of Boxes* field. Below is an example:

The standard has a DL* P/F tolerance of +1.0, -1.0. The total DL* acceptability distance is 2.0.

The number of boxes is 9.

The box size is 2/9 or .22.



This produces a high DL* of .11 and a low DL* of -.11. The range of DL* from -.11 to +.11 defines the "5" box for DL*.

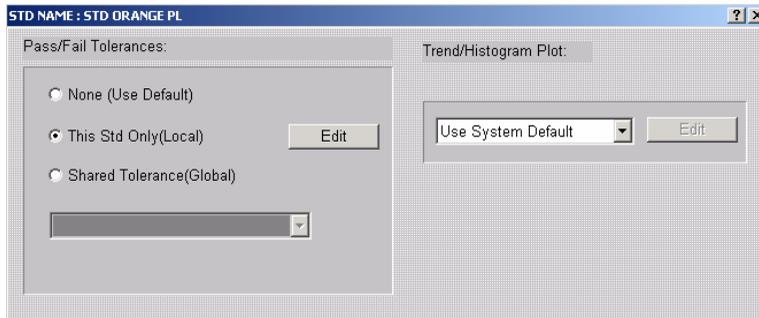
The calculation is repeated for the Da* and Db* tolerances.

See also *Applications Technology, Shade Sorting* for a detailed discussion of shade sorting.

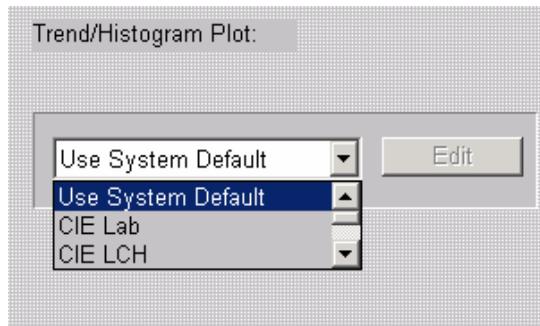
Trend/Histogram Plot

Datacolor TOOLS includes options to display trend or histogram plots of colorimetric data. This field identifies the colorimetric parameters to be displayed on a trend or histogram plot. The tolerances define the range of data displayed on the plot.

Creating/Editing Trend/Histogram Plot Tolerances



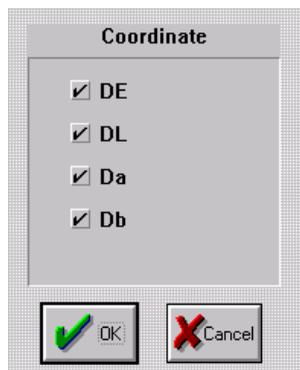
1. In the *Trend/Histogram Plot* field, click on the down arrow to view the tolerances for the trend/histogram plot.



NOTE

When Generic is selected, the program will add a generic tolerance to the trend plot.

2. Highlight one of the selections, and click **Edit**. The screen below displays:



3. A check next to the coordinate indicates that it will be included on the plot. Click in the box to enable a coordinate. Click again, to disable the coordinate. The check will disappear.

Adjust Standard Curve

This feature allows the user to edit a standard curve manually. The curve is adjusted at every wavelength by the same value, and can be based on an input **amount** or **percent**. This option can also be added as a button or included in a form.

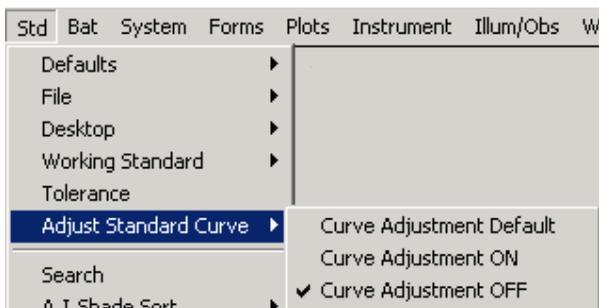
NOTES

The form *QC Input Surface Corr* includes all of the fields and buttons required for this option. *Curve Adjustment* and *Surface Correction* are two separate adjustments.

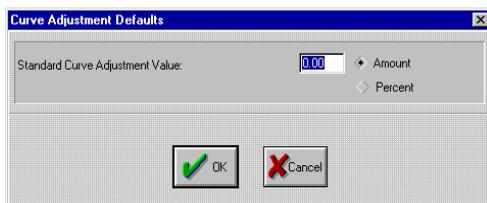
When this option is enabled, the standard on the desktop is adjusted immediately.

This feature is not enabled for Datacolor TOOLS^{QCX}.

1. From the menu bar, select **Std, Adjust Standard Curve**.
2. From the list of submenu options, select the desired adjustment option.

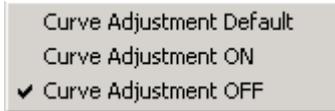


3. **Curve Adjustment Default.** This option sets the values for the curve adjustment. The curve is adjusted at every wavelength by the same value, and the value can be based on an input **amount** or **percent**.



- **Amount.** Enter an amount by which you want to adjust the curve at each wavelength.
- **Percent.** Enter the percent by which you want to adjust the curve at each wavelength.

4. When you have completed the entry, click **OK**.
5. **Curve Adjustment On/Off.** Point and click on the option to enable it. A check indicates the option is enabled. Click a second time to disable the option, and remove the check.



- **Curve Adjustment On.** All standard curves are automatically adjusted by the value set in the *Curve Adjustment Default Value*.
- **Curve Adjustment Off.** None of the standard curves are adjusted.

NOTE

These options can also be added as a button or included in a form. See also *System Menu, Edit Button Bars for instructions*.

Below is an example of curve adjustment results:

The screenshot shows a window titled 'QC INPUT - SURF CORR'. It contains several sections:

- Standard Name:** 5 of 5. A dropdown menu shows 'STD GOLD PL'. Below are buttons: 'New Std', 'Retrieve Std', 'Store Std', 'List Std'.
- Batch Name:** 15 of 16. A dropdown menu shows 'BAT 14'. Below are buttons: 'New Bat', 'Retrieve Bat', 'Store Bat', 'List Bat'.
- Date:** 11-Apr-02 **Time:** 09:05:34
- Surf Corr Status:** OFF **Value:** 0.00
- Std Surf Corr Status:** Unadjusted **Std Surf Corr Value:** 0.00
- Bat Surf Corr Status:** Unadjusted **Bat Surf Corr Value:** 0.00
- Buttons: 'Surf Corr ON', 'Surf Corr OFF', 'Surf Corr Defs'
- Std Curve Adjust Value:** 0.00 **Std Curve Adj Status:** Unadjusted
- Buttons: 'Adj %R Curve', 'UnAdj %R Curve', 'Adj Std %R Defs'
- Bat Curve Adjust Value:** 5.00 **Bat Curve Adj Status:** Adjusted
- Buttons: 'Adj Bat %R', 'UnAdj Bat %R', 'Adj Bat %R Defs'

At the bottom is a table with the following data:

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
A-T5 10 Deg	3.52	-1.97	-9.00	-9.05	-1.72	9.86
F02 10 Deg	3.64	-1.97	-9.19	-9.39	-0.50	10.08
D65 10 Deg	3.93	-2.22	-8.71	-8.84	-1.62	9.81

- Click on the curve adj buttons to instantly enable/disable the standard curve adjustment, or to change the values used for the adjustment. The data will be updated immediately to reflect the change you have made.

Search

Users of color quality control and formulation systems have generated enormous collections of standards, batches and formulas. When a new color is submitted, often searching the archive will produce an acceptable match to the new standard. The *Search* option performs this function. The advantage to using an existing formula is that it has already been run in production. This speeds the laboratory and production approval processes.

The user presents the new sample as the standard. This data can be measured on the desktop, retrieved from a folder, or entered from the keyboard. The only requirement is that it contains reflectance or transmittance data.

The option offers a choice of 6 color space equations. It searches an individual folder for the samples that fall within the specified DE. The search can be based either on DE (total color difference) or on hue and chroma differences. The Illuminant/Observer condition defaults to D65/10°.

The Search function uses defaults to specify the number of samples to include in the results, the parameter to serve as the basis of the search, and the search tolerance. The default parameters used for Search are accessed from *System Menu, Search Defaults*. At run time, the user can change the Search Defaults including:

- changing the search parameters
- changing the number of samples to find
- changing the search parameter
- changing the default search DE

These changes are only applied at run time and the program retains the system default values.

NOTE

This option is not enabled for Datacolor TOOLS^{QCX}.

Running the Search Option

1. Click on **Std Menu, Search**. The dialog box below displays:

Colorimetric Search

Standard: STD GOLD PL
Illuminant: D65 10 Deg

Click New Search After Changing Select Below

Color Difference Formula

CIE Marks & Spencer
 CMC Datacolor
 CIE94 Datacolor AI

Maximum Number Of Batches
 Maximum distance

Search method

normal search
 search lighter batches
 search stronger batches
 search on hue and chroma only

Sample Type

All Types

Search Folder:
 ..
 Include Sub Folders

Search User Defined Field

Result Of Search

DE	Sample Name
0.00	STD GOLD PL
0.00	STD GOLD PL
0.68	BAT 39
0.77	BAT 31
0.86	BAT 6
0.89	BAT 23
0.93	BAT 26
0.94	BAT 21
0.96	BAT 17
1.13	BAT 30

Selected Samples Will Be Added To Desktop As Batch

New Search

The Search dialog box contains the current search parameters and search results. This includes the standard names, and the DE between each sample and the current standard. The user selects samples to be moved to the Desktop for further evaluation.

NOTES

The Search option does not consider any samples in a folder that do not contain reflectance or transmittance data (e.g., L, a, b or X, Y, Z data).

The Search option uses the default standard folder to perform an initial search. The default standard folder is defined on the menu option, *System, Default File Setup*.

The Search Option can be run from the Std Menu, added to the button bars, or placed on a form.

To add the search button to a button bar, use the **System, Edit Button Bars** option, and select this from the available command buttons.

See also Datacolor TOOLS, Form Editor to add the Search button to a form.

Search Parameters

The fields in the left window pane are the parameters used by the program to perform the search. Below is an explanation of each field:

The screenshot shows a software dialog box for search parameters. It is organized into several sections:
 - **Color Difference Formula:** A group of radio buttons where 'CIE' is selected. Other options include Marks & Spencer, CMC, Datacolor, CIE94, and Datacolor AI.
 - **Maximum Number Of Batches:** A text input field containing the value '10'.
 - **Maximum distance:** A text input field containing the value '2.00'.
 - **Search method:** A group of radio buttons where 'normal search' is selected. Other options are 'search lighter batches', 'search stronger batches', and 'search on hue and chroma only'.
 - **Sample Type:** A dropdown menu currently showing 'All Types'.
 - **Search Folder:** A text box containing 'My Database' and a browse button.
 - **Include Sub Folders:** An unchecked checkbox.
 - **Search User Defined Field:** An unchecked checkbox.

- **Color Difference Formula.** Click the radio button next to the equation to be used. See also *Applications Technology, Interpreting Color Differences for an explanation of the color different output from each equation.*
- **Maximum Number of Batches.** Enter the maximum number of batches to be displayed in the results.
- **Maximum Distance.** Enter the maximum acceptable color difference between the current standard and the stored samples.

NOTE

The *Search Method* selected determines how the *Maximum Distance* is applied.

- **Search Method.** These options provide several choices regarding the colorimetric basis for the search. Most Search options look for acceptable samples based on DE, the total color difference. In some cases however, samples may have a DE that is outside the acceptability tolerance. However, if the sample differs slightly in either lightness or chroma, it may be acceptable visually, although the DE is out of tolerance.

- **Normal Search.** The program selects acceptable samples based on the DE, or total color difference between the standard and the stored samples. The *Maximum Distance* tolerance is assigned to DE.
- **Search Lighter Batches.** The *Maximum Distance* limit is applied to the DL value.
- **Search Stronger Batches.** The *Maximum Distance* limit is applied to the DC value.
- **Search on Hue and Chroma Only.** The *Maximum Distance* limit is used in an equation to select samples that have both a DH and DC value less than the limit specified.
- **Sample Type.** You can restrict the search to standard or batches, or you can expand the search to include all samples in the database. Click on the down arrow, and select the appropriate sample type(s) to be included.
- **Search Folder.** Identifies the folder to be searched.
 - **Include Sub Folders.** Will search all subfolders contained in the search folder that has been defined. This folder is defined in *System Menu, Default File Setup*.

NOTES

Pigment Database Users: If the default Search folder selected is **My Database**, the program will *automatically* search all subfolders. This option will not be active.

Textile Database Users: If the default Search folder selected is the root folder for the current user (default is DCI), the program will *automatically* search all subfolders. This option will not be active.

- **Search User Defined Field.** If you have custom fields created for your samples, such as *customer name, product model, etc.*, you can direct the program to search for entries in those fields. Click on the **Browse** button, and select the field to be used for the search. See *System Menu, Search Defaults* for instructions to configure the program to search on these custom fields.
- **New Search.** After making any changes to the Search parameters, click this button to re-run the search using the new parameters.
 - To change the search folder, click the **Browse** button...



...and select another folder. A new search result will automatically display.

Search Results

When you have made all selections, click the **New Search** button. The information in the right window pane will be updated with the new search results.

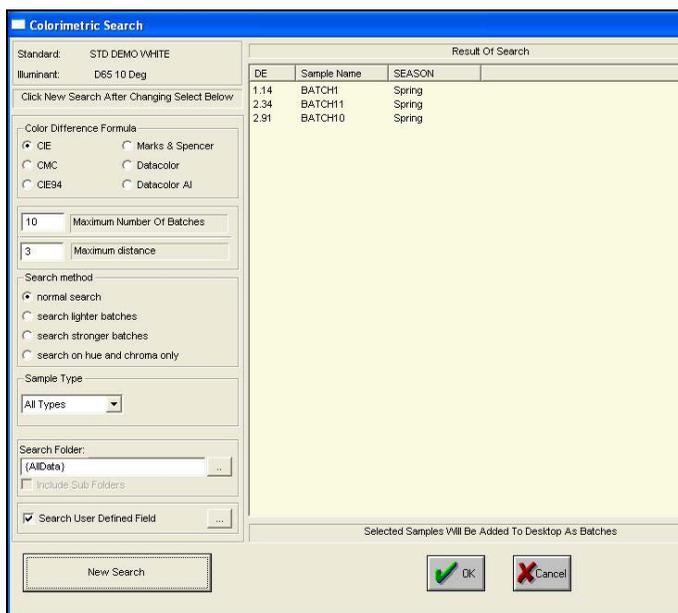
Standard: STD GREEN PL	Result Of Search	
Illuminant: D65 10 Deg	DE	Sample Name
Click New Search After Changing Select Below	0.00	STD GREEN PL
Color Difference Formula <input checked="" type="radio"/> CIE <input type="radio"/> Marks & Spencer <input type="radio"/> CMC <input type="radio"/> Datacolor <input type="radio"/> CIE94 <input type="radio"/> Datacolor AI	0.38	F4
	0.54	E8
	0.73	F3
	0.87	ABC4
	0.97	C10
	1.03	D1
	1.03	B15
	1.04	E6
	1.05	C9

The acceptable matches are listed in the right pane. They are ordered from best to worst based on the size of the color difference, in the *Illuminant/Observer condition* displayed on the left. You can move any/all of these samples to the desktop for further examination.

- To select a batch to add to the desktop, move to the *Result of Search* listing, and highlight the desired batch.
- To select multiple batches, do the following:
 - Press and hold the **Ctrl** key.
 - Move to the *Result of Search* list, and use the mouse to click on each batch you want to add.

Search User-Defined Field

Below is an example of a search based on a user-defined field. Listed are all samples that have the entry *spring* in the batch field *Season*.



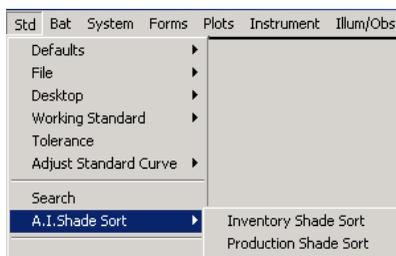
See System Menu, Search Defaults for instructions to configure the program to search on these custom fields.

A.I. Shade Sort

This option allows you to perform shade sorting using the Artificial Intelligence capability offered in the program.

NOTE

This option is not enabled for Datacolor TOOLS^{QCX}.



A.I. Shade Sort offers two sorting options.

- *Inventory Shade Sort* sorts all of the batches associated with the standard into appropriate bins.
- *Production Shade Sort* assigns the current desktop batch to a sort bin.

See *Applications Technology, Artificial Intelligence (A.I.) Shade Sorting* for a detailed explanation of this feature.

Inventory Shade Sort

NOTE

This option is not enabled for Datacolor TOOLS^{QCX}.

This sort operates on an accumulated inventory of pieces, or samples, and assigns them into sets of bins. The bin centers are calculated to cluster the pieces that can be combined together visually into the smallest possible number of bins.

For the inventory shade sort, the program sorts all the batches on the desktop associated with the current standard, using the default setting for the A.I. sort tolerance. See also *System Menu, A.I. Shade Sort Defaults* for information on these settings.

1. From the sub-menu of options, select **Inventory Shade Sort**. The A.I. Shade Sort dialog box is displayed.

Bin#:	Batch Name:	dL:	dC:	dH:
Reject	N0001 AQUA N	1.249	0.705	0.924

- **Max Bin.** The maximum number of bins available for sorting.
- **Min Sample.** The minimum number of samples per bin.
- **Total Bin #.** Total number of bins used for sort. Bin # starts at zero.
- **Num of Reject Samples.** Number of batches that failed A.I pass/fail tolerances.

- **Num of Unsorted Samples.** Number of batches that passed A.I. pass/fail tolerances, but were not placed into any bins. Unsorted samples typically occur when the number of bins is too small.
- **Sort Type.** Identifies whether the sort results are from an inventory sort or a production sort.
- **Display options.** Regular or Tapered. For *Regular* sort, the samples are sorted by Bin #. For *Tapered* sort, the samples within each shade bin are sorted so that the delta values (differences) between any two adjacent pieces in a bin are minimized. In addition, the bins are ordered so that each bin contains pieces that are the closest visual match to the pieces contained in the adjacent bins.
- **Bin #.** Identifies the bin number for the sample.
- **Batch Name.** Displays the sample name.
- **DL/DC/DH.** Displays the color differences between the standard and the batch for lightness (DL), chroma (DC) or hue(DH).

A file containing this information, entitled **A.I.SORT.OUT**, is generated and placed in the Data folder inside the Datacolor TOOLS program folder. This file can be opened as a text file and printed.

See also Applications Technology, A.I. Shade Sorting for a detailed discussion of this feature, including step-by-step instructions for using it.

Production Shade Sort

This sort operates on individual pieces as they are produced, clustering them *on the fly*, into optimal bin assignments.

NOTES

- This option is not enabled for Datacolor TOOLS^{QCX} users.
- This option can only be run when two command buttons are displayed on the desktop. The buttons are **Prod. Sort Current** and **End Prod Sort**. To add these buttons to the button bar, refer to the instructions found in **System Menu, Edit Button Bars**.

To run the production shade sort:

1. Retrieve or measure a standard
2. Retrieve a batch to be sorted.
3. To start production shade sort, move to the button bar, and click **Production sort current batch**. A production bin number is assigned to the batch.
4. To run a second batch through the sort, select a different batch to be the current desktop batch.

5. Click the **Production sort current** button again.
6. To view the results, move to the menu bar, and select **A.I. Shade Sort, Production Shade Sort**.

Max Bin:
 Min Sample:

Result of Shade Sort

Total Bin#: Sort Type:
 Num of Reject Samples: Display Option: Regular Tapered
 Num of Unsorted Samples:

Bin#:	Batch Name:	dL:	dC:	dH:
0	BAT 12	1.655	1.837	1.713
0	BAT 13	0.139	1.280	0.475
0	BAT 14	0.985	1.231	0.852
0	BAT 7	1.642	3.199	-0.213
0	BAT 8	0.861	2.636	-0.281
0	BAT 9	0.083	1.783	1.406
0	BAT 9	0.083	1.783	1.406
0	BAT 9	0.083	1.783	1.406
0	BAT 9	0.083	1.783	1.406
Reject	BAT 11	0.620	5.366	0.942

The A.I. Shade Sort dialog box displays the following:

- **Max Bin.** The maximum number of bins available for sorting.
- **Min Sample.** The minimum number of samples per bin.
- **Total Bin #.** Total number of bins used for sort. Bin # starts at zero.
- **Num of Reject Samples.** Number of batches that failed A.I. pass/fail tolerances.
- **Num of Unsorted Samples.** Number of batches that passed A.I. pass/fail tolerances, but were not placed into any bins. Unsorted samples typically occur when the number of bins is too small.
- **Sort Type.** Identifies whether the sort results are from an inventory sort or a production sort.
- **Display Options. Regular or Tapered.** For *Regular* sort, the samples are sorted by Bin #. For *Tapered* sort, the samples within each shade bin are sorted so that the delta values or differences between any two adjacent pieces in a bin are minimized. In addition, the bins are ordered so that each bin contains pieces that are the closest visual match to the pieces contained in the adjacent bins.
- **Bin #.** Identifies the bin number for the sample.
- **Batch Name.** Displays the sample name.
- **DL/DC/DH.** Displays the color differences between the standard and the batch for lightness (DL), chroma (DC) or hue (DH).

7. To finish the current production run and delete the production history file, click the **End Production Run** button on the desktop.

See also *Applications Technology, A.I. Shade Sorting* for a detailed discussion of this feature, including step-by-step instructions for using it.

A.I. P/F Training

This option is used to set up tolerances for the A.I. Pass/Fail option. Creating pass/fail tolerances for the A.I. feature is called *Training the Standard*. Physical samples representing batches must be available for someone to make visual pass or fail judgments. You will measure the batches and use the *training* option to produce ellipsoidal A.I. P/F tolerances.

Once you have marked all of the batches, you can begin the A.I. P/F training. It incorporates your visual assessments of the samples into the creation of acceptability tolerances.

NOTES

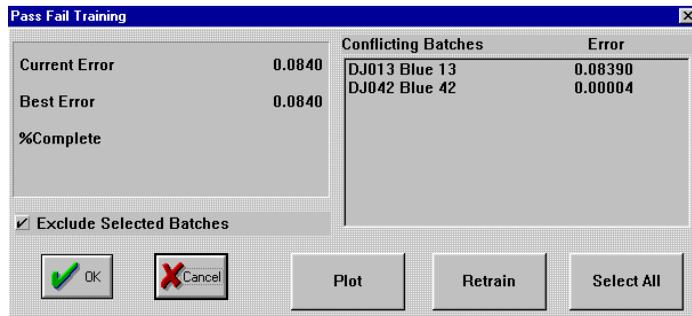
- This option is not enabled for Datacolor TOOLS^{QCX}.
- It is recommended that you add the *P/F Training* button to the button bar. See also *System Menu, Edit Button Bars* for instructions.
- The screen form named *Visual Tolerancing Form* is used to produce ellipsoidal A.I. P/F Tolerances. See also *Forms Menu, Screen Forms* for instructions to access this form.

See also *Applications Technology, A.I. Tolerancing* for a detailed explanation of the concept and operation of A.I. P/F.

Training the Samples

You must first evaluate the batches visually, and record these visual evaluations. See also *Applications Technology, A.I. Tolerancing* for information on this procedure.

1. Once the samples are evaluated and marked, select **Std Menu, A.I. P/F Training**. This option displays the results in the *Pass/Fail Training* dialog box:



The dialog box titled "Pass Fail Training" displays the following information:

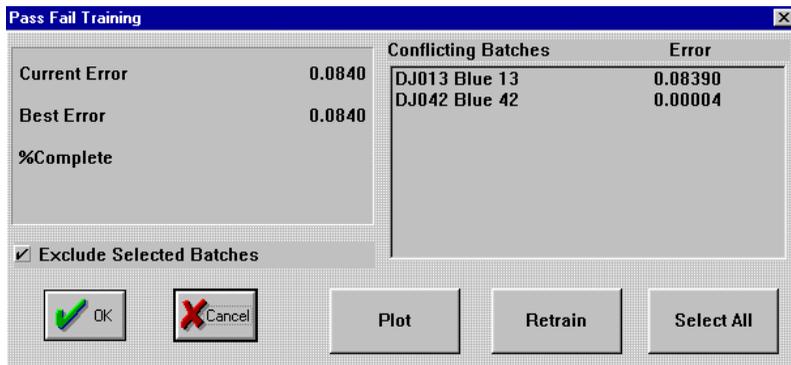
Current Error		Conflicting Batches		Error
Current Error	0.0840	DJ013 Blue 13		0.08390
Best Error	0.0840	DJ042 Blue 42		0.00004
%Complete				

Exclude Selected Batches

Buttons:

Errors and Conflicts

Statistical errors and conflicting batches are generated during a P/F training session:



- **Errors.** Errors reflect the presence of conflicting batches. An error of zero indicates that there weren't any conflicting batches.
- **Conflicts.** A conflict can occur if you pass a sample that falls in the same area of color space as one that you failed. In this case, the software cannot exclude the failing sample while including the passing sample. This can occur because of a mistake in input or it may be a visual judgment error. In this example, there are 2 batches in conflict. The error number displayed for each batch indicates the degree of error. The magnitude of the error indicates the degree of conflict associated with the batch. A higher number indicates that the batch is a greater problem.

Eliminating Conflicts. There are 2 ways to handle conflicting batches.

- The recommended approach is to re-evaluate the visual pass/fail judgment made regarding the conflicting batch. Start with the batches having the highest error. If you decide that the visual evaluation is not correct, you change the judgment and 'retrain' the standard. In many cases, if you change the evaluation of the samples with the greatest error first, the other conflicts may be resolved.
- The fastest way to eliminate the conflict is to 'exclude' the conflicting batches from the training.
 - To exclude a single batch, click on the batch name to highlight it.
 - To exclude a group of batches, hold down the Ctrl key and click on the batches. To exclude all the conflicting batches, click the Select All button.

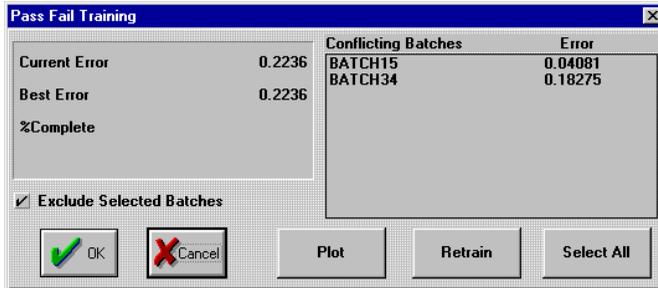
After you have excluded the batches, click on the **Retrain** button to start the training again. The conflicting batches will be excluded.

Exclude Selected Batches

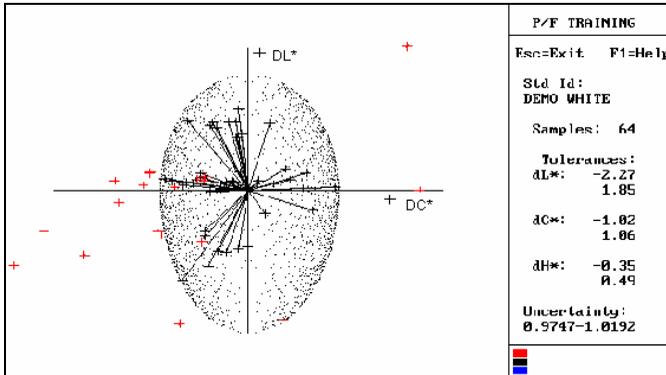
You can exclude batches from the calculation of the tolerance. This is useful if you think a particular sample is not representative of the product.

Plot

The 3D plot graphically represents the results of a Pass/Fail Training session. In the Pass Fail Training dialog box, click the **Plot** button to obtain a 3D plot of the ellipsoidal acceptability volume.



Below is an example:



The ellipsoid may be rotated in order to show the shape of the ellipsoid along the other axes. For example, you can display DL vs. DC, or DL vs. DH. *See also Plot Menu, 3D Plot Rotation Controls for information on the keys that control the operation of the 3D plot:*

Storing A.I. P/F Tolerances

After you are satisfied with the training session, you can store the new A.I. P/F tolerances with the standard by clicking the **OK** button.

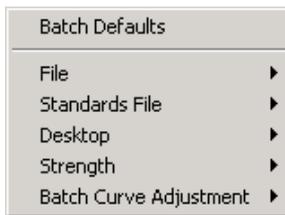
Batch Menu

Batch Menu Options

The Batch (BAT) menu options control naming conventions for the batch, the method for batch data input, storage and retrieval of batch data, and other batch setups specific to particular color evaluation options.

Accessing the Batch Menu

From the main window, move to the menu bar, and click **Bat**. A drop-down list displays with the list of menu options.

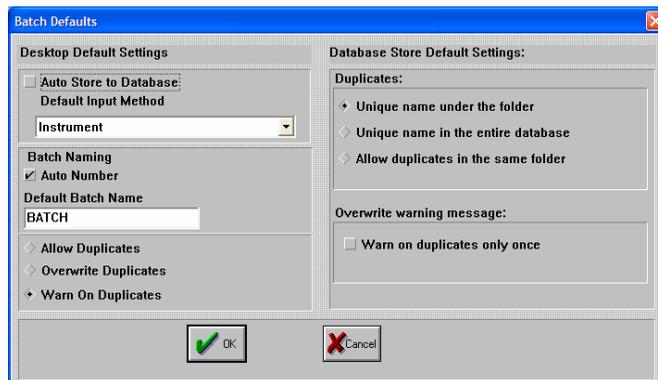


To select a menu option, simply click on it. If a right-facing arrow is shown next to an option, this indicates there is a secondary list of submenu options (e.g., Bat, File, Retrieve).

Batch Defaults

This group of menu options includes selections for batch naming conventions, the default method for batch input, and the display of batches on the desktop. *See also The Datacolor TOOLS Desktop for details on the design of the desktop.*

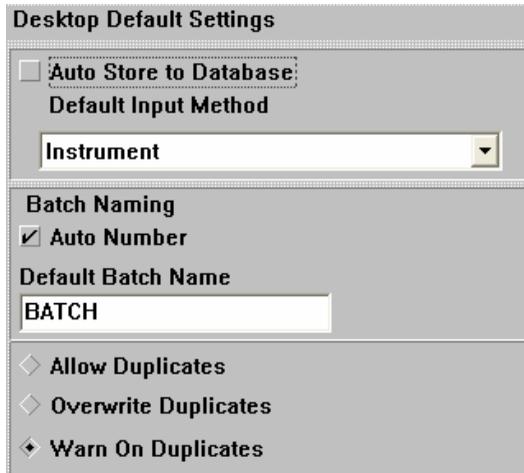
- From the menu bar, click on **Bat, Batch Defaults**. The Batch Defaults dialog box is displayed.



Default Settings

These options include instructions for handling batch data on the TOOLS desktop, and storing batch data into the database. They include selections for both measuring and storing batches.

Desktop Default Settings. The selections on the left side of the screen are used when handling data on the desktop.



The screenshot shows a dialog box titled "Desktop Default Settings" with a grey background. It is divided into three sections. The top section has a checkbox labeled "Auto Store to Database:" which is unchecked, and a dropdown menu labeled "Default Input Method" with "Instrument" selected. The middle section is titled "Batch Naming" and contains a checked checkbox for "Auto Number" and a text input field containing "BATCH". The bottom section contains three options, each with a diamond-shaped icon: "Allow Duplicates" (unchecked), "Overwrite Duplicates" (unchecked), and "Warn On Duplicates" (checked).

Auto Store to Database. When *the Auto Store* option is enabled, batches added to the desktop are automatically stored into the data base. The default setting for this option is *Off*.

- To turn this option on, click on the check box in the dialog box.
- To turn the option off, click on the check box to remove the check mark.

NOTE

There is a setting in *System Menu, Strength Defaults* that controls whether the program will prompt for a folder name for the batch data.

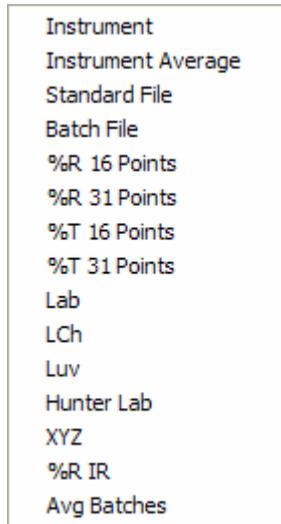
Default Input Method

This selection determines the method for the batch measurement. The *method* is the type of data input for the batch. The most common is measurement (instrument). You can also retrieve data from a folder or input data, in many different formats, from the keyboard.



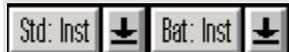
The screenshot shows a dropdown menu titled "Default Input Method" with a grey background. The menu is open, showing the word "Instrument" selected and a small downward-pointing arrow on the right side.

- Click the drop-down list arrow shown at the end of the field, and select one of the following methods:



NOTE

The same selections are available using drop-down list arrow that displays next to the standard or batch measurement button, on the desktop button bar:



The button bar options allow you to change the batch measurement method while running the program. This change is not permanent. When you exit the program, the setting returns to the selection made in *Batch, Defaults*.

- **Instrument.** Batch data comes from the instrument. The measurement defaults to a single scan of the batch. *This method is not enabled for Datacolor TOOLS^{WORKSTATION}.*
- **Instrument Average.** Takes multiple reads of the batch from the instrument, and then averages them. The number of reads is based on the selection made in *Instrument Menu, Instrument Setup, General Options, Multiple Measurements*. This method is not enabled for Datacolor TOOLS^{WORKSTATION}.
- **Standard File.** Retrieves standard data from the database as the batch. The default folder is identified in *Std, Standard Defaults*.
- **Batch File.** Retrieves batch data from the database. The default folder is identified in *Bat, Batch Defaults*.

- **%R** User enters reflectance data from the keyboard for the standard.
 - **16 pt.** User enters data in 20 nm increments from 400–700m.
 - **31 pt.** User enters data in 10 nm increments from 400–700m.
- **%T.** User enters transmittance data from the keyboard.
 - **16 pt.** User enters data in 20 nm increments from 400–700m.
 - **31 pt.** User enters data in 10 nm increments from 400–700m.
- **Lab.** User enters L*,a*,b* values calculated from CIEL*a*b* color difference equation.
- **LCH.** User enters L*,C*,H* values calculated from CIEL*a*b*(C*H*) color difference equation.
- **Luv.** User enters L*,u*,v* values calculated from CIEL*u*v* color difference equation.
- **Hunter Lab.** User enters L, a, b, values from Hunter Lab color difference equation.
- **XYZ.** User enters CIE X, Y, Z values.

NOTE

All colorimetric data is specific to an Illuminant/Observer condition. Please confirm the Illuminant/Observer selection before entering the data.

- **%R IR.** User enters reflectance data from the keyboard. This data includes wavelengths in the infrared region of the spectrum (710nm-1100nm).
- **Avg Batches.** Creates a new standard on the desktop by averaging all of the batches attached to the current standard.

Batch Naming

These fields control the defaults to be used for naming batches.

Batch Naming

Auto Number

Default Batch Name

Allow Duplicates

Overwrite Duplicates

Warn On Duplicates

- **Auto Number.** Adds a sequential number to every batch name. Click in the check box. When a checkmark displays, the option is active. To disable the option, click in the box again, removing the check mark.
- **Default Batch Name.** This name will be assigned to the batch if you do not input a batch name. This is handy if you are measuring many batches of the same material, or when a specific name is not important.

Batch Control Options

These options instruct the program regarding how to name batches when "Auto Numbering" is not used. These defaults are applied to **batches on the desktop only**.

- **Allow Duplicates.** This option allows duplicate batch names.
- **Overwrite Duplicates.** This option will automatically overwrite the batch data when a new measurement is made, and no batch name is entered. This is useful in production situations using a hand-held instrument. You can remeasure easily without retyping a batch name.
- **Warn On Duplicates.** If you don't input a new batch name and try to take a batch measurement, the program will pop up a warning asking if you want to overwrite the batch, input a new name, or cancel the operation.

Database Default Settings

The selections on the right side of the screen are used when storing data to the database. They provide rules for the program to use when it discovers batch samples with duplicate names.

Database Store Default Settings:

Duplicates:

- Unique name under the folder
- Unique name in the entire database
- Allow duplicates in the same folder

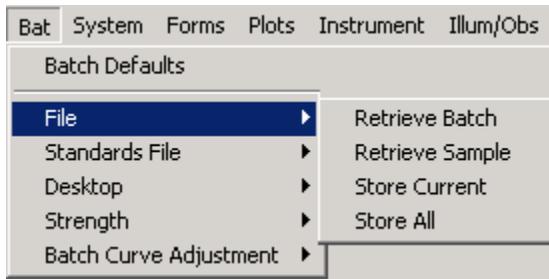
Overwrite warning message:

- Warn on duplicates only once

- **Unique Name Under the Folder.** No duplicate batch names are allowed in a single folder.
- **Unique Name in the Entire Database.** No duplicate batch names are allowed in the entire database.
- **Allow Duplicates in the Same Folder.** Program allows multiple instances of the same batch name in a single folder. There is no prefix or suffix assigned to distinguish the batches. However, there is a date/time stamp associated with the record. This option is offered to maintain consistency with older versions of the program.
- **Overwrite Warning Message.** Warns the user only for the first instance of a duplicate name.

File

These menu selections include commands for retrieving and storing batch data.



Retrieve Batch

This option is used for retrieving a batch from the database to the desktop. It will only display those samples marked as “batches”. The *Retrieve* procedure differs slightly depending on the database structure used.

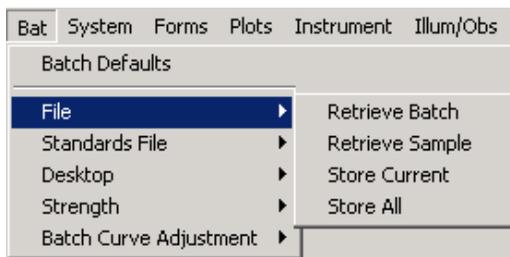
See also Data Management for a discussion of the two different database structures, Textile and Pigment, used by the program.

NOTES

- If you would like to retrieve a standard as a batch for comparison to another standard, see *Retrieve Samples*.
- This function can be added as a button on one of the button bars. *See also System Menu, Edit Button Bars for instructions to add buttons to the button bars.*

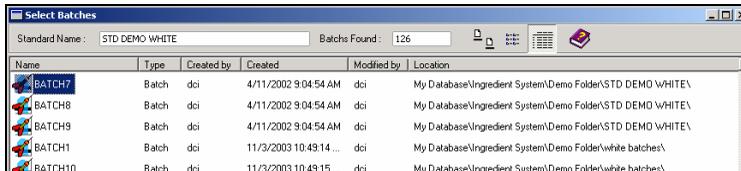
Retrieve Batches from Pigment Database

The pigment database allows you to store identical standards and batches in multiple folders. Unlike the Textile database, which searches only the active folder, the *Retrieve Batch* option in the Pigment database will retrieve all copies of the batch associated with the current desktop standard.

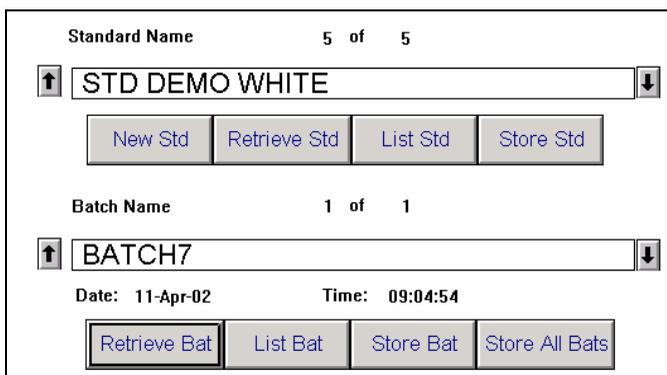


To retrieve batches from the database:

1. Click **Batch Menu, File, Retrieve Batch**, or the **Retrieve Bat** button on the desktop. The Select Batches window will open, displaying all of the batches stored for the current desktop standard, and the folder in which they are stored. The same sample may appear in more than one folder.
2. Click on the batch to be retrieved.



3. Click the **Select** button at the bottom of the window. The Select Batches window will close, and the batch you highlighted will be displayed as the batch on the desktop.



NOTE

The **Retrieve Batch** function in a Pigment database opens the Data Navigator, and provides access to advanced filtering and sorting options. See also *Applications Technology, Data Management* for a detailed discussion of these features.

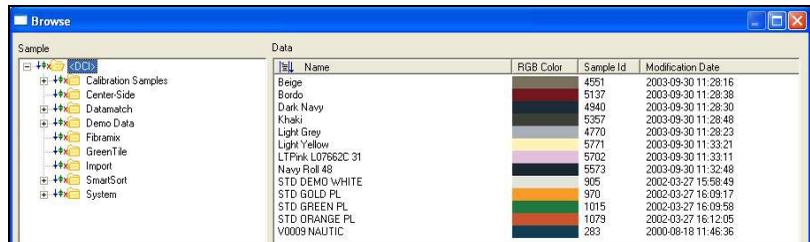
Retrieve Batches from Textile Database

In the Textile database, batches are retrieved only from the active file. A default batch file is defined in the **System Menu, Default File Setup**,

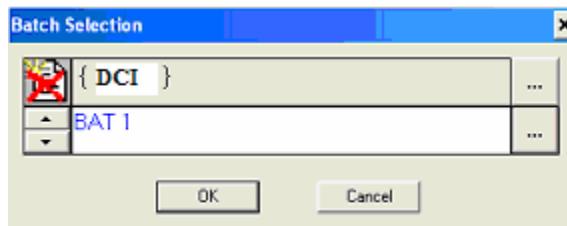
NOTE

The default file selection can be overridden at run time.

1. On the desktop, click **Batch Menu, File, Retrieve Batch**, or the **Retrieve Bat** button on the desktop. The Select Folder window is displayed, and the active folder is highlighted:



2. If required, click to highlight a different folder to be displayed. Then click **OK**. The Batch Selection dialog box is displayed:



There are two methods to retrieve batches from folders in the Textile database. The method used depends on the information you enter into the batch selection window.

NOTE

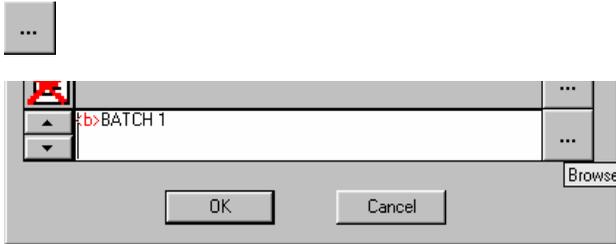
This button indicates the *Input mode* is locked.



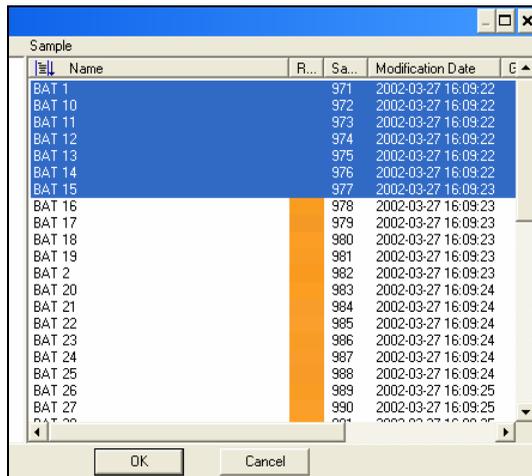
When this button displays, you cannot measure a new batch. You can only retrieve a batch from the desktop, or from a folder.

METHOD #1. This option is used to narrow the sample selection based on characters included in the sample name.

If you know the first few characters of the batch sample name, enter the characters into the blank input box. A *Browse* button is located at the end of the each line. Click the **Browse** button shown at the end of the second line.



1. In the example above, the letter b is entered in the input box, and the lower **Browse** button is clicked. The Browse dialog box is displayed with sample names matching that character.



You can enter several characters into the dialog box to further narrow the search. Only the samples including those characters will be displayed.

2. Select a sample(s) to be retrieved.
3. Click **OK**. The samples displays in the Batch Selection window.
4. Click **OK**. The samples will appear in the batch field on the desktop.

METHOD #2. Displays all the samples in a folder.

1. To display a list of all samples in a highlighted folder, in the Batch Selection window, click the **Browse** button located at the end of the second line.



2. The Browse dialog box is displayed. Under the Folder heading, click to highlight a folder name. In the example below, the folder *DCI* is selected.



A list of the batches is displayed on the right.

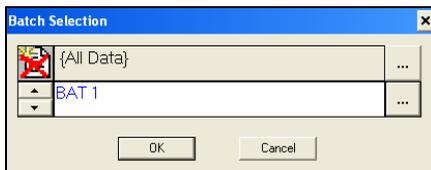
3. Use the up/down scroll bar shown along the right-hand side of the dialog box to move through the list of batches until you locate the desired sample. Then click **OK**. (At any time, click **Cancel** to close the dialog box.)

NOTES

- You can select more than one sample to be retrieved to the desktop.
- From the Browse window, you can create, rename, and delete batch folders.

See also Database Management for details on creating, renaming and deleting folders, and on sample selection.

4. Click **OK**. The Batch Selection dialog box displays.



5. Click **OK** to close the window. The batch displays on the desktop.

Retrieve Sample

This option was added for users of Datacolor formulation programs. It is used to retrieve samples that were not stored to the database using the Datacolor TOOLS program, as batches or standards.

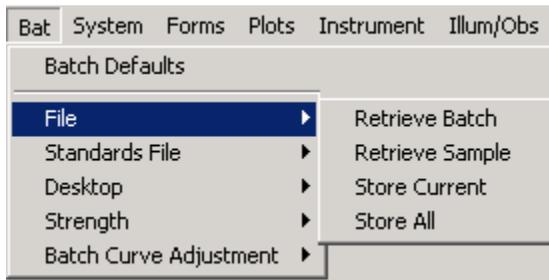
NOTES

- For Datacolor MATCH^{PIGMENT} users this option is used to retrieve substrates, targets and trials and place them on the desktop as batches.
- For Datacolor MATCH^{TEXTILE} users, this option is used to retrieve all samples stored to the database.

See **Retrieve Batches** for instructions to retrieve samples from the database

Store Batches

You can store batches one-by-one, or you can store all of the batches on the desktop, using a single instruction. In either case, the batches stored into the database will be associated with the current standard on the desktop.



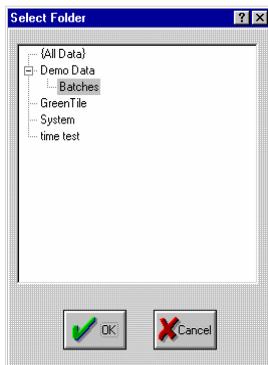
NOTE

These features are also available as buttons on the desktop. See also *System Menu, Edit Button Bars* for information on adding buttons to the button bar.

- **Store Current.** Stores the active batch on the desktop to the database.
- **Store All.** Stores all batches on the desktop to the database.

Procedure to Store Batches

1. From the menu bar, click **Bat, Store Current** or **Store All**. The Select Folder dialog box displays and the default batch folder is highlighted. The default batch folder can be identified from the **System** menu, **Default File Setup**.



2. Click on the folder that will hold the batch information. Then click **OK**.
3. If you wish to store into a new folder, you can create it from this point.

NOTE

From the *Browse* window, you can also rename, and delete batch folders.

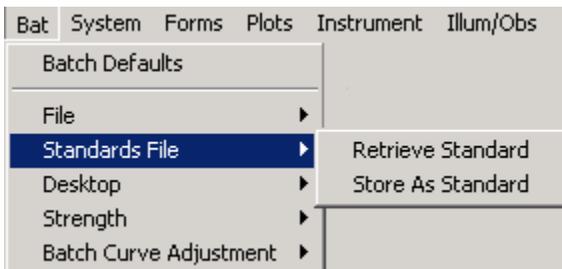
Creating a New Batch Folder

If you wish to store your batches in a different folder from your standards, you can create a new folder. The new folder should be named in a way that easily identifies its contents. For example, you can name folders by product type, color type, vendor, process, or anything that identifies the data that is stored in it. The folder name can include a maximum of 50 characters.

See Program Features, The Datacolor TOOLS Database, Folder Maintenance for instructions to create a new folder.

Standards File

This option gives you the flexibility to compare two batches to one another. You can retrieve a standard as a batch. You can also store the current batch as a "standard", allowing you to recall it to the desktop later as the reference sample, or "standard", and compare it to other batches.



- **Retrieve Standard.** Displays a list of all of the standards in the database. The sample selected from this list becomes the active batch on the desktop.
- **Store as Standard.** Stores the current batch as a standard. The program will request a folder name to identify where the standard should be stored.

NOTES

When *Autostore Batch* (**Batch Menu, Batch Defaults**) is enabled and you retrieve a standard, the program will automatically store the retrieved standard as a batch.

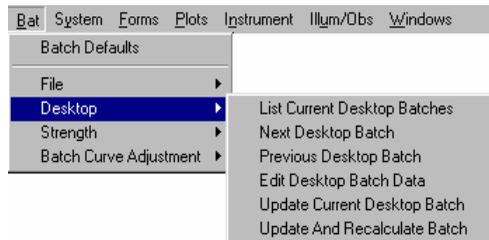
When *Ask Folder Name When Storing* (**System Menu, Default File Setup**) is enabled, the program will request a folder name identifying where the batch should be stored.

See also *Batch Menu, Retrieve Batches* for step-by-step instructions to retrieve samples from the database.

Desktop

The *Desktop* menu provides options to manage the batches on the desktop. These options enable you to move the samples between the database and the desktop. This saves you the trouble of sorting through multiple folders containing hundreds of samples when you are in the midst of a single color evaluation.

- From the menu bar, click **Bat, Desktop**. From the submenu, select the desired option.



NOTE

Your desktop may contain buttons that perform these desktop management functions. If these buttons do not appear on your screen and you would like to add them, see *System Menu, Edit Button Bars* for instructions to add/change buttons on the button bar or on forms.

List Current Desktop Batches

This function lists all of the current desktop batches. You can select batches to examine, selectively enable/disable batches, or delete the batches from the desktop.

To list the batches on the desktop,

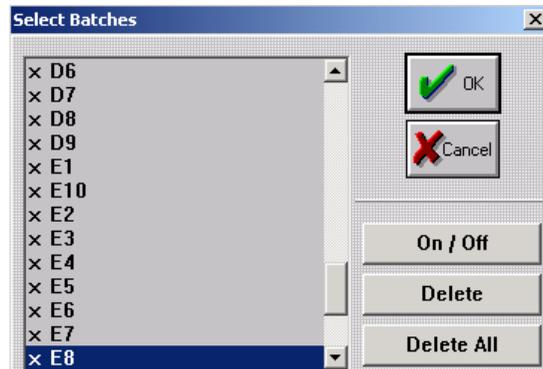
1. From the menu bar click on **Batch, Desktop, List Current Desktop Batches:**

....OR...

Click the **List Bat** button.

The screenshot shows a dialog box with two main sections. The top section is titled "Standard Name" and shows "4 of 4" items. A list box contains "DJV01 Blue reference" with up and down arrow buttons on either side. Below this are four buttons: "New Std", "Retrieve Std", "List Std", and "Store Std". The bottom section is titled "Batch Name" and shows "46 of 50" items. A list box contains "DJ046 Blue 46" with up and down arrow buttons. Below this are fields for "Date:" and "Time:". At the bottom are four buttons: "Retrieve Bat", "List Bat", "Store Bat", and "Store All Bats".

The Select Batches dialog box displays.



- **On/Off.** This option can be used to exclude a sample from the current desktop evaluation, without deleting it from the desktop. It can be enabled at a later time to make it active on the desktop.

To enable/disable a batch, highlight an entry, and click the **On/Off** button.

- **Delete.** To delete a single batch, highlight it on the list, and click **Delete**.

NOTE

The *Delete* option only deletes the batch from the desktop. If the batch is also in a permanent folder, it remains in that folder.

- **Delete All.** Deletes all of the batches shown.

2. Click **OK** to close and exit the dialog box.

Next Desktop Batch



This function makes the next batch the current batch on the desktop. Performs the same function as the down arrow to the right of the batch name.

Previous Desktop Batch



This function makes the previous batch the current batch on the desktop. Performs the same function as the up arrow to the left of the batch name.

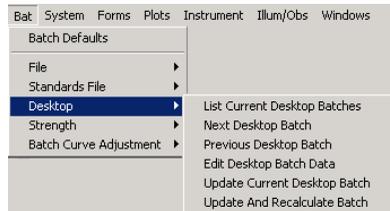
Edit Desktop Batch

This function allows you to edit the **spectral** values of the current batch.

NOTE

The spectral data is the most basic data describing the batch. Changing this data can have a significant impact on future color evaluations made using the batch.

1. From the menu bar, click on **Batch, Desktop, Edit Desktop Batch Data.**



The spectral data is displayed:

Edit 2R: 31 Points							
400:	8.57	480:	5.80	560:	3.89	640:	22.25
410:	9.28	490:	5.17	570:	5.19	650:	28.30
420:	9.79	500:	4.67	580:	7.31	660:	35.32
430:	10.24	510:	4.01	590:	8.96	670:	43.36
440:	10.24	520:	3.53	600:	10.61	680:	51.44
450:	9.27	530:	3.63	610:	11.96	690:	58.44
460:	7.97	540:	3.86	620:	13.95	700:	64.75
470:	6.81	550:	3.87	630:	17.49	Sum:	489.93

2. To change an existing entry in any field, click in the field, and type the new data.
3. When all selections/entries are made, click **OK**.

Update Current Desktop Batch

This option updates changes to the batch in the temporary desktop folder. To update the current desktop batch:

- Click on **Std, Desktop, Update Desktop Batch Data**.

NOTE

This updates the batch information in the temporary desktop folder. If the sample is stored in the database, the changes must also be made to the permanent record in the database. This is done by clicking the **Store Bat** button on the desktop.

Update and Recalculate Current Batch

When you add or change any **input data fields** for a desktop batch, you must select this option to execute the change. When data fields are added, the Recalculate function generates the data for the new fields. It also ensures that the changes are stored with the batch in the temporary desktop folder.

NOTE

This updates the batch information in the temporary desktop folder. If the sample is stored in the database, the changes must also be made to the permanent record in the database. This is done by clicking the **Store Bat** button on the desktop.

Strength

The **Strength Adjustment** evaluates the tinting strength of the batch. This option turns the strength adjustment option on and off.

See also Applications Technology, Strength Evaluation for a detailed explanation of the strength options and settings.

NOTE

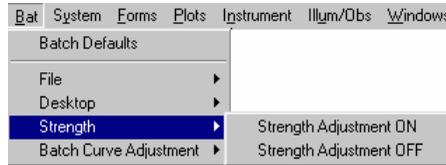
The screen form *QC Input Strength* includes all of the buttons and output relevant to the strength adjustment:

The screenshot shows a software window titled "QC INPUT - STRENGTH". At the top, it displays "Standard Name" as "STD GOLD PL" and "Today's Date" as "29-Jul-04". Below this are buttons for "New Std", "Retrieve Std", "Store Std", and "List Std". There are also buttons for "Strength Adj OFF", "Strength Adj ON", and "Strength Data". The "Batch Name" is "BAT 14". The "Date" is "29-Jul-04" and "Time" is "11:16:51". The "Strength" is displayed as "74.91 %". Below this is a table with columns: "HVObs", "DL*", "Da*", "Db*", "DC*", "DH*", and "DE*". The table contains three rows of data for different wavelengths: "A-TS 10 Deg", "F02 10 Deg", and "D65 10 Deg".

HVObs	DL*	Da*	Db*	DC*	DH*	DE*
A-TS 10 Deg	0.58	-0.32	1.46	1.23	0.85	1.61
F02 10 Deg	0.60	-0.87	1.55	1.20	1.23	1.88
D65 10 Deg	0.60	-0.36	1.45	1.19	0.91	1.61

The strength data and buttons can be added to other forms. *See also Form Editor for instructions to create and edit screen forms.*

- From the menu bar, click **Bat, Strength**. A submenu displays.



Strength Adjustment ON

The color difference data is based on the adjusted batch data.

NOTE

When the Strength Adjustment is set to **ON**, the uncorrected measurement data is stored in the database.

To work with the uncorrected measurement data for other evaluations, simply turn the strength adjustment **OFF**. This can be done by clicking the **Strength Adjustment Off** button on the Strength form, or disabling it from the Batch Menu.

Strength Adjustment OFF

The color difference data is based on the batch measurement “as is”.

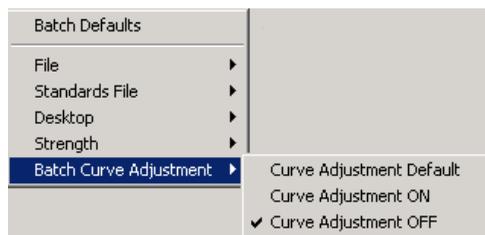
Batch Curve Adjustment

This feature allows the user to edit a batch curve manually. The curve is adjusted at every wavelength by the same value. The adjustment can be made based on an input amount or percent.

NOTE

This option is not enabled for Datacolor TOOLS^{OCX}.

- From the menu bar, select **Bat Menu, Batch Curve Adjustment**.

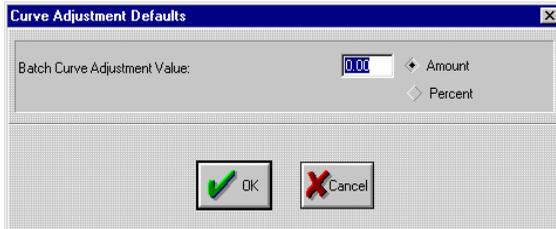


NOTE

The batch measurement stored to the database is the unadjusted batch curve. This option can also be put on a button bar or on a form.

Curve Adjustment Defaults

This option sets the values for the curve adjustment. The curve is adjusted at every wavelength by the same value, and the value can be based on an input **amount** or **percent**.



- **Amount.** Enter an amount by which you want to adjust the curve at each wavelength
- **Percent.** Enter the percent by which you want to adjust the curve at each wavelength.

When you have completed the entry, click **OK**.

Curve Adjustment On/Off

A check indicates the option is enabled. Click on the option to enable the option. Click a second time to disable the option, and remove the check.

- **Curve Adjustment On.** All batch curves are automatically adjusted by the value set in the *Curve Adjustment Default Value*.
- **Curve Adjustment Off.** None of the batch curves are adjusted.

The *form QC Input Surface Corr* displays information regarding the status (adjusted/unadjusted) of the batch measurement:

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
A-T5 10 Deg	3.52	-1.97	-9.00	-9.05	-1.72	9.86
F02 10 Deg	3.64	-1.97	-9.19	-9.39	-0.50	10.08
D65 10 Deg	3.93	-2.22	-8.71	-8.84	-1.62	9.81

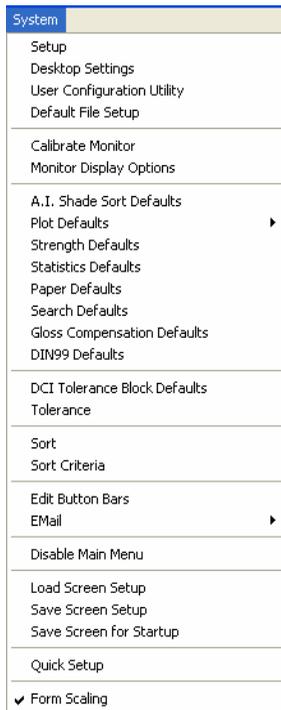
Standard Name		5 of 5	Surf Corr Status: OFF	Value: 0.00
STD GOLD PL			Std Surf Corr Status: Unadjusted	
			Std Surf Corr Value: 0.00	
			Bat Surf Corr Status: Unadjusted	
			Bat Surf Corr Value: 0.00	
Batch Name		15 of 16	Surf Corr ON Surf Corr OFF Surf Corr Defs	
BAT 14			Std Curve Adjust Value: 0.00	
Date: 11-Apr-02		Time: 09:05:34	Std Curve Adj Status: Unadjusted	
			Adj %R Curve UnAdj %R Curve Adj Std %R Defs	
			Bat Curve Adjust Value: 5.00	
			Bat Curve Adj Status: Adjusted	
			Adj Bat %R UnAdj Bat %R Adj Bat %R Defs	

NOTES

- If you see no change between the adjusted and unadjusted batch values, check the batch adjustment default value. The program defaults to a value of 0.0.
- Buttons can be added to the button bar to enable/disable this option. You can also include a button that allows you to change the value used for the batch adjustment. *See also System Menu, Edit Button Bars for instructions to edit the top and bottom button bars.*
- You can customize a form to include this information. *See also Form Editor for instructions to create and edit screen forms.*

System Menu

The **System Menu** includes options that control the default values and setups for various features, as well as the desktop configuration. To select a menu option, simply click on it. If a right-facing arrow is shown next to an option, this indicates there is a secondary list of submenu options.



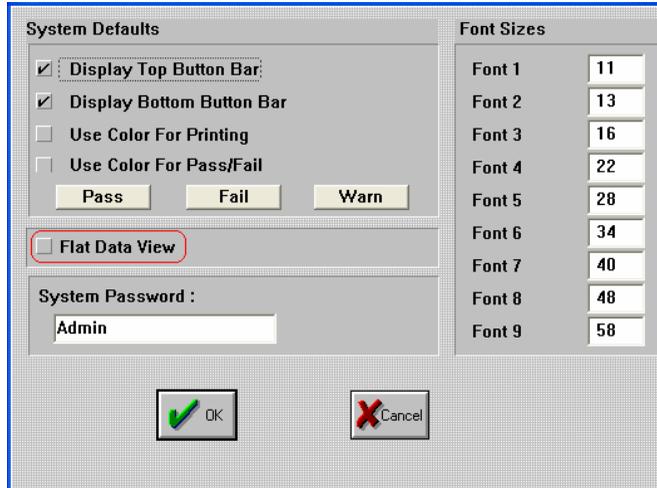
NOTE

Some of the options on this menu are not enabled for Datacolor TOOLS^{QCX}.

Setup

This group of options controls the configuration of the display screen. It also sets the system password.

1. From the menu bar, click **System**.
2. From the drop-down list of options, click **Setup**. The System Setup dialog box is displayed.



- **System Defaults.** This group of options enables/disables features used in the display of the data. Click in the box for the feature(s) to be enabled. A check displays. Click in the box again to remove the check and disable the feature.
- **Display Top Button Bar.** When this option is checked, the top button bar is displayed.
- **Display Bottom Button Bar.** When this option is checked, the bottom button bar is displayed.
- **Use Color For Printing.** If you use a color printer, this option should be checked.
- **Use Color for Pass//Fail.** You can configure the system to display the words *Pass*, *Fail*, and *Warn* in different colors.
 - o Click on the appropriate button. A dialog box will open displaying a color palette.
 - o Select the color to be applied to the term.
 - o Repeat this procedure for each term.

- **Flat Data View** (*Textile Users only*). When browsing the contents of the database, all data stored in visible folders is displayed. *See also Appendix, Data Security for a complete explanation of this option.*
- **System Password.** Access to the program menu bar can be protected by a password. If the main menu is disabled, this password must be entered to open the program.

If you create users in the *User Configuration Utility*, this is the input box for entering a *System* password for the System Administrator. *See also System, User Configuration Utility.*

NOTE

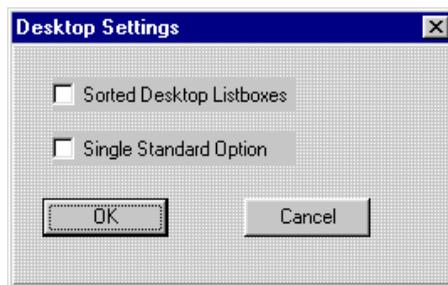
This is not the same as the login password. This is the password created through the User Configuration Utility in Datacolor TOOLS.

- **Font Sizes.** These settings determine the relative size of the fonts used in Datacolor TOOLS and in the Datacolor TOOLS Form Editor. These should not be changed unless you are redesigning forms and require special font sizes.

Desktop Settings

The desktop settings control the appearance of the samples on the desktop.

1. From the menu bar, click **System, Desktop Settings**. The Desktop Settings dialog box is displayed.



2. Click in the box for the feature(s) to be enabled. A check displays. Click in the box again to remove the check and disable the feature.
 - **Sorted Desktop Listboxes.** When this option is checked, this setting instructs the program to sort the sample names appearing in the List Box in alphanumeric order. The List box is displayed when using the List Standard or List Batches menu options, or the *List Std* or *List Bat* buttons on a screen form. Only measured samples are sorted in the list box. It does not automatically sort samples retrieved from a folder.

NOTE

This option is not enabled for Datacolor TOOLS^{QCX}.

- **Single Standard Option.** This setting allows the user to 'turn off' the desktop. When this option is checked, only one standard (and its associated batches) is available for analysis at any given time. This feature only works with standards that are measured, and does not include those retrieved from the file.

NOTE

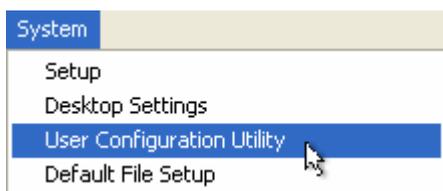
When enabled, this feature does not prevent the user from retrieving multiple standards from a folder.

User Configuration Utility

NOTE

This option is not enabled for Datacolor TOOLS^{QCX}.

Datacolor TOOLS includes a data security feature that enables you to selectively limit access to the data management functions. This feature was created to protect proprietary color data, such as standard measurements and colorant data, that you generate using Datacolor programs. The data security feature is configured from *System Menu, User Configuration Utility*:



NOTE

This option is not enabled for Datacolor TOOLS^{QCX}. A user must have Administrator Rights to have access to the data security options.

Authorized users of the system, such as the System Administrator, have the ability to define different or classes of users, or *user groups*. Examples of a "class" might be technician, supervisor, manager, or laboratory and production, etc. This menu option provides access to the following functions:

- Assigns user names and password. The user name and password are required to access the program. Included in the security feature is the ability to remove the menu bar and button bars from the display.
- Defines the data management functions available to each user group.

Pigment vs. Textile Database Configuration

The features of the data security option are the same for both the pigment and textile database configurations. However, there are some differences regarding the feature access, default user names and default folder names used by each configuration. Complete documentation of this data security feature is provided in the Appendix for both a textile and a pigment configuration. *See also Applications Technology, Data Security for details.*

Customizing the TOOLS Desktop

For either database structure, once you have restarted the program and logged in under the new user, you can now customize the following options on the desktop for the user:

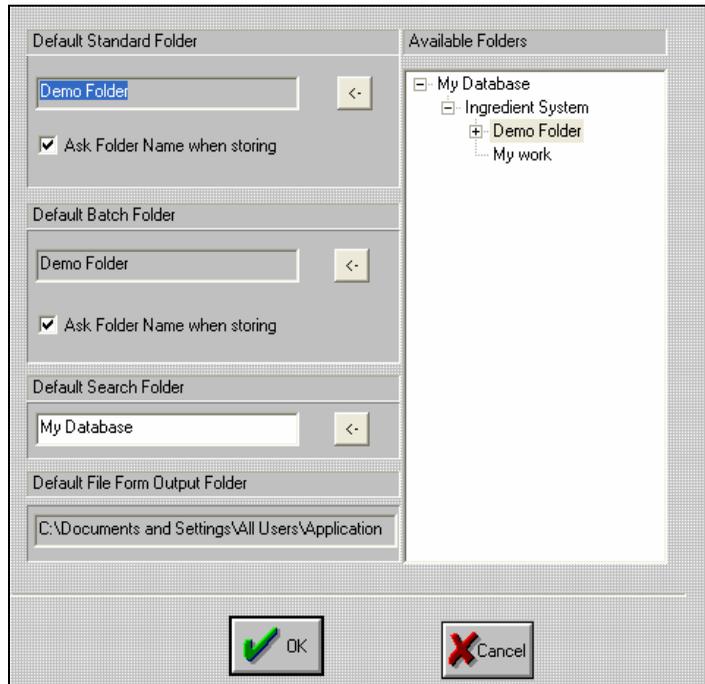
- The top and bottom button bars can be changed. *See also System, Edit Button Bars*
- The starting screen form can be changed. *See also System, Screen Setup, Save Screen for Startup.*
- The Illuminant/Observer defaults can be changed. *See also Illum/Obs Menu.*
- The screen and print forms available to the user can be modified or deleted. Modifications are done through the Datacolor TOOLS Form Editor. *See also Datacolor TOOLS Form Editor. PDF for instructions for editing the forms.*

The changes you have made are saved when the program is closed, and recalled the next time the user accesses the program.

Default File Setup

This option sets the default folders that are used when you retrieve and store information to a folder in the database.

- From the menu bar, click **System, Default File Setup**. The Select Folder dialog box is displayed.



- **Default Standard Folder.** Identifies the folder to be used when storing and retrieving standards.
- **Ask Folder Name when storing.** Gives the user the option to select a different folder for standard storage and retrieval. When this option is *not* enabled, and the user selects “Store Standard”, the data will always be stored in the default standard folder.
- **Default Batch Folder.** Identifies the folder to be used when storing and retrieving batches.
- **Ask Folder Name when storing.** Gives the user the option to select a different folder for batch storage and retrieval. When this option is *not* enabled, and the user selects “Store Batch”, the data will always be stored in the default batch folder.
- **Default Search Folder.** Identifies the folder to be searched when the Search option is activated.
- **Default File Form Output Folder.** On the Form Menu, there is an option to save the form as a file. This field identifies the location where the form file is to be stored.

To change the default folder(s), do the following

1. Move to the *Available Folders* listing, and click the folder to be used as the new default.
2. Click the **<- arrow** to move the folder into the applicable field (*Default Standard Folder, Default Batch Folder or Default Search Folder*).
3. When all selections/entries are made, click **OK**.

NOTE

The default folder selection you make in this option displays in the *Std, File* and *Bat, File* options.

Calibrate Monitor

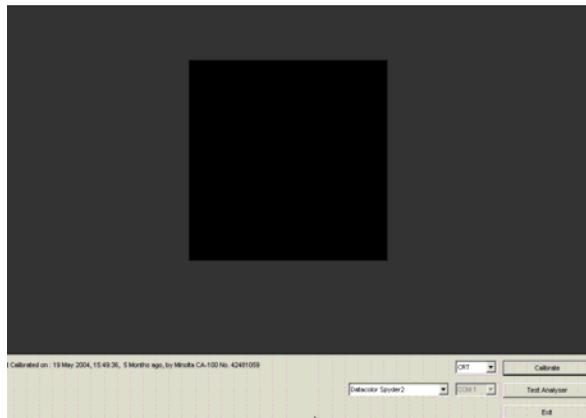
This option is used along with the Datacolor Spyder2 to adjust the color of the monitor. After calibrating the monitor, all color patches displayed on the screen should more closely approximate the color of the measured sample.

NOTES

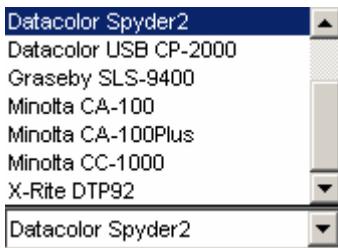
- This feature is not enabled for Datacolor TOOLS^{QCX}.
- See also *Datacolor SPYDER2 User's Guide* for instructions on the setup and operation of the device.
- You will not need to install any additional software to enable this option.
- Connect the calibration device to the computer (either serial or USB port depending on the device you are using).
- Monitor calibration does not work with a terminal server application.

To start the procedure, do the following:

1. Select **View Menu, Calibrate Monitor**. The window below displays:



2. Verify that you have the correct device selected. Click on the down arrow to view the choices, and highlight the calibration device.



3. Verify that the correct monitor type is selected. Click on the down arrow to view the choices, highlight the monitor type you are calibrating.



4. Click on **Calibrate**. Windows displays, prompting you through the calibration.
5. When the calibration is completed, click **Exit**.

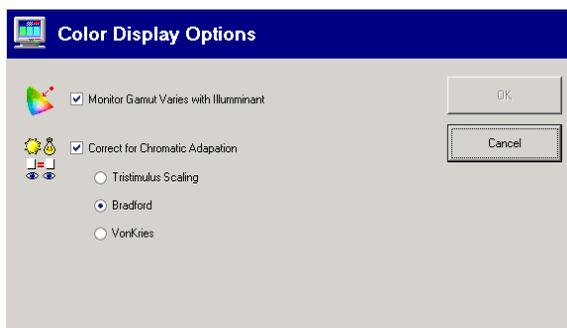
NOTE

For best results, perform the monitor calibration on a daily basis.

Test Analyzer. If you fail to communicate with the Spyder2, or the calibration is unsuccessful, use this option to test the communication between the computer and the calibration device.

Monitor Display Options

Color Display Options. This group of options controls the display of sample colors on the monitor. The selections also determine the method for finding the closest color (RGB value) when the sample color falls outside the color gamut of the monitor.



- **Monitor Gamut Varies with Illuminant.** When you change the Evaluation Illuminant/Observer selection, the RGB values for samples are calculated using the Evaluation Illuminant/Observer currently selected. When this is not enabled, the RGB values for *out of gamut* colors are calculated using D65/10 Illuminant/Observer condition.
- **Correct for Chromatic Adaptation.** Enabling this option preserves the white balance of the color displayed regardless of the Illuminant/Observer selected. When the option is not enabled and the illuminant is changed from III D65 to II A, white samples often appear orange on the monitor.

The remaining selections in this screen determine the factors used to balance the white point for the monitor.

- **Tristimulus Scaling.** Uses the XYZ values of the sample to find the closest RGB value.
- **Bradford.** Applies an additional factor to the transformation of the XYZ values to RGB values. Uses a different factor from the Von Kries equation.
- **Von Kries.** Applies an additional factor to the transformation of the XYZ values to RGB values. Uses a different factor from the Bradford equation.

A.I. Shade Sort Defaults

The A.I. Shade Sort Defaults define the A.I. tolerances, number of bins, and number of samples required for A.I. shade sorting.

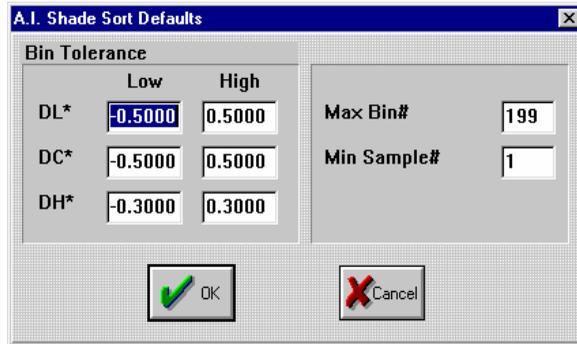
NOTES

A.I. Shade Sorting is not enabled for Datacolor TOOLS^{QCX}.

These are ***not*** the tolerances used to determine whether a batch is an acceptable match to the standard. These tolerances are used to create the bins used to sort batches that have passed the acceptability tolerances. The program uses the A.I. pass/fail tolerances to determine whether a batch is acceptable.

See also Applications Technology, AI Shade Sorting for a detailed explanation of A.I. Shade Sort. See also Applications Technology, A.I. Tolerances for a detailed explanation of A. I. acceptability tolerances.

- From the menu bar, click **System, A.I. Shade Sort Defaults**. The A.I. Shade Sort Defaults dialog box is displayed.



- **Bin Tolerance.** Low and High limits are specified for each parameter (DL*, DC*, DH*) in the bin. Enter the limits for the standard bin.
- **Max Bin Number.** Defines the maximum number of bins for sorting. This number must be less than 200.

NOTE

When this number is too low, the program may not be able to place some acceptable pieces into a bin. Those pieces not assigned count as an unsorted sample.

- **Min Sample Number.** Defines the minimum number of samples needed for sorting. This number must be larger than 0, and the default is 1.

Plot Defaults

This option sets default conditions for the QC plots. Defaults are set for the following plots: *Curve*, *Color Difference*, *Trend*, *Histogram*, or *Chromaticity*.

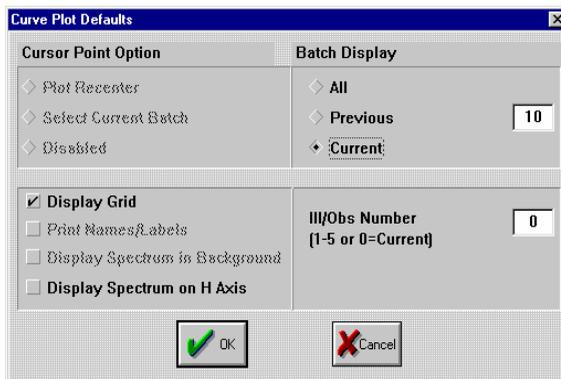
1. From the menu bar, click **System, Plot Defaults**.



2. Highlight a curve type from the submenu, and the dialog box below displays.

NOTE

The same dialog box displays for each plot type, but options are selectively enabled/disabled depending on whether they are available for the plot selected.



- **Cursor Point Option.** These options make the plot dynamic. When enabled, you can point and click on a sample to modify the plot.
 - **Plot Recenter.** Double-click on a point in the plot and the plot is re-scaled, making the selected point the center of the plot.
 - **Select Current Batch.** Double-click on a batch point to make it the current batch.
 - **Disabled.** Removes the capability to change the plot on the screen.
- **Batch Display.** Controls how many batches are initially displayed on a plot.
 - **All** displays all batches.
 - **Previous** displays the previous number of batches (as entered in the corresponding field).
 - **Current** displays the current batch only.
- **Display Grid.** Displays a grid with a plot.
- **Print Names/Labels.** Assigns a 1-character label to each batch on the color difference plot.
- **Display Spectrum in Background.** Displays a full color spectrum behind the curve plot.
- **Display Spectrum on H axis.** Displays a color spectrum bar along the wavelength (nm) scale.
- **Ill/Obs Number (1-5 or 0=Current).** Designates the Illuminant/Observer condition defined for the plot.
 - 0 indicates the current condition.
 - 1-5 corresponds to Illuminant/Observer selects made in the *Illuminant Menu*.

TIP

For color difference plots, a change in the Illuminant/Observer selection changes the data plotted for the sample.

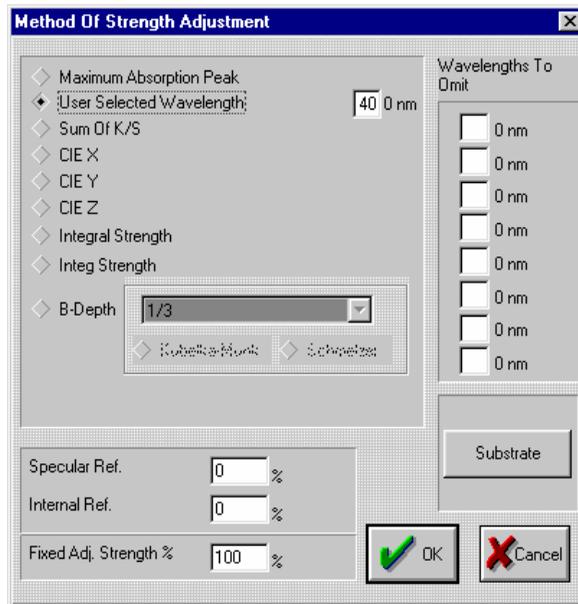
Strength Defaults

Strength is a tool for comparing the performance of incoming raw materials to the standard materials. There are several methods available in the program for evaluating strength. Every method compares the performance of the batch to the standard, in terms of its tinting strength. In order for the strength evaluation to be meaningful, you must prepare your samples using a specific procedure, and select the strength evaluation options that are appropriate for your application.

This option allows you to view and change the defaults being used when you select the strength evaluation. These defaults can also be configured for individual standards. *See also Std Menu, Standard Defaults, Strength.*

See also Applications Technology, Strength Evaluation for a detailed explanation of evaluating the strength of incoming raw materials.

- From the menu bar, click **System, Strength Defaults**. The Method of Strength Adjustment dialog box is displayed.



Substrate. When measuring translucent samples, the substrate shows through the colored layer, and contributes to the measurement. To get an accurate evaluation of the colorant strength, the measurement should be corrected for the substrate contribution. This option allows you to identify a stored measurement of the substrate being used. This measurement data can be used to correct the strength evaluation so that the evaluation is limited to the influence of the colorant only, and not the substrate.

When this option is selected a dialog box opens, requesting the name of the sample to be used as the substrate measurement.

See also *Std Menu*, *Strength Defaults* for an explanation of the remaining selections that appear in this window.

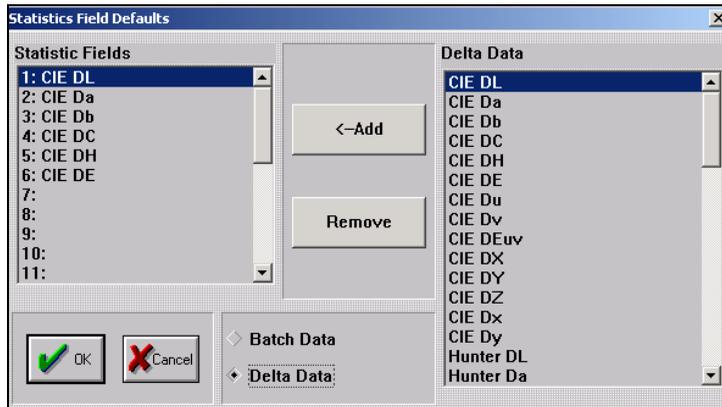
Statistics Defaults

Datacolor TOOLS includes a feature that performs a limited statistical analysis of your batch data. It calculates the average (mean) and the standard deviation for a specific color parameter, using all of the batches assigned to the desktop standard. The results are displayed on a screen form named "Statistics", displayed below:

STD ORANGE PL		D65 10 Deg	
DESCRIPTOR	36 BATCHES	STD. DEV.	AVERAGE
CIE DL		0.74	0.56
CIE Da		1.29	-0.24
CIE Db		1.46	-0.05
CIE DC		1.82	-0.21
CIE DH		0.69	0.12
CIE DE		0.90	1.96

This option selects the parameters that appear in this report. There are 25 fields reserved for calculation of statistics. You identify the colorimetric parameter to be assigned to each field. The program calculates and reports statistical data based on the values in the fields.

1. Select **System Menu, Statistics**. The window below displays:



The calculation is based on either the color *coordinate* value for each parameter or the *difference* value for each parameter. For example, from the Field 1 data it calculates either the average L* value (*Batch* data) or the average DL* (*Delta* data) for all of the batches. The program calculates both the average (mean) and the standard deviation for each field. Click in the radio button at the bottom of the screen, next to the type of data (Batch or Delta) that you want to use.

- *Batch* data uses the color coordinates as the basis for the calculations.
 - *Delta* data uses the color differences as the basis for the calculations.
2. Click in the *Statistic Fields* listing and highlight the position number that you want to change/add.
 3. Move to the *Batch/Delta Data* field, and locate the data field you want to add. To move up/down through the list, use the up/down scroll bar shown along the right side of the dialog box.
 4. Click the **<- Add** button. The selected data field is moved to the designated position in the *Statistic Fields* listing.
 5. Repeat this procedure for each parameter to be included in the report. When all selections/entries are made, click **OK**.

To remove an item from the *Statistic Fields* listing:

1. In the *Statistics Fields* list, highlight the item you want to remove.
2. Click **Remove**. The item is deleted from the list.
3. When all selections/entries are made, click **OK**.

NOTES

- The Illuminant/Observer combination used for this option is defined by the screen or print form you are using.
- You should only change these default values if you need different statistics output from the information currently available, and/or if you are designing your own QC forms.
- To report the average for a field, use the fields 'Average (1) through Average (25) on the *Statistics* form. To report the standard deviation for the field, use the fields 'Standard Deviation (1) through Standard Deviation (25) on the form.

When you receive your system, default settings are assigned to the first 6 statistics fields, using CIELAB parameters. Below are the assignments:

<u>FIELD #</u>	<u>PARAMETER</u>
1	L*
2	a*
3	b*
4	C*
5	H*(h*)
6	E*

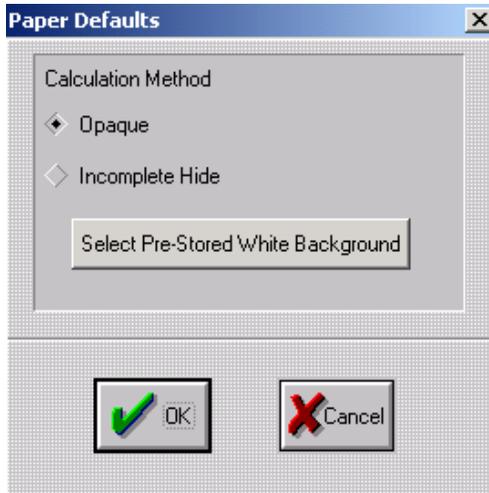
Performing a Statistical Analysis

To run a statistical analysis, you must select one of the Statistics forms. One of the Statistics screen forms is named *Statistics*. See also *Forms Menu*, *Screen Forms for instructions to select a screen form*. See also *Appendix, Screen Forms for a list of all screen forms provided with the program*. See also *Datacolor TOOLS Form Editor.PDF for instructions to customize a form to include these results*.

Paper Defaults

Opacity evaluation options used by the paper industry require a specific procedure for sample measurement. This option is used to configure the measurement method to be used for opacity evaluations.

When the option is selected the dialog box below is displayed:



Paper Default Fields

When you are working with paper evaluations, the calculations are based on either an opaque sample or a translucent sample. An opaque sample requires one measurement, and a translucent sample requires 2 measurements. The selections in this window identify the following:

- The number of sample measurements to be made.
- The background measurement to be used when measuring translucent samples.

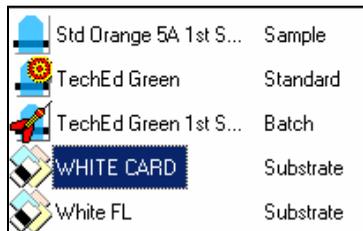
Calculation Method

- **Opaque.** The sample being measured is opaque. To complete an opacity calculation, one measurement is required.

- **Incomplete Hide.** The translucent sample is presented twice: measured over a light (white) background and a second time over a black background. When this option is selected, the paper calculation requires three measurements.
 - The sample over a dark background.
 - The sample over a light background.
 - A separate measurement of the white background is also required. You have the option to measure the white background at the time you measure the translucent sample, or to recall it from the database. See *Select Pre-Stored White Background*.
- **Select Pre-Stored White Background.** For the *Incomplete Hide* (translucent) condition, the white background can be measured as part of the procedure, or retrieved from the database. When this option is selected, the program does not prompt the user for a separate measurement of a white background. It retrieves a measurement from the database.

When this option is selected, a window displaying the database opens. You must identify where the white background data is stored.

1. Browse to the correct folder, and highlight the sample.



2. Click **Open**. The program stores the sample you have selected and will automatically retrieve it whenever you are measuring a translucent sample presented over a white background.

Search Defaults

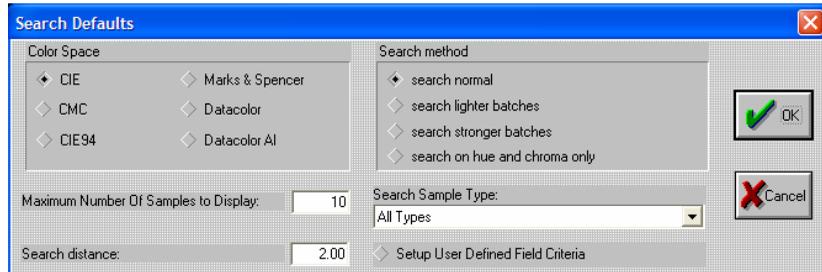
You can search the database for samples based on the size of the color difference between the current standard and all stored samples. Defaults used by the Search option include a color difference selection, the number of samples to display, and a DE value that defines the acceptability tolerance. *See also Std Menu, Search for a detailed explanation of the Search feature.*

NOTES

Search uses D65/10° as the Illuminant/Observer condition. *See also Applications Technology, Illuminant Observer Specification for an explanation of the Illuminant/Observer.*

Search is confined to a single folder. The default folder is selected from this option, but can be overridden at run time.

- From the menu bar, click **System, Search Defaults**. The Search Defaults dialog box is displayed.



Search Defaults

- **Color Space.** Click the radio button next to the color difference equation to be used. The listing under *Result of Search* will change to reflect the new color difference equation selected. See also *Applications Technology, Interpreting Color Differences for an explanation of the color difference output from each equation.*
- **Maximum Number of Samples to Display .** This limits the number of Search results displayed. For example, if you specify "10", the program will only display 10 samples regardless of the number of acceptable matches it finds in the database.
- **Search Distance.** Enter the maximum acceptable color difference between the current standard and the stored samples. When the color difference between the standard and stored sample is larger than this value, the sample is discarded as a candidate.

NOTE

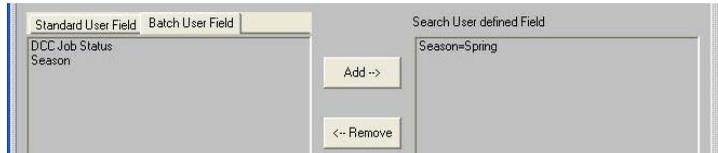
The *Search Method* selected determines how the Maximum Distance is applied.

- **Search Method.** These options provide several choices regarding the colorimetric basis for the search. Most Search options look for acceptable samples based on DE, the total color difference. In some cases however, samples that vary from the standard may have a DE that is outside the acceptability tolerance. However, if the sample differs significantly in either lightness or chroma, it may be acceptable visually, although the DE is out of tolerance.
 - **Normal Search.** The program selects acceptable samples based on the DE, or total color difference between the standard and the stored samples. The Maximum Distance tolerance is assigned to DE.
 - **Search Lighter Batches.** The maximum distance limit is applied to the DL value.
 - **Search Stronger Batches.** The maximum distance limit is applied to the DC value.

- **Search on Hue and Chroma Only.** The maximum distance limit is used in an equation to select samples that have both a DH and DC value less than the limit specified.

See also the *Datacolor TOOLS Form Editor* for instructions to customize fields that are stored with the standard or batch.

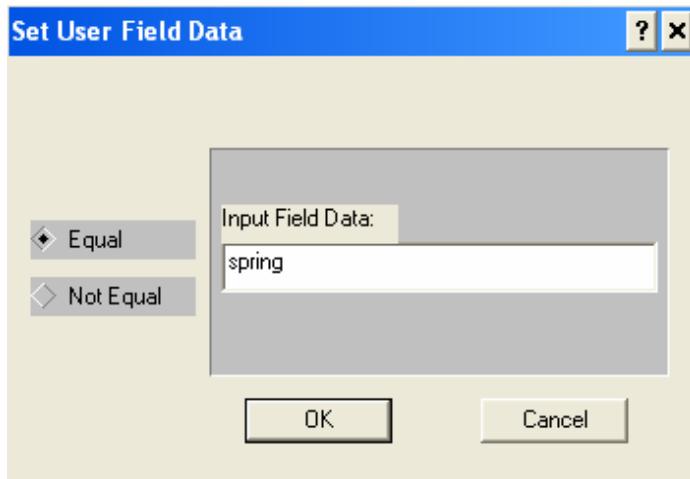
- **Setup User-Defined Criteria.** This option enables you to base a search on the contents of custom fields you have created for your data. When this option is selected, additional fields are displayed at the bottom of the window:



- **Std Field.** Displays all of the fields available that can be applied to standards.
- **Bat Field.** Displays all fields that can be applied to batches.

To configure a search based on customized fields:

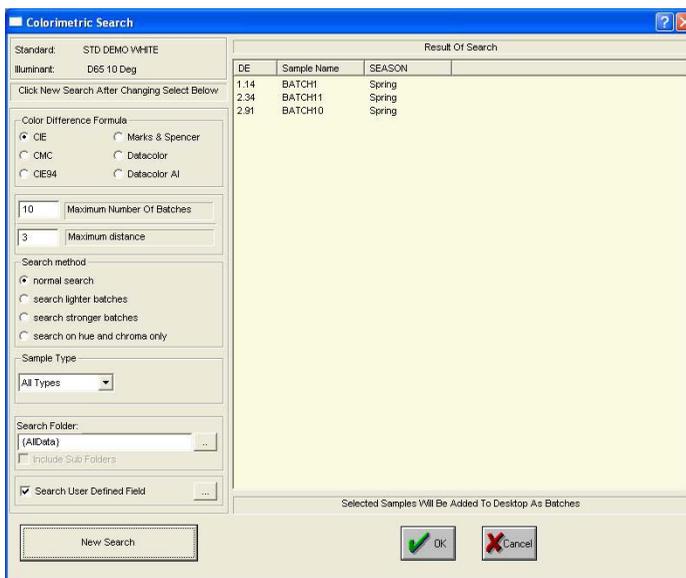
1. Highlight a field to be considered during a search. In this example, the batch field *Season* will be used. Click **Season, Add**. The window below displays:



If the field has an alpha or numeric value, you can sort the samples on the desktop based on a value or value range assigned to the field. To attach a value to the field:

2. Input a value into *Input Field Data*.

3. Click in the radio button for the operator you want to use:
 - **Equal.** The value for the data in the field is equal to the value input here.
 - **Not Equal.** The value for the data in the field is not equal to the value input here.
4. When you have finished, select **OK** in this window.
5. Select **Std Menu, Search**. The program will search the database using the specification you have just entered. Below is an example of the search results based on the *Season* code *spring*:



6. You can also customize forms to display the Search results: Below is an example:

Sample Analysis						
<u>Sample Analysis</u>						III/Obs: D65 10 Deg
Standard:						
<u>Sample#</u>	<u>Season</u>	<u>DL*</u>	<u>Da*</u>	<u>Db*</u>	<u>DE (CMC)</u>	<u>P/F Decision</u>
BATCH1	Spring	1.07	-0.09	-0.39	0.60	Pass
BATCH10	Spring	-1.13	-0.36	-2.65	3.16	Fail
BATCH11	Spring	-0.55	-0.30	-2.26	2.66	Fail
BATCH2	Summer	-0.72	-0.17	-0.47	0.64	Pass
BATCH20	Summer	1.13	-0.11	-0.37	0.60	Pass
BATCH21	Summer	0.15	-0.24	0.08	0.33	Pass

See also *Datacolor TOOLS Form Editor* for instructions to customize forms for screen and printer output.

Gloss Compensation Defaults

Datacolor TOOLS includes a feature to adjust sample measurements for gloss. This feature enables you to generate valid instrumental color evaluations on samples that have different gloss values. The options in this window include a field to enable gloss compensation automatically and fields for default gloss value and gloss geometry.

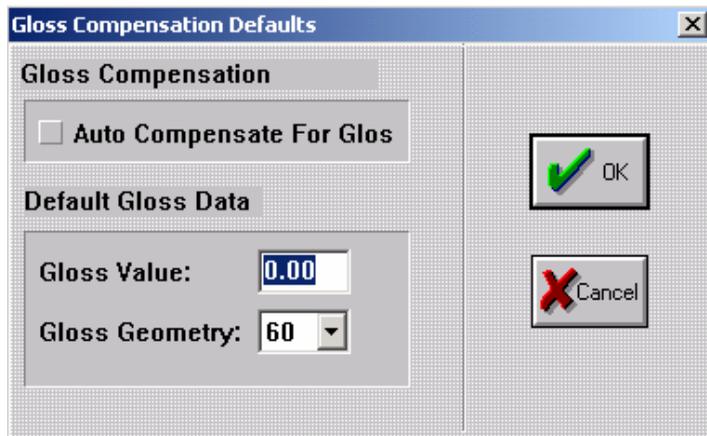
NOTE

This option is not enabled for Datacolor TOOLS^{QCX}.

See also *Applications Technology, Gloss Compensation* for a detailed explanation of the feature.

To view/change the default settings for gloss compensation:

- Click **System Menu, Gloss Compensation Defaults**. The dialog box below displays:



Gloss Compensation

Auto Compensate for Gloss. When this option is checked, every measurement made is adjusted for gloss. The target gloss value and gloss geometry are defined in the instrument calibration options. However, if no gloss values are defined there, the default values displayed in this window are applied.

NOTE

In order to use the gloss compensation feature, you must also activate the gloss measurement condition in the instrument calibration options. See also *Applications Technology, Gloss Compensation* for detailed instruction regarding all program options that must be enabled in order to generate a valid gloss adjustment.

Default Gloss Data

- **Gloss Value.** This is the target gloss value.
- **Gloss Geometry.** Gloss values are based on the gloss geometry used by standard, commercial gloss meters. Several gloss geometries are used in industrial applications. The gloss geometry should always be specified with any reading. The user is offered a choice of three: 20°, 60° and 85°, and Auto.
 - 20°. Used for high gloss materials.
 - 60°. This is the most commonly used geometry and is the default selection.
 - 85°. Used for low gloss or matte materials

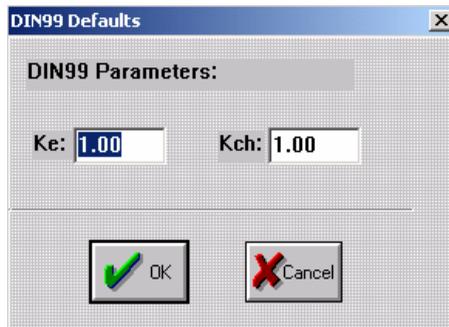
DIN99 Defaults

These settings are used for the calculation of DIN 99 values. DIN 99 is a color difference formula developed by the German Standards Institute, and includes factors comparable to the *l:c* ratio used in the CMC calculation.

NOTE

This option is not enabled for Datacolor TOOLS^{QCX}.

1. Click **System Menu, Din99 Defaults**. The dialog box below displays:



2. Enter the values for Ke and Kch that you want applied to the DIN 99 equation.
3. Click **OK**. These values will be applied to future DIN 99 calculations.

NOTE

For textile applications, the following values correspond to a CMC *l:c* ratio of 2:1:

Ke: 2.0

kCH: 0.50

DCI Tolerance Block Defaults

This option is used to define custom tolerance blocks for the Datacolor Tolerance. The color difference equation and acceptance limit defined in this option are used to select the batches from the desktop, for use in calculating a *Datacolor Tolerance Block*.

NOTE

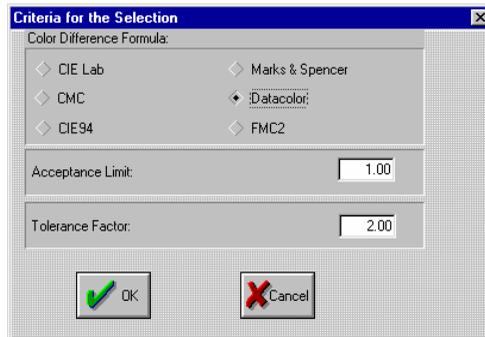
Datacolor Tolerancing is not enabled for Datacolor TOOLS^{QCX}.

Creating/editing a Datacolor tolerance equation is different from standard pass/fail evaluations. It is a 2-step process:

- **Define the *Criteria for Selection*.** Defaults are used to pre-select batches on the desktop, to be used for generating the tolerance block. The default includes a color difference equation and a pass/fail tolerance. These criteria are used to select batches on the desktop to be used as the basis for the DCI Tolerance.
- **Generate the Datacolor Tolerance Block.** This menu option calculates the Datacolor Tolerance block, based on the Criteria for Selection. *See also Applications Technology, Datacolor Tolerance for a detailed discussion of this feature, and step-by-step instructions for implementing it.*

Criteria for Selection

1. From the System Menu, select **DCI Tolerance Block Defaults**. The Criteria for the Selection dialog box displays.



2. Under the *Color Difference Formula* section, click the radio button to select the equation to be used

3. In the *Acceptance Limit* field, enter an acceptance limit. This is used by the Datacolor tolerance maintenance to identify the batches on the desktop that are included in the calculation of the DCI Tolerance Block.

NOTE

The criteria in the DCI Tolerance Block option is used simply to preselect the batches from which the tolerance block is calculated. You should evaluate each batch visually before proceeding to calculate the tolerance block.

4. The Tolerance Factor defines the size of the tolerance area, once the tolerance block is created. Changing this value allows you to expand or restrict the size of the tolerance area, and is the value that should be modified to reflect changes in the acceptability tolerance for a standard. Enter a value for this field.

Calculating the Tolerance Block

After you have set the *Criteria for Selection* you can generate the Datacolor Tolerance Block. This is done by creating a “Datacolor” tolerance.

NOTE

You can create the tolerance as either a Standard Tolerance or a Global/System Tolerance. See also *Std Menu, Tolerances or System Menu, Tolerances for detailed instructions to create tolerances.*

See also Applications Technology, Datacolor Tolerance for a detailed discussion of this feature, and step-by-step instructions for implementing it.

Tolerance

This option is used to assign a system tolerance, and to create or edit shared (global) tolerances. A system tolerance is a tolerance that is used when no tolerance has been assigned to the standard. It is selected from the shared (global) tolerances. A shared tolerance is a tolerance that can be assigned to more than one standard

NOTES

If Sort tolerances are included as part of the tolerance, these tolerances can also be edited.

This option is also used to create/edit the limits applied to trend and histogram plots. See also *Plot Options, Trend Plots and Plot Options, Histogram for information on these plots.*

See also Applications Technology, Acceptability Tolerances for a detailed explanation of the relationship between Local, System and Shared Tolerances, and the use of tolerances embedded in the program code.

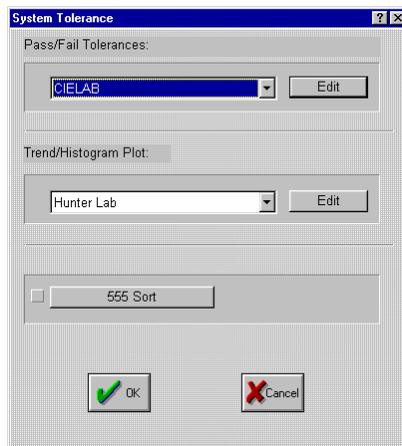
Creating/Editing System Tolerances

The tolerance that displays in the *System Tolerance/ Pass/Fail Tolerances* field is the default system tolerance.



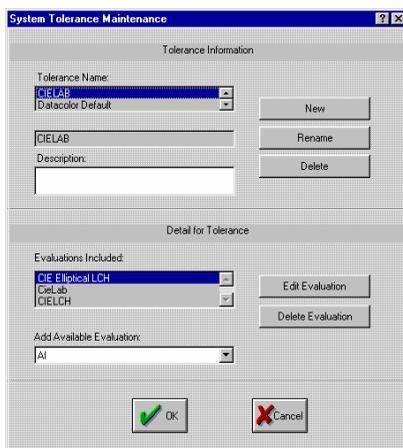
Creating/Editing Shared (Global) Tolerances

1. To create, edit or delete shared tolerances, click on **System Menu, Tolerances:**



- **Pass/Fail Tolerances.** Lists all of the global tolerances currently available. The tolerance displayed in the field is the default system tolerance.
- **Trend/Histogram Plots.** Lists all of the Trend/Histogram Plot tolerances currently available.

- Click on the down arrow in the *Pass/Fail Tolerances* field to view the existing tolerances. Highlight one of the tolerances, and click on the **Edit** button. The window below displays:



This window includes all of the tolerance editing features.

Tolerance Information

The top half of the window includes a list of existing tolerances, and buttons to create, rename and delete tolerances.

- **Tolerance Name.** Displays the names of all of the tolerances currently stored in the system.
- **Description.** The field contains a description of the tolerance. This can be useful for identifying the components of the tolerance, the products it is used for, or other information useful to the operator. The description can be entered after creating the tolerance name.
- **New.** Click this button to create a new shared (global) tolerance. The new tolerance can function as either a system tolerance or a shared tolerance.
- **Rename.** Click this button to change the name of the tolerance currently selected.
- **Delete.** Click this button to delete the tolerance selected.

Details for Tolerance Fields

- **Evaluations Included.** Lists all of the color difference equations included in the tolerance selected. You can include more than one color difference equation in a single tolerance.

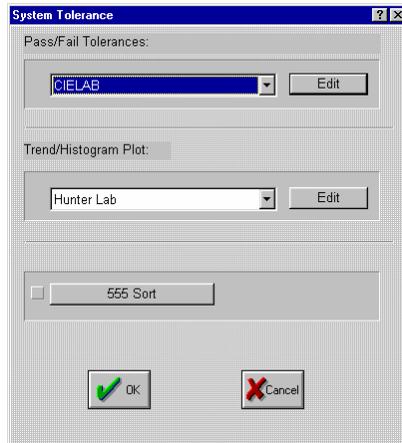
NOTES

For a new tolerance, this field will be blank. Move to the *Add Available Evaluation* field to select an equation to be included in the tolerance.

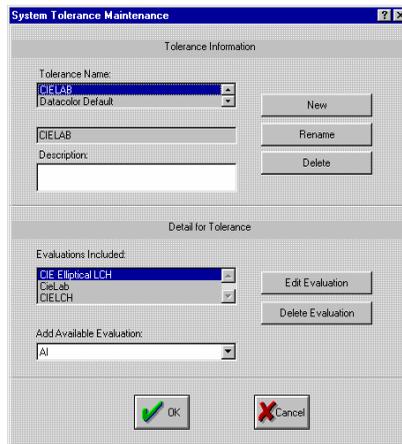
- **Add Available Evaluation.** Lists all of the possible evaluations that can be included in a tolerance.
- **Edit Evaluation.** Click this button to change the tolerances for the equation highlighted in the *Evaluations Included* field.
- **Delete Evaluation.** Click this button to delete the selection(s) highlighted in *Evaluations Included*.

Creating a New System/Shared Tolerance

1. Click on **System Menu, Tolerances:**



2. Click on the down arrow in the *Pass/Fail Tolerances* field to view the existing tolerances. Highlight one of the tolerances, and click on the **Edit** button. The window below displays:



3. Click **New**. The fields will be cleared. Enter a *Tolerance Name* and a *Description*.

- In the *Add Available Evaluation* field, click the down arrow to view the choices. Highlight an evaluation to be added. A window (similar to the one below), containing the parameters for the evaluation displays.

DE	1.0	
Deltas	Low	High
L		
a		
b		
C		
H		

OK Cancel

- Enter the tolerance limits to be used for the equation. The new selection will automatically appear in the *Evaluations Included* field.
- Repeat steps 4 and 5 until you have defined all of the evaluations to be included in the tolerance.
- Click **OK** on the System Tolerance Maintenance window to store the tolerance. It can now be selected as a System or Global (Shared) Tolerance.

Editing System/Shared Tolerances

- Click on **System Menu, Tolerances:**

System Tolerance

Pass/Fail Tolerances:

CIELAB Edit

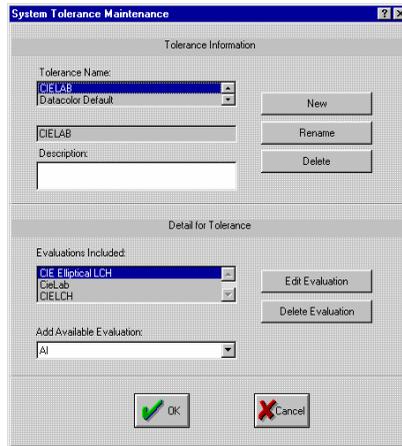
Trend/Histogram Plot:

Hunter Lab Edit

555 Sort

OK Cancel

- Click on the down arrow in the *Pass/Fail Tolerances* field to view the existing tolerances. Highlight one of the tolerances, and click on the **Edit** button. The window below displays:

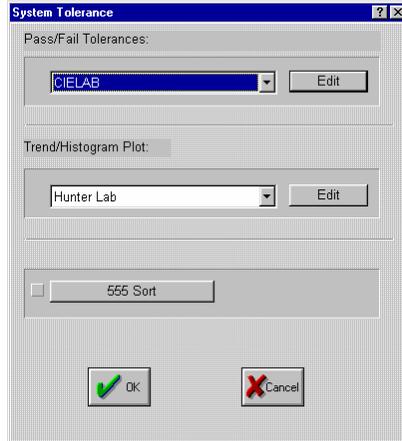


- To edit existing evaluations in the tolerance, click the down arrow in *Evaluations Included*, and highlight the evaluation to be edited.
 - Click **Edit**.
 - A window containing the current parameters for the evaluation displays. Make changes as necessary, and click **OK**.
 - Repeat above procedure, as required, to make all of the desired edits.
- To add an evaluation to the tolerance:
 - In the *Add Available Evaluation* field, highlight the evaluation to be added to the tolerance. A window displays, containing the current parameters for the evaluation.
 - Enter the tolerance limits to be used for the equation. The new selection will automatically appear under *Evaluations Included*.
 - Click **OK** to close the window.
 - Repeat the above procedure until you have defined all of the evaluations to be included in the tolerance.
- Click **OK** on the System Tolerance Maintenance window to store the tolerance. It can now be selected as a System or Global (Shared) Tolerance.

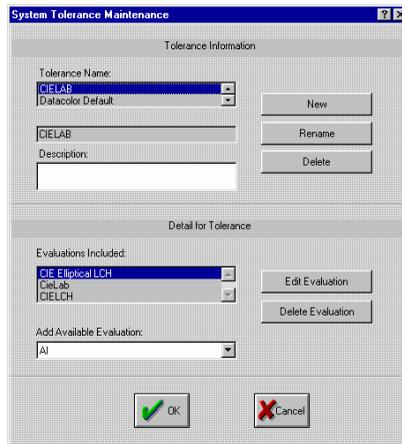
Deleting System/Shared (Global) Tolerances

To delete a System/Shared Global Tolerance:

1. Click on **System Menu, Tolerances:**



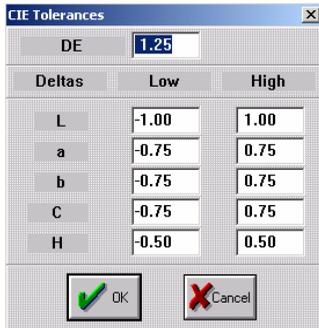
2. Click on the down arrow in the *Pass/Fail Tolerances* field to view the existing tolerances. Highlight the tolerance to be deleted and click **Edit**. The window below is displayed:



3. Click **Delete**. The program will ask *Are you Sure?* Click **Yes** to delete the tolerance or **No** to cancel the function.

More About Pass/Fail Tolerances

Below is an example of the details that appear for each tolerance screen.



CIE Tolerances		
DE	1.25	
Deltas	Low	High
L	-1.00	1.00
a	-0.75	0.75
b	-0.75	0.75
C	-0.75	0.75
H	-0.50	0.50

OK Cancel

CIE Tolerances. The name of the color difference equation included in the tolerance. In this example, the tolerances are based on the CIE $L^*a^*b^*$ color difference equation. You can enter a high and low limit for each parameter displayed.

In this example, CIELab DL^* , Da^* , Db^* , DC^* and DH^* values are included. The low and high values for each parameter define a range around the standard, and are usually expressed as a relative difference from the standard (e.g., ± 1.0).

A DE value is available for every color difference equation, and the DE* value must be a positive number. In this example the batch passes only if:

- the DE* is less 1.25, **and**
- the DL* is ± 1.0 , **and**
- the Da* is ± 0.75 , **and**
- the Db* is ± 0.75 **and**
- the DC* is ± 0.75 **and**
- the DH* is ± 0.50

NOTES

- The tolerances are expressed as differences from the standard. You must indicate whether the difference is a positive (+) or negative (-) difference from the standard.
- You are not required to enter one positive and one negative term. For example you can enter a DL of + 0.1 to -1.0. In this situation, any batch that is darker than the standard (-L) would be rejected.
- You are not required to enter a value for every field displayed. You must define a minimum of one parameter (for example, DE).
- **DE* Tolerance Only.** If you input a tolerance for DE* only, you are defining a spherical acceptability area around the standard.
- **L*a*b* Tolerances Only.** If you input tolerances for L*a*b* only, you are creating a rectangular acceptability area around the standard.

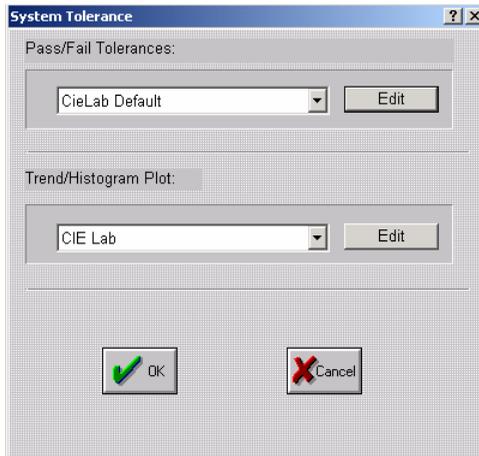
Sort Tolerances

You can include sort tolerances (either 5-5-5 Sort or A.I. Sort) as part of a tolerance. See *Std Menu, Sort Tolerances, Creating Sort Tolerances* for instructions to create and edit sort tolerances.

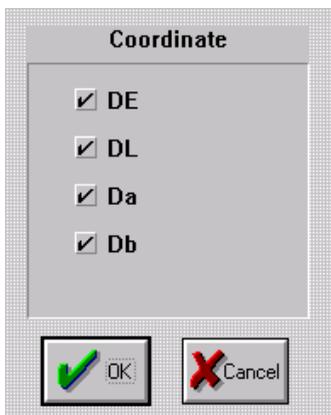
Trend/Histogram Plots

In addition to color difference limits, all tolerances include parameters for trend and histogram plots.

1. Select **System Menu, Tolerances**. The window below displays:



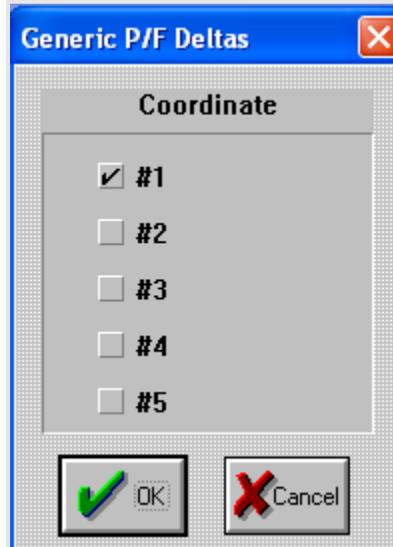
2. In the *Trend/Histogram Plot* field, click on the down arrow to view the parameters included in the plot. Select one, and click the **Edit** button. The window below displays:



3. A check next to the coordinate indicates that it will be included on the plot. Click in the box to enable a coordinate. Click again, to disable the coordinate. The check will disappear.

NOTE

When you assign the Generic tolerance to a standard, the program will display the following screen:



It also adds a generic tolerance to the trend plot. There is a selection for #1 to #5 that corresponds to the generic pass/fail slots.

Performing Pass/Fail Evaluations

Once you have established your tolerances, you can run a pass/fail evaluation. Be sure that the screen or printer form you are using has the appropriate color difference equation and includes the pass/fail field(s). For example, the screen form *QC INPUT-A.I. P/F* contains the A.I. P/F pass/fail determination while the form *QC INPUT-CMC P/F* contains the CMC pass/fail determination.

NOTES

- If no tolerance is assigned to the individual standard, the program refers to the system tolerance defined here for pass/fail evaluations.
- If the tolerance being used does not include tolerances for the pass/fail evaluation you are running, the program uses tolerances stored in the program code to generate pass/fail evaluations. *See also Appendix, Embedded Tolerances for the tolerances values built into the program code.*
- Tolerances can include several color difference equations. Creating a tolerance with multiple color differences can be useful for those standards (products) that are supplied to multiple customers, each having their own acceptability tolerance.

When the shared tolerance is assigned to the standard, you can display any of the pass/fail evaluations you need to review, without reselecting either the standard or the tolerance.

- As part of the tolerance option, you can also enter default settings for the trend plots and sort tolerances.

If you don't agree with the pass/fail evaluation, you should verify that you are working with the correct form, and the appropriate tolerance values are included in your tolerance (*System Menu, Tolerance, Edit Evaluation*). It is important to understand that the system will produce a pass/fail evaluation for **every equation in the system**. If you select a screen or print form that contains an evaluation not included in the tolerance assigned to the standard, **a pass/fail message will still be displayed**. This pass/fail evaluation is based on a set of default tolerances embedded in the program code.

Sort

This option sorts the batches on the desktop, based on specific properties you have defined as Sort Criteria. Once created, this option is used to execute the Sort function. *See also Sort Criteria for instructions to create sort criteria.*

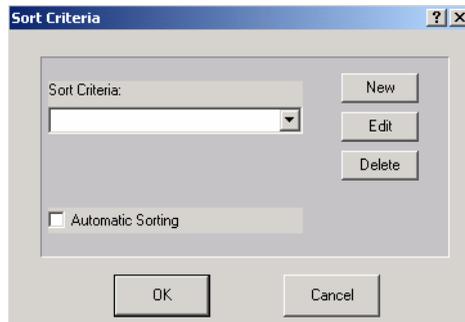
NOTE

This feature is not enabled for Datacolor TOOLS^{QCX}.

Sort Criteria

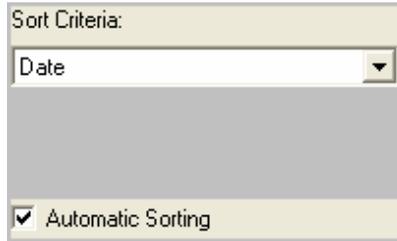
This option is used to create parameters for sorting batches on the desktop. The samples can be sorted based any property that is stored with the sample such as gloss, DE, etc.

- Select **System Menu, Sort Criteria**.



Sort Criteria Fields

- **Sort Criteria.** Click on the down arrow to see a list of the sort criteria that have been created. If the field is blank, no sort criteria have been created.

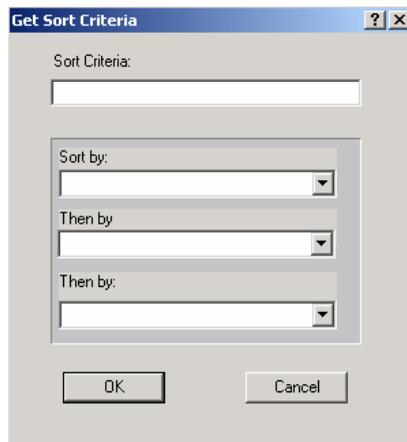


Sort Criteria:
Date
 Automatic Sorting

NOTE

If you have customized fields for your samples, these will be available for sorting function.

- **New.** Creates a new sort criterion. The sort criteria you are creating will be applied to the current standard on the desktop. When selected, the window below displays:

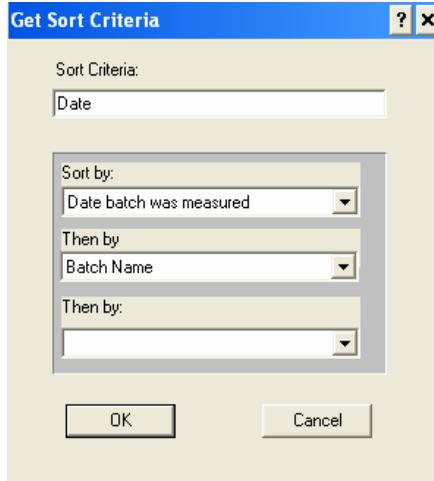


Get Sort Criteria ? x

Sort Criteria:
Sort by:
Then by:
Then by:
OK Cancel

- **Sort Criteria.** Enter the name to be assigned to the sort criterion you are creating.
- **Sort By.** Click on the down arrow to view all of the available characteristics for sorting, and select the first parameter to be used.
- **Then By.** If you want the batches sorted on multiple properties, enter a second characteristic to be used for the sort.
- **Then by.** If you want to include a third property for sorting, enter it in this field.

When you are finished selecting the sort criteria, click **OK**.



- **Edit.** Enables you to edit an existing sort criterion. Highlight the criterion to be edited, and click **Edit**. The current sort parameters will be displayed. Make edits as needed, and click **OK** to store the changes.
- **Delete.** Enables you to delete an existing sort criterion.
- **Automatic Sorting.** When you retrieve multiple batches, the batches will be sorted when they appear on the desktop. Place a check in the box to enable this option.

To run the Sort, do the following:

1. Select **System Menu, Sort**. Below is an example of the results obtained from this sort. The samples are sorted by date, and then by name:

<u>Sample Analysis</u>							III/Obs: D65 10 Deg
Color Name/Standard #:		STD ORANGE PL					
<u>Sample #</u>	<u>Date stored</u>	<u>DL*</u>	<u>Da*</u>	<u>Db*</u>	<u>DE (CMC)</u>	<u>P/F Result</u>	
BAT12	26-Oct-04	-0.97	-1.47	0.11	1.00	Fail	
BAT18	26-Oct-04	-0.06	2.68	2.67	1.44	Fail	
BAT19	26-Oct-04	0.33	1.90	2.10	1.05	Fail	
BAT1	27-Sep-04	0.14	1.48	3.64	1.85	Fail	
BAT2	27-Sep-04	0.93	1.02	-0.06	0.74	Pass	
BAT3	27-Sep-04	0.69	1.34	-0.36	0.98	Warn	
BAT4	27-Sep-04	0.32	-0.57	-0.20	0.30	Pass	
BAT5	27-Sep-04	0.98	-0.94	-0.09	0.68	Pass	
BAT6	27-Sep-04	1.15	-0.29	-0.85	0.69	Pass	
BAT7	27-Sep-04	-1.32	-0.16	2.04	1.47	Fail	
BAT8	27-Sep-04	1.90	-0.09	-0.32	0.88	Warn	
BAT9	27-Sep-04	0.99	-0.17	-0.25	0.46	Pass	

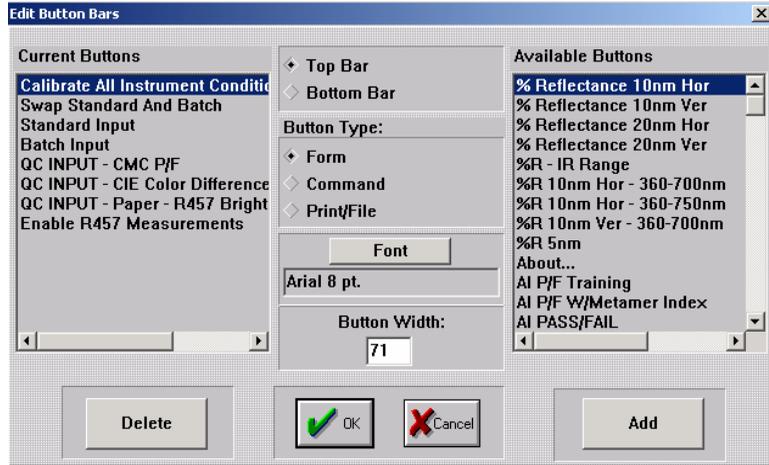
Edit Button Bars

The buttons along the top and bottom of the desktop can be customized to include the options you frequently use. The buttons execute commands, and control the display and printing of forms.

NOTE

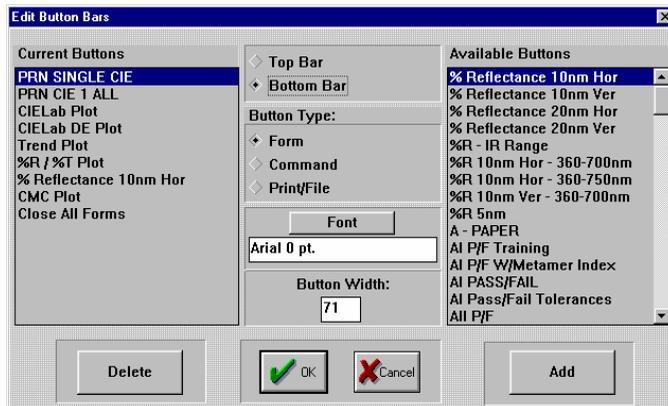
This option is not enabled for Datacolor TOOLS^{QCX}.

- Select **System Menu, Edit Button Bars**. The screen below displays:



Current Buttons

This box lists the names of all of the buttons included on the *button bar* selected, for the *button type* selected. In the example below, all of the buttons on the bottom button bar related to forms are listed:



Top/Bottom Bar

Click in the radio button to display the selections for the top or bottom button bar.

Button Types

Three types of buttons are available. Click in the radio button to identify the type of button you want to edit.

- **Form.** Selects forms to be displayed on the desktop. These forms typically include fields for data input, or the results of evaluations. *See also Forms Menu.*
- **Command.** Instructs the program to perform a specific function. This includes procedures such as calibration, printing output, calculations, and sample management tasks.
- **Print.** Selects specific forms to be sent to the printer. You can print both screen and printer forms. If you print a screen form, the information on the printer may not look the same as that displayed on the screen. This is because the default font does not print the same on a printer. In most cases, it is better to use a printer form (i.e., one designed for the printer) for printing.

Font

You can customize the font button sizes on the screen.

- **Font.** Controls the font type and size used for the buttons. Changing this provides space for adding more buttons to the button bar.
- **Button Width.** Controls the size of the button. You can make them larger or smaller, depending on how many are to be added to a bar.

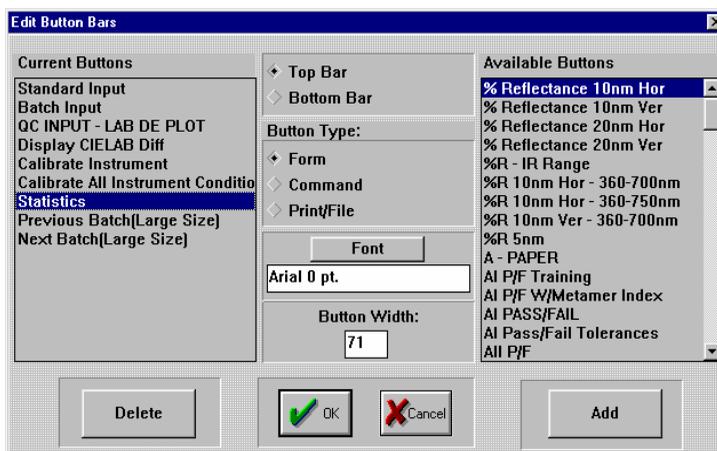
Available Buttons

Displays a list of all of the buttons available for the button type selected.

Add Button

1. In the Edit Button Bars dialog box, select the bar to which you want to add a button—**Top Bar** or **Bottom Bar**.
2. Move to the *Button Type* section, and select a button type. In the example below, **Form** is selected. The Available Buttons list will change based on the button type selected.
3. Move to the *Available Buttons* list, and click on the desired form (e.g., *Statistics*).

- Click **Add**. The *Enter Text for Button* dialog box displays. Enter the name to display for this form—e.g., *Statistics*. The Form Button now displays under the *Current Buttons* list.



- Click **OK**. When you return to the desktop, the newly created button displays in the corresponding button bar, top or bottom.

NOTE

When you add command buttons, you do not have to input text for the button. All the QC commands have reserved names for command buttons.

Command Button Summary

The functions offered by the buttons are described by the button name. The buttons defined below are those buttons whose functions are not obvious.

- **Get Closest Batch From Desktop.** This feature finds the (desktop) batch closest to the standard and makes it the current batch. It uses the CIEL^a*b* equation to find the closest batch.

NOTES

If the Marks & Spencer equation is enabled, then the M&S equation is used.

- **Swap Standard and Batch.** This feature *swaps* or exchanges the standard and batch with the click of a button.
- **Send Desktop.** Sends **all data** on desktop to a Datacolor TOOLS Email file.
- **Send Standard.** Sends **current standard** data to an Email file. See *System Menu, Email for specific instructions to enable this option*.
- **Send Batch.** Sends **current batch** data to a Datacolor TOOLS email file.
- **Retrieve Sample As Std.** Retrieves any sample in a folder, as a standard on the desktop. After retrieval, if the sample is re-stored to a folder, it will be designated as a standard.

- **Retrieve Sample As Bat.** Retrieves any sample as a *batch*, associated with the current standard on the desktop. After retrieval, if the sample is re-stored to a folder, it will be designated as a batch.
- **ENVISION Tiles.** Launches the ENVISION program and displays *solid colored tiles* for the current standards and its batches on the desktop.
- **ImageMaster Image.** Launches the ImageMaster program and displays an image file, which can be defined in the CTCOLORITE.INI.
- **ImageMaster Environment.** Launches the ImageMaster program and displays an *environment file*, which can be defined in the CTCOLORITE.INI (Datacolor legacy product).
- **Select ImageMaster Environment File.** Allows you to select the ImageMaster environment file to use as a default setting, when using the command button, ImageMaster Environment (Datacolor legacy product).
- **Select ImageMaster Image File.** Allows you to select the ImageMaster image file to use as a default setting, when using the command button, ImageMaster Image (Datacolor legacy product).
- **Execute DCIMatch Program.** Launches the textile formulation program.
- **Execute DCIMatch Correction Program.** Launches the textile batch correction program.
- **Get DyeLot.** Retrieves dyelot data directly from DCIMatch program.
- **Production Sort Current Batch.** Performs an A.I. Production Shade Sort on the current batch on the desktop. Once sorting is completed, a production bin number is assigned to the batch.
- **End Production Sort Run.** Finishes the current A.I. Production Shade Sort, and deletes the production history file.
- **Receive Desktop.** Opens the email Inbox and looks for the Datacolor TOOLS Email file in default email attachment folder.
- **List Standards.** This button lists the standards only. A separate button, List/Delete Standards, offers both *List* and *Delete* functions.
- **List Batches.** This button lists the batches only. A separate button, List/Delete Batches, offers both *List* and *Delete* functions.
- **Import/Export Desktop.** This command button uses the same data format as the email feature. A dialog box will allow the user to select the name and the destination of the file to be exported. It creates an ASCII file, which can be read by any text editor. When a file is imported into Datacolor TOOLS using the proper format, the data is automatically added to the desktop. *See also Appendix, Command Buttons for a complete list of command buttons.*

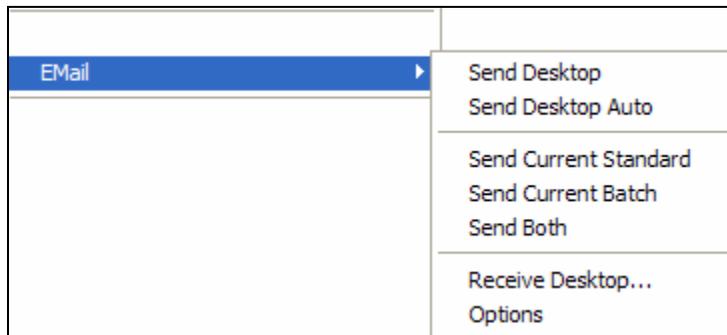
Email

The *Email* feature works with email systems that are compliant with the Microsoft MAPI standard (MS Mail, Microsoft Messaging, MS Exchange, MS Outlook). It enables a user to send or receive desktop data with the click of a mouse button.

NOTES

- The email options are not enabled for Datacolor TOOLS^{QCX}.
- This option assumes that a fully compliant MAPI email system is installed on the system. For additional information to setup an email account on a Windows system, refer to Microsoft documentation.
- There is a bug in Microsoft Outlook Express that causes problems when using the Datacolor TOOLS Email feature. It is recommended to use an Email system other than Outlook Express.
- All of the Email **Send** options create a file containing the Datacolor TOOLS desktop data. This file is called CTMAIL#.QTX (where # is a sequential number; e.g., CTMAIL0.QTX, CTMAIL1.QTX, etc.). The # is incremented with each Email sent. These files are saved in the default directory defined in the Options screen (**System Menu, Email, Options**).

- Select **System Menu, Email**. The submenu below is displayed:



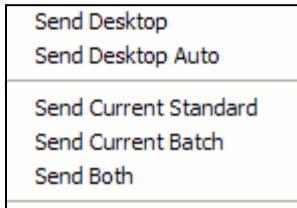
Accessing Email

The Email option can be accessed as follows:

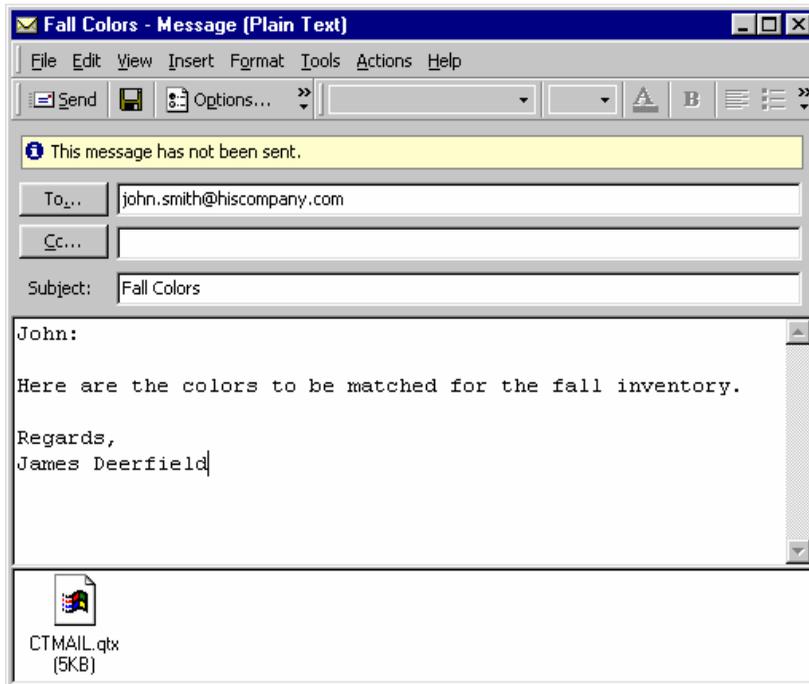
- Via the menu bar using the **System, Email, Send Options**.
- Via an **Email** command button on the button bar. *See also System, Edit Button Bars for instructions to add button bars to the desktop.*
- Via an **Email** command button on a screen form. *See also Datacolor TOOLS Form Editor.PDF for instructions to add a button to a form. See also Applications Technology, Exchanging Data with Other TOOLS users for a discussion of all data exchange options.*

Sending Email

A user can send data on the desktop using one of the *Send* options.



The command opens your Email account, and displays a screen similar to the one shown below:



The program automatically launches the user's default Email system and the data is automatically inserted into the Email as a file attachment. The user specifies a recipient, and has the option to add a message. The file attachment has a *.QTX file extension.

- Click the **Send** button to send the message.

The specific **Send** option selected determines the data that is included in the Email.

- **Send Desktop.** Sends all of the data on the desktop.
- **Send Desktop Auto.** Automatically sends desktop data to the default address setup in *Options*.
- **Send Current Standard.** Sends the current standard data.
- **Send Current Batch.** Sends the current batch data.
- **Send Both.** Sends the current standard and the current batch data.

NOTE

If you have added user fields to the database, the fields must also be added to the QC.FLD file. If they are not added, they will not be included in the Email attachment. See also *Datacolor TOOLS Form Editor.PDF* for instructions to edit Forms. See also *Applications Technology, Exchanging Data with Other TOOLS Users* for a detailed discussion of all data exchange options available.

Receive Email

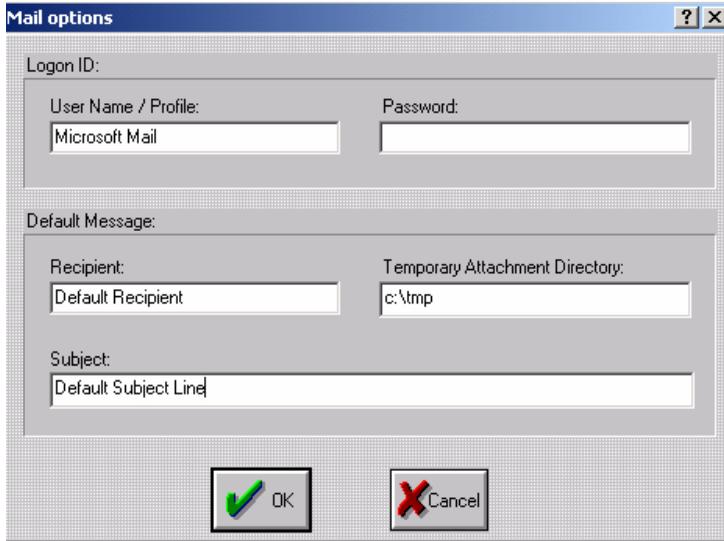
This option opens the default Email inbox, and the program selects mail messages containing a Datacolor TOOLS attachment. The data is added to the TOOLS desktop.

The recipient of a TOOLS Email attachment can access it using any of the following options:

1. From the Datacolor TOOLS menu bar, select **System, Email, Receive Desktop**.
2. Click the **Receive Desktop** button on the button bar. See also *System Menu, Edit Button Bars* for instructions to add buttons to the button bars.
3. Click the **Receive Desktop** button on a screen form. See also *Datacolor TOOLS Form Editor* for instructions to add a button to a form.
4. Using the Properties option Windows Explorer you can instruct the system to automatically use Datacolor TOOLS to open all Email attachments having the file extension QTX. This launches Datacolor TOOLS automatically from the Email program when the user double-clicks on the data attachment.

Options

The *Options* selection is used to provide the program with information about the Email system to be used. This includes the user profile/password, default recipient, temporary directory for attachments, and default subject line. When selected, the window below displays:



- **User Name/Profile.** Enter the MAPI profile name assigned to your Email account when it was created. If you are using Microsoft Email products and are unsure of the profile name, *see Appendix, Email System Setup for instructions on locating the profile name.*
- **Password.** This information is not used at this time. Leave the field empty.
- **Recipient.** A default Email address can be entered here. This is useful if Datacolor TOOLS data is consistently sent to the same Email box.
- **Temporary Attachment Directory.** Location of the temporary Datacolor TOOLS Email file attachment that will be sent.
- **Subject.** Default Email subject line can be entered here.

Disable Main Menu

This option removes the main menu bar from the display. This is useful if you want to limit access to the button bar and form options. When you select this option, the menu bar is reduced to the following:



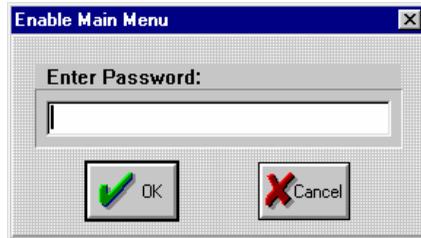
Notice that all options on the menu bar are gone with the exception of a System option.

To return the menu bar to its previous format, click **System** and, from the short drop-down list, click **Enable Main Menu**. The menu bar is restored.

Password Access

If you have a password activated (created through *System, Setup*), when you attempt to enable the main menu, you are requested to enter a password.

1. Move to the menu bar, and select **System, Enable Main Menu**.
2. In the Enable Main Menu dialog box, move to the *Enter Password* field, and type the applicable password.
3. Then click **OK**.

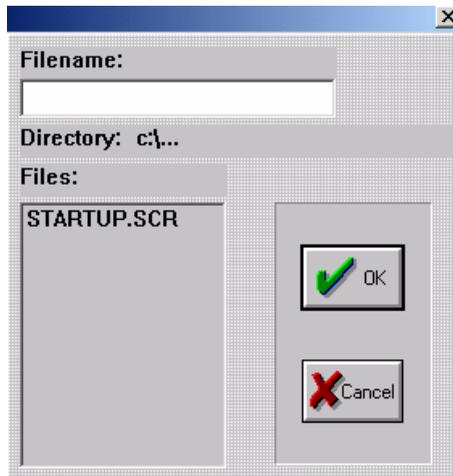


Load Screen Setup

This option allows you to select previously stored desktop configurations for use as the desktop screen. The selected setup replaces the current configuration. When you recall the screen setup file, all of the windows will be configured and displayed exactly as they were when you stored the screen setup.

To select a screen setup:

1. From the menu bar, click **System, Load Screen Setup**.

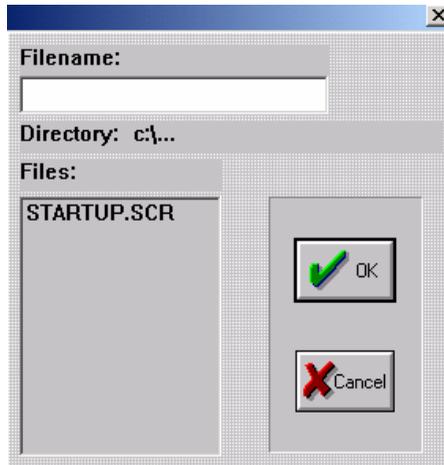


2. Click on the screen setup file you want to use, and click **OK**.

Save Screen Setup

This option allows you to store specific desktop window configurations to a file. The files have a .SCR extension and are stored in your main program directory. These screens can then be recalled as an alternate desktop configuration.

1. Select **System, Save Screen Setup**. The window below displays:



2. In the *Filename* field enter the name you want to assign to the current screen setup, and then click **OK**.
3. To use this screen, select **System, Load Screen Setup** and retrieve the file you stored.

Save Screen for Startup

This option allows you to store the current desktop window configuration to a file, and use it as your startup screen.

- For the *Save Screen for Startup* option, no dialog box displays. The screen is automatically saved into the "STARTUP.scr" file.

NOTE

When this option is selected, the current startup screen configuration is replaced with the current desktop screen.

Quick Setup

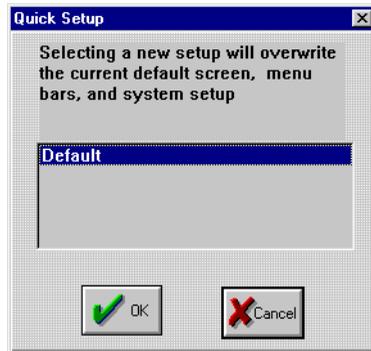
This function allows you to change the default screen which includes button bars, and input and output fields.

WARNING

This option is not intended for use in day-to-day operations. Do not make any changes to this option without consulting an Applications Specialist.

The same results can be achieved by customizing the screen setup for individual users. See also *Save Screen Setup, and Save Screen for Startup*.

1. From the menu bar, click **System, Quick Setup**. The *Quick Setup* dialog box is displayed.
2. From the list of options, select the desired setup from the list.
3. Click **OK**.

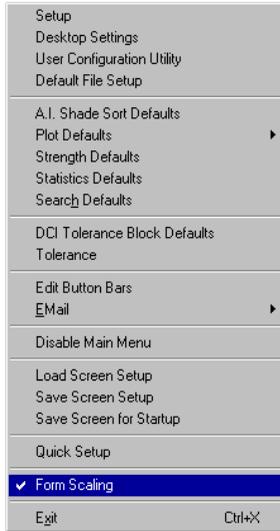


Form Scaling

When a screen form is created, the screen resolution is saved with the form. If your monitor resolution has changed, and the Form Scaling option is activated, all the items on the form are re-scaled based on the new screen resolution.

All the current screen forms supplied with Datacolor TOOLS are saved in 640 x 480 screen resolution. If your video settings are a higher resolution (for example, 800 x 600), activate the Form Scaling feature to adjust the fields on the screen form. This allows you to take a smaller form and re-scale it to fill the screen.

- From the menu bar, click **System, Form Scaling**. A checkmark next to this option indicates the Form Scaling feature is active. To deactivate this option, select the option again and the checkmark is removed.



Forms Menu

Forms Menu Options

Forms are the basis of the Datacolor TOOLS user interface. All of the information displayed by the program, both input and output, is displayed on a form. Three types of forms are used by Datacolor TOOLS:

- **Screen Forms.** Controls the display of information on the computer monitor.
- **Printer Forms.** Controls the contents of the printed data.
- **File Forms.** Controls the information exported to ASCII files for examination outside of the Datacolor TOOLS environment.

The Forms Menu includes all options available to view, create and edit the forms.

- From the main window, move to the menu bar, and click Forms. A drop-down list displays:



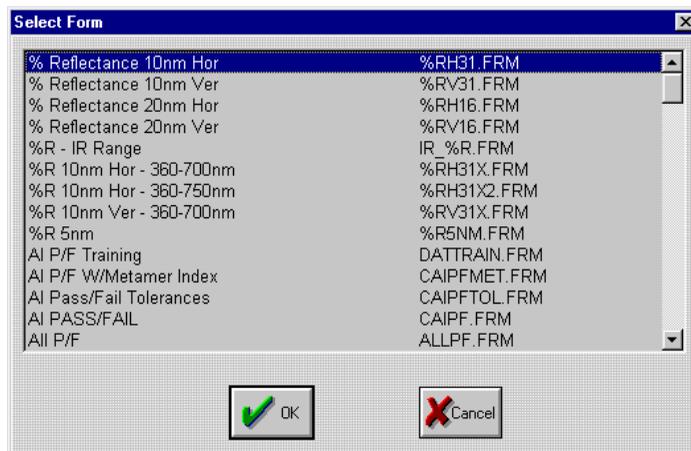
NOTES

- You can create new forms or customize existing forms in program. This is done using the Form Editor program. This program is included on the Datacolor TOOLS CD (*Datacolor TOOLS Form Editor.exe*). Form Editor.PDF also on the CD, documents how to use the program.
- Datacolor TOOLS^{QCX} users cannot create or customize forms.

Screen Forms

Screen forms can be used on the desktop for entering data, and displaying results of colorimetric calculations. There are many different screen forms available for use.

1. From the menu bar, select **Forms/ Screen Forms**. The Select Form dialog box displays. A list of available screen forms is shown.
2. To select a form, click on it to highlight it. If necessary, use the scroll bars to the right of the list to move up and down through the list.



3. When your selection is made, click the **OK** button. The selected form displays in the active window.

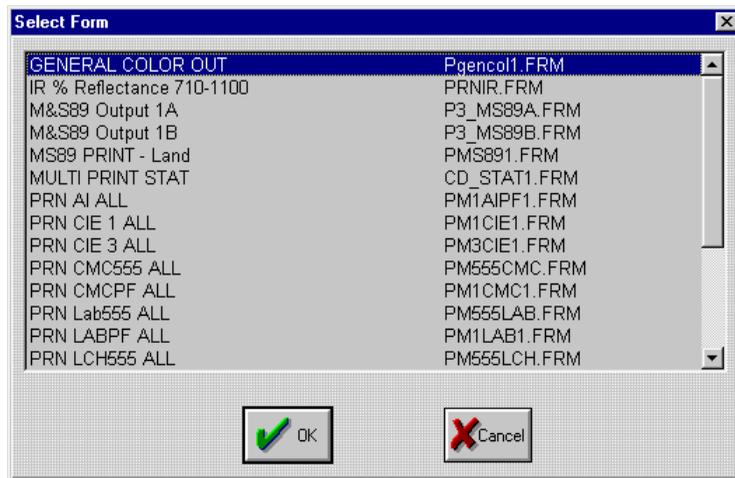
NOTES

- You can create new forms or customize existing forms for use with the program. This is done using the Form Editor program. This program is included on the Datacolor TOOLS CD. Form Editor.PDF is an electronic manual that documents how to use this program. *See also Appendix, Screen Forms for a list of all screen forms shipped with the program.*
- Datacolor TOOLS^{QCX} users cannot create or customize forms.

Printer Forms

Printer forms are forms designed for printing a hard copy of the data. The printing function is handled through Windows, and uses the default printer defined for Windows.

1. From the menu bar, select **Forms/ Printer Forms**. The Select Form dialog box displays. A list of available screen forms is shown.
2. To select a form, click on it to highlight it. If necessary, use the scroll bars to the right of the list to move up and down through the list.



3. When your selection is made, click the **OK** button. The selected form is sent to the default printer.

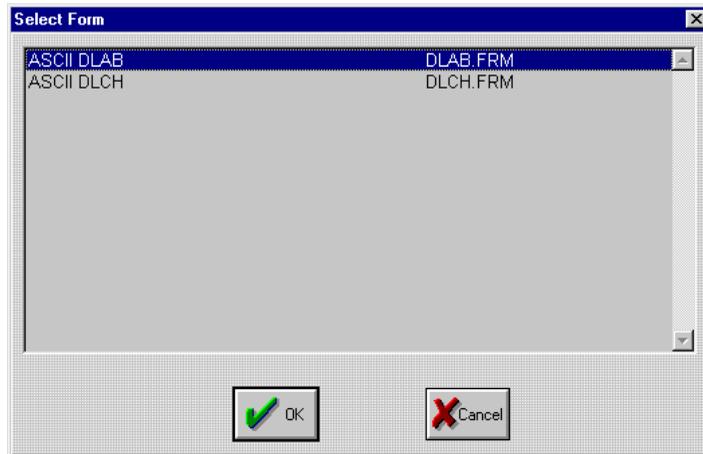
NOTES

- You can create new forms or customize existing forms for use with the program. This is done using the Form Editor program. This program is included on the Datacolor TOOLS CD. Form Editor.PDF is an electronic manual which documents how to use this program. *See also Appendix, Screen Forms for a list of all screen forms shipped with the program.*
- Datacolor TOOLS^{QCX} users cannot create or customize forms.

File Forms

File forms are forms that send colorimetric data to ASCII files. ASCII files are text files that are useful to transfer data to other programs. Using file forms, data can be sent to programs like Excel or Lotus, or any program that accepts ASCII input.

1. From the menu bar, select **Forms/File Forms**. The Select Form dialog box displays. A list of available screen forms is shown.
2. To select a form, click on it to highlight it. If necessary, use the scroll bars to the right of the list to move up and down through the list.



3. When your selection is made, click the **OK** button. The selected form is sent to the designated ASCII file.

NOTES

- You can create new forms or customize existing forms for use with the program. This is done using the Form Editor program. This program is included on the Datacolor TOOLS CD. Form Editor.PDF is an electronic manual which documents how to use this program. *See also Appendix, Screen Forms for a list of all screen forms shipped with the program.*
- Datacolor TOOLS^{QCX} users cannot create or customize forms.

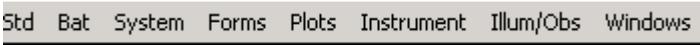
Plots Menu

The Plot options provide access to powerful tools for data evaluation.. These options allow you to graph your data, and examine the graphs using both 2D and 3D views. You can plot either the spectral or the colorimetric data for your samples. In the case of colorimetric plots, you can plot either the absolute values (colorimetric coordinates) or the relative values (color differences).

NOTE

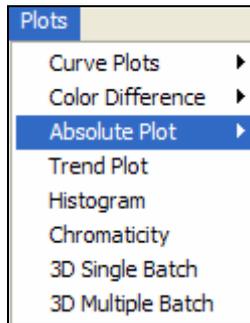
Some of the plot options are not enabled for Datacolor TOOLS^{QCX}.

1. From the main window, move to the menu bar, and click **Plots**.



Std Bat System Forms Plots Instrument Illum/Obs Windows

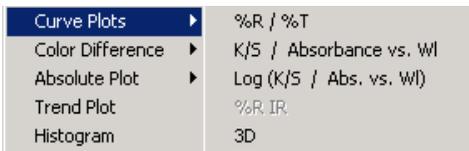
A drop-down list displays with the list of menu options.



2. To select a menu option, simply click on it. If a right-facing arrow is shown next to an option, this indicates there is a secondary list of submenu options (e.g., Plots, Curve Plots, %R / %T).

Curve Plots

The Curve Plots option on the Plots Menu includes the submenu below:

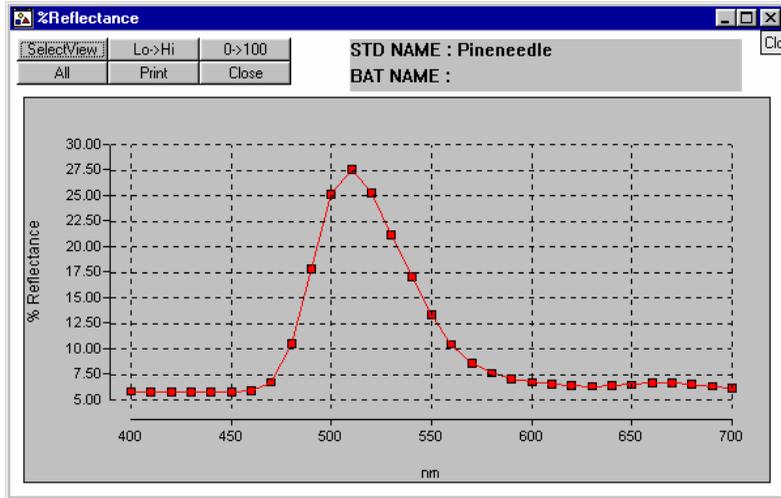


These plot options display sample data wavelength-by-wavelength for the standard and batches. It is either spectral data (%R or %T), or K/S data.

%R / %T

These curves are an important tool for determining if metamerism exists between a batch and a standard. The %R plot indicates the amount of light reflected by an object at each wavelength in the visible spectrum. The %T plot (measured using the transmission mode of an instrument) indicates the amount of light transmitted through an object at each wavelength.

Below is an example of a reflectance plot. This example includes a standard and a single batch.



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

NOTES

- When viewing a curve plot that includes multiple batches, up to 15 different colors will be displayed to differentiate the batches. If you include more than 15 batches in the plot, batches in position #15 or higher will be displayed using a blue curve. If you are using a color printer, the same rule applies.
- For both types of curve plots, the y axis is automatically scaled from the lowest spectral value (% R or %T) to the highest spectral value. However, there are options that allow the user to fix the scales used for the plots.
- If you are using a color printer, a legend will be printed automatically on a separate page. The active curve will be displayed with small boxes at each wavelength.

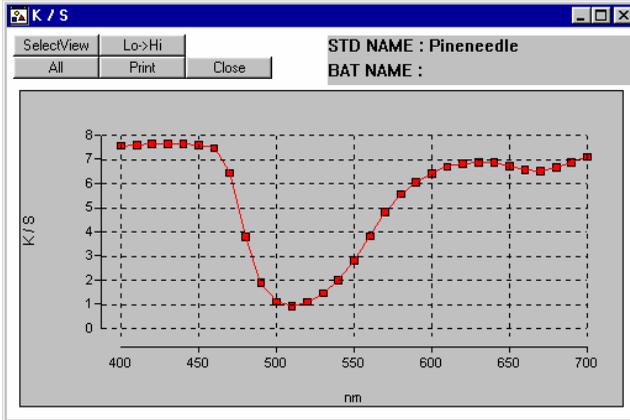
K/S vs. Wavelength Plot

This option graphs the K/S vs. Wavelength or the Absorbance vs. Wavelength for a standard and batch(es). K/S and Absorbance plots include data from each wavelength in the visible spectrum. *This plot is not enabled for Datacolor TOOLS^{QCX}.*

NOTES

A K/S plot is used to analyze opaque and translucent materials, and is based on a reflectance measurement.

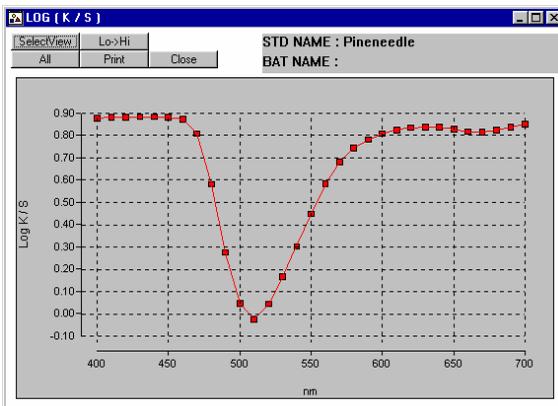
An Absorbance plot is used to analyze transparent materials, and is based on a transmittance measurement.



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

Log K/S vs. Wavelength Plot

This option graphs the Log K/S vs. wavelength or Log Absorbance vs. wavelength for a standard and batches. The plot of Log Absorbance vs. Wavelength is used for the analysis of transparent materials and is based on transmittance measurements. *This plot is not enabled for Datacolor TOOLS^{QCX}.*



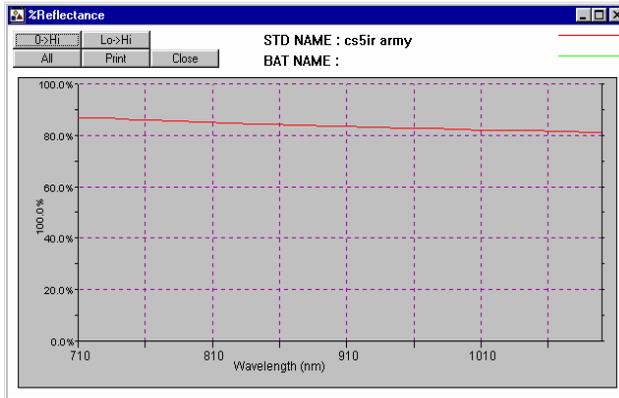
See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

%R IR

This is a reflectance plot that includes the infrared region of the spectrum, and includes wavelengths 380-1100nm.

NOTE

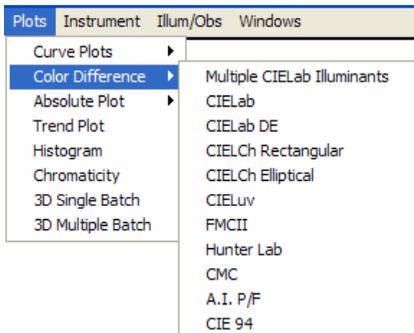
This is available only for instruments that have infra-red capability.



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

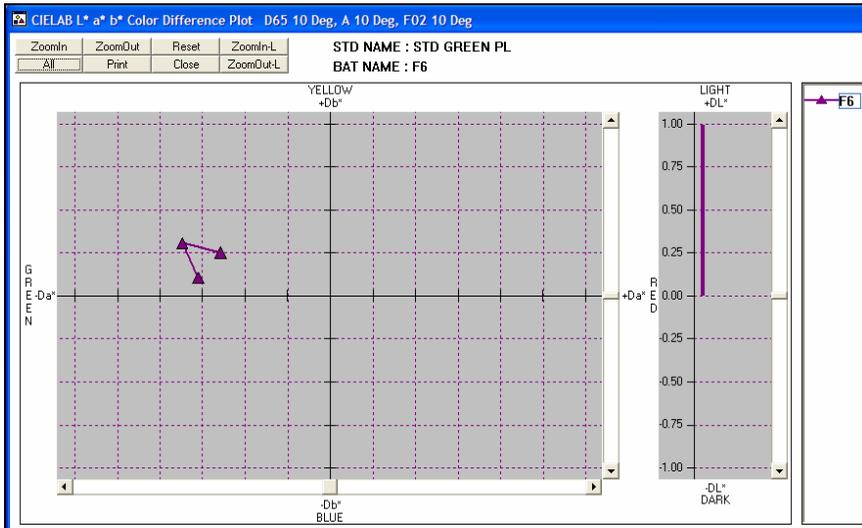
Color Difference Plots

These options graph the location of the samples in a color space, and include the acceptability area, based on the tolerances associated with the standard. Several of these plots include a label along each axis to identify the relative differences represented in the plot.



Multiple CIE Lab Illuminants

This option plots the same samples under 3 different illuminants:



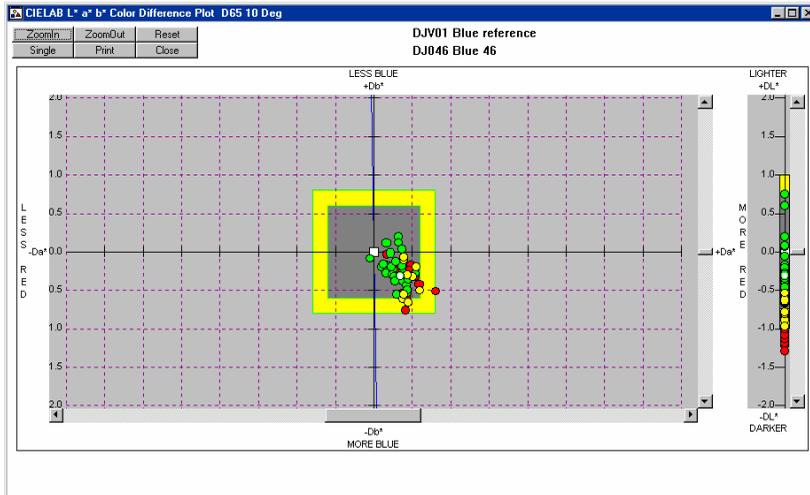
The standard is located at the intersection of the x,y axes. Each batch is represented by 3 points on the plot. You can include a single batch, or all batches on the desktop.

CIELab Plot

This plot locates the samples in an L, A, B color solid based on the differences between the L*a*b* coordinates of the standard and batch(es). On the left, you see the a* and b* plane with the standard at the intersection of the a* and b* axes. The L* plane is shown at the right with the standard at the center.

The plot also displays the L*a*b* tolerances for the standard. These tolerances form a rectangular acceptability area (dark gray area) in the color space. Batches that pass are displayed in green while batches that fail are displayed in red.

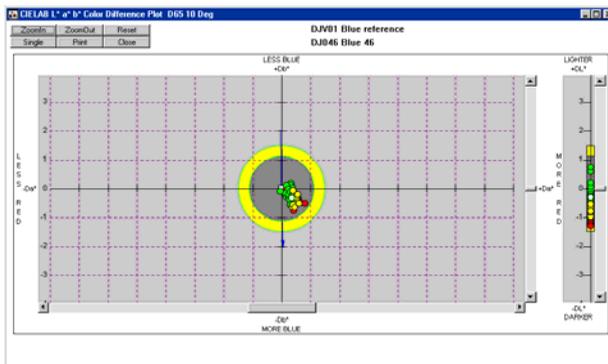
You can limit the batches included in the plot to the *current batch* on the desktop, or you can include *all of the batches* on the desktop that are associated with the standard. In the example shown below, all of the desktop batches are included in the display.



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

CIE Lab DE Plot

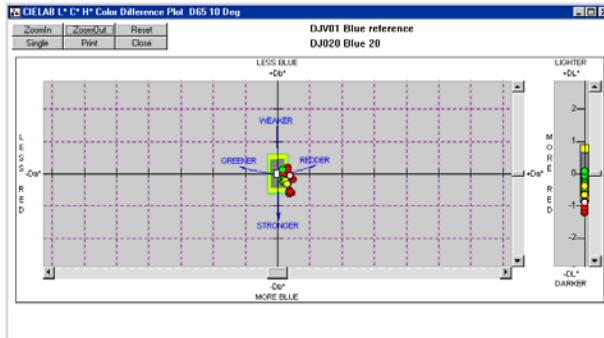
This plot is similar to the CIE L*a*b* plot except that it plots the relative differences between the standard and batch. It uses a single tolerance, DE^* , to define the acceptability area. This produces a spherical volume in the L*a*b* color space.



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

CIELCh Rectangular Plot

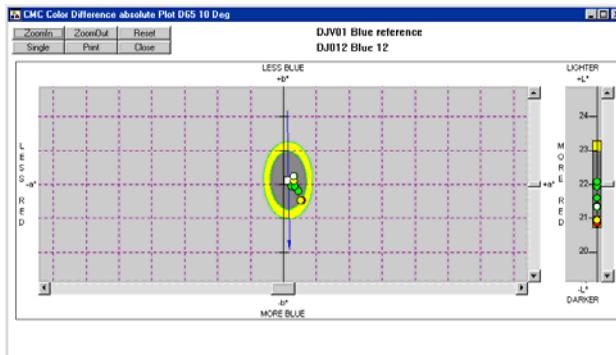
This option presents the differences between the standard and batch(es) based on the CIE $L^*a^*b^*$ coordinates of the samples, and identifies the C^* and H^* axes. The DC^* and DH^* plane is shown by rotating the rectangular tolerance area to the right area of color space. The DC and DH arrows indicate the direction of the chroma and hue axes. The tolerances displayed with this plot are the $L^*a^*b^*$ rectangular tolerances. These tolerances form a rectangular acceptability area in the color space. The darker gray box represents the acceptability area defined by the tolerances.



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

CIELCh Elliptical Plot

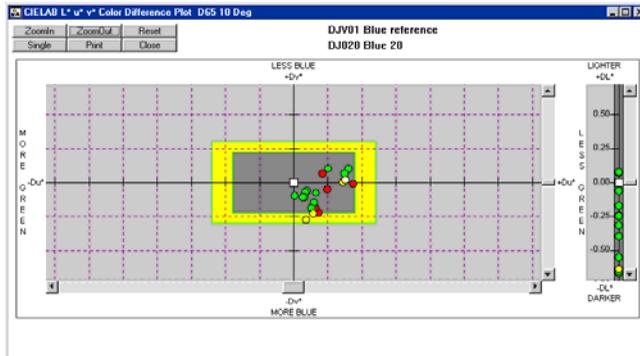
This plot is also a CIE $L^*C^*H^*$ plot. The difference between this plot and the CIEL $^*C^*H^*$ rectangular plot is that the acceptability tolerances are based on the $L^*C^*H^*$ values of the samples, and define a symmetrical ellipsoidal acceptability area in the color space. *This plot is not enabled for Datacolor TOOLS^{QCX}.*



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

CIELuv Plot

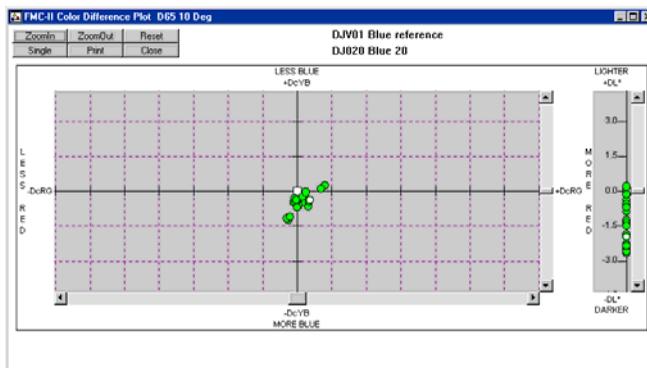
This plot presents the CIE $L^*u^*v^*$ color differences between the standard and batch(es). The Du^* and Dv^* planes are shown on the left, and the DL^* plane on the right. The tolerances displayed with this plot are the $L^*u^*v^*$ tolerances, and form a rectangular acceptability area in the color space. The darker gray box represents the tolerance acceptability area. *This plot is not enabled for Datacolor TOOLS^{QCX}.*



See also *Plot Controls* to customize the sample data that displays on the plot, and the *plot scaling*.

FMC II Plot

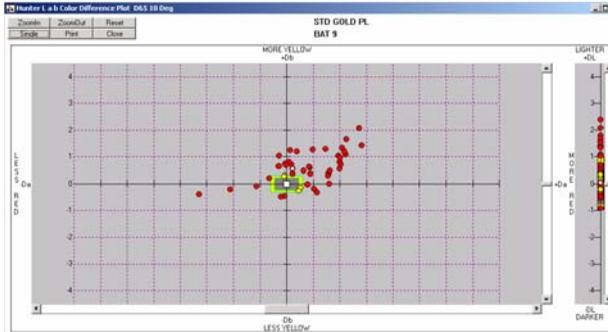
This plot presents the FMCII color differences between the standard and batch(es). The DCRG and DCYB planes are shown on the left and the DL plane on the right. The tolerances displayed with this plot are FMCII tolerances, and form a rectangular acceptability area in the color space. The darker gray box represents the tolerance acceptability area.



See also *Plot Controls* to customize the sample data that displays on the plot, and the *plot scaling*.

Hunter Lab Plot

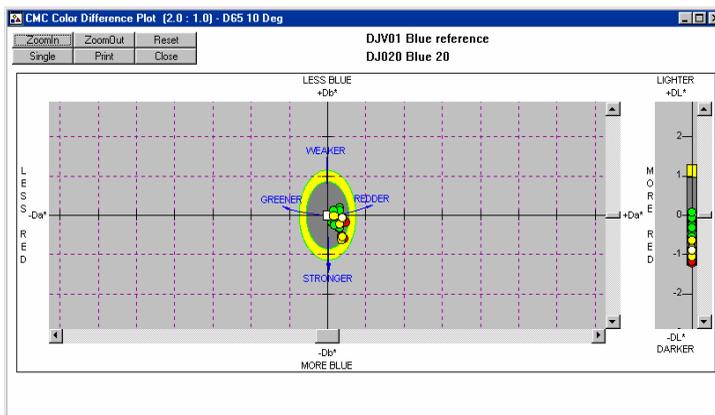
This plot presents the Hunter Lab color differences between the samples. The D_a and D_b planes are shown on the left and the D_L plane at the right. The tolerances displayed with this plot are the Hunter Lab tolerances, and form a rectangular acceptability area in the color space. The darker gray box represents the tolerance acceptability area.



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

CMC Plot

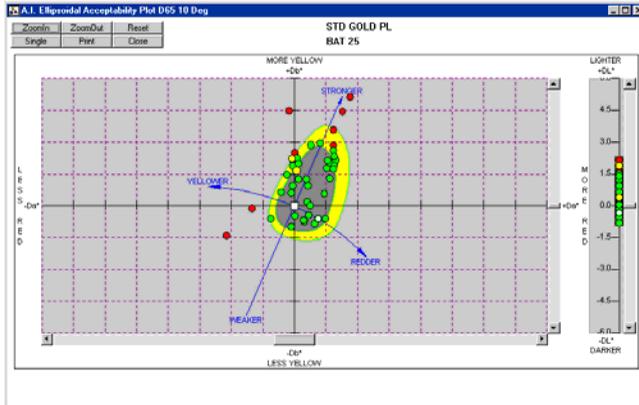
This plot presents the CMC acceptability ellipsoid in the CIE $L^*C^*H^*$ color space. The CMC equation sets up a symmetrical ellipsoid around the standard. The $l:c$ parameters and the DE acceptability tolerance can skew the ellipsoid.



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

A.I. PF Plot

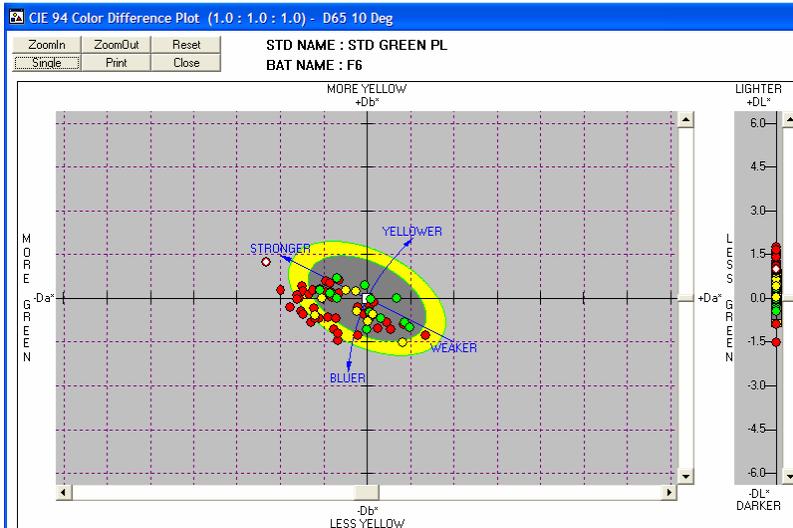
This plot presents the AI P/F tolerance ellipsoid in L*C*H* color space. The AI ellipsoid can be non-symmetrical and skewed away from the standard. *This plot is not enabled for Datacolor TOOLS^{QCX}.*



See also *Applications Technology, AI Tolerancing* for a detailed discussion of this feature. See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

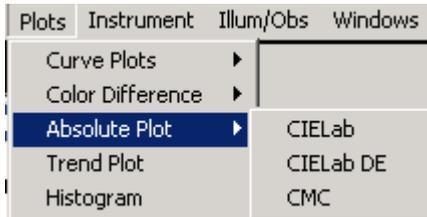
CIE 94 Plot

This plot presents the standard and batches in the Lab color solid. It includes an acceptability ellipsoid based on the CIE94 color difference equation.



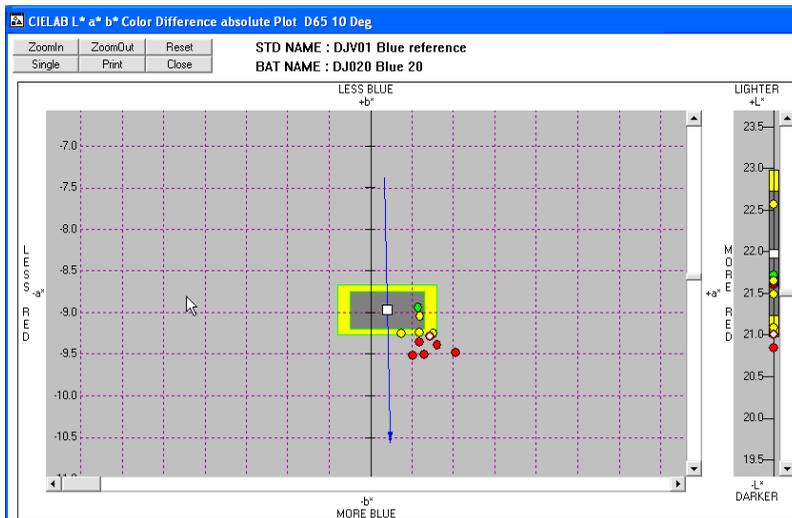
Absolute Plot (Color Coordinates)

These options plot the absolute coordinates of the samples in color space. A single graph does not capture the complete map of color space. It displays a *snapshot* of color space that includes the selected standard and batches based on their color space coordinates. Some of the plots label the absolute range of coordinates along each axis.



CIELab

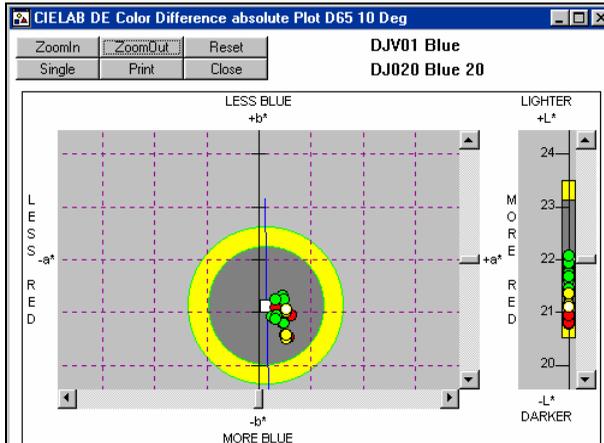
This plot locates the samples in the LAB color space model. The a^* and b^* planes are shown on the left, with the standard at the intersection of the a^*b^* axes. The L^* plane is shown at the right with the standard at the center. It includes the rectangular acceptability area in the color space, defined by the tolerances for the standard. The dark gray box represents the acceptability area. Batches that pass are displayed in green, while batches that fail are displayed in red. *This plot is not enabled for Datacolor TOOLS^{QCX}.*



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

CIELab DE

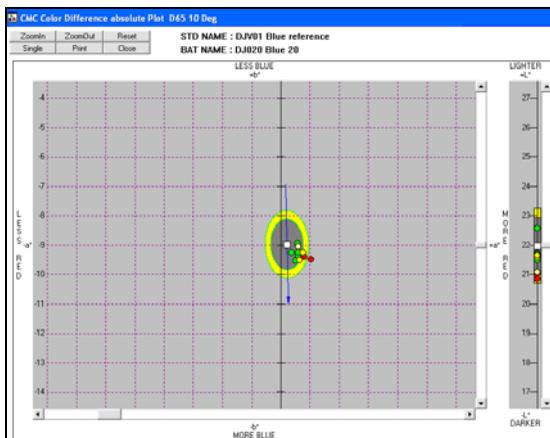
The CIELab DE absolute plot illustrates the acceptability tolerance for the standard based solely on DE. It locates the standard and batch based on their absolute L^* , a^* , b^* coordinates. *This plot is not enabled for Datacolor TOOLS^{QCX}.*



See also *Plot Controls* to customize the sample data that displays on the plot, and the plot scaling.

CMC

The CMC absolute plot illustrates the acceptability tolerance for the standard based on the CMC tolerance. The standard and batch(es) are located in the color solid based on their L^* , a^* , b^* coordinates. *This plot is not enabled for Datacolor TOOLS^{QCX}.*



See also *Plot Controls* to customize the sample data that displays on the plot, and the *plot scaling*.

Trend and Histogram Plots

These plots allow you to observe patterns in the behavior of your process. For example in a printing application, you may see a noticeable variation in the DL of all batches made using a particular press. This could be due to changes in processing variables such as film thickness or viscosity, or slight mechanical differences between the presses. These tools may help you to identify the source of the processing problem.

Trend Plots

The trend plot displays batch color difference data in a linear, horizontal style. Batch data are easily compared and any trends in the data become obvious. The trend plot can be set up to display any color difference parameter. See *System Menu/Tolerance Defaults* for instructions to create/change trend plot defaults.

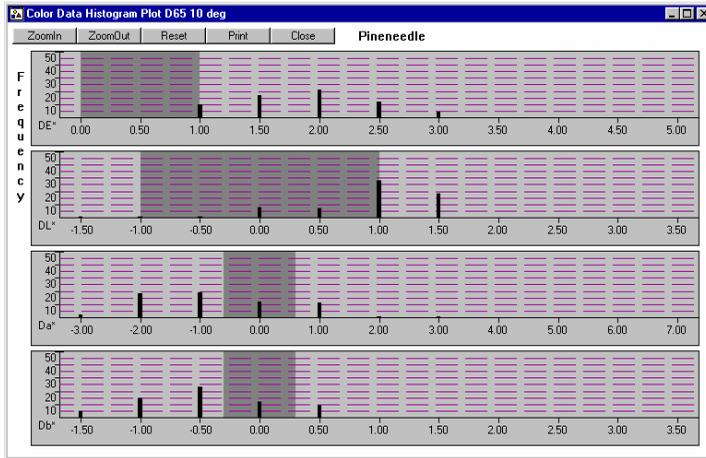
In the example shown below, DL*, DC*, and DH* are displayed. The dark gray depicts the pass tolerance.



If the *Cursor Point* option is enabled, you can double-click on any batch point to make it the current batch.

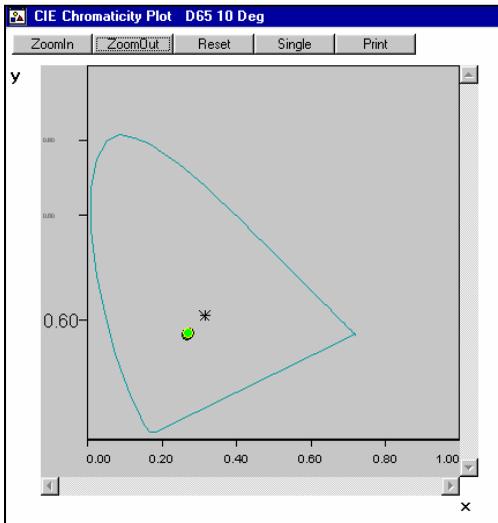
Histogram Plots

The histogram shows the clustering of batches at various distances (differences) from the standard. One color difference parameter is defined for each graph included in the histogram. It is way to observe how the population of batches clustered within each parameter. *This plot is not enabled for Datacolor TOOLS^{QCX}.*



Chromaticity Plot

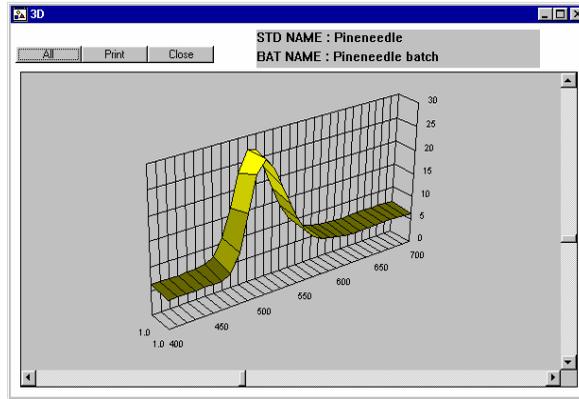
This plot displays the original CIE chromaticity diagram, and locates the samples in this color solid based on their x,y values. *This plot is not enabled for Datacolor TOOLS^{QCX}.*



3D Plots

This plot type offers a 3-dimensional representation of a reflectance or transmittance plot. The plot is automatically scaled to the highest %R or %T value. *This plot is not enabled for Datacolor TOOLS^{QCX}.*

- Click on **Plot Menu, %R/%T Plots, 3D** to access the 3-D spectral plot. A plot similar to the one below is displayed:

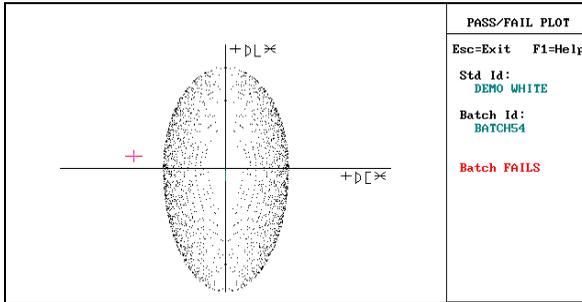


3D Single/Multiple Batch Plots

This plot type offers a 3-dimensional representation of the colorimetric data. These plots can be rotated in space to view the location of the sample(s) in a L* C* H* color space model. You have a choice to include either a single batch or all batches on the desktop. *These plots are not enabled for Datacolor TOOLS^{QCX}.*

- Click on **Plot Menu, 3D Single Batch** or **3D Multiple Batch** to access the 3-D spectral plot:

Below is a 3D plot of L*C*H* color space showing the position of the current batch, and the pass/fail evaluation based on AI P/F tolerances.

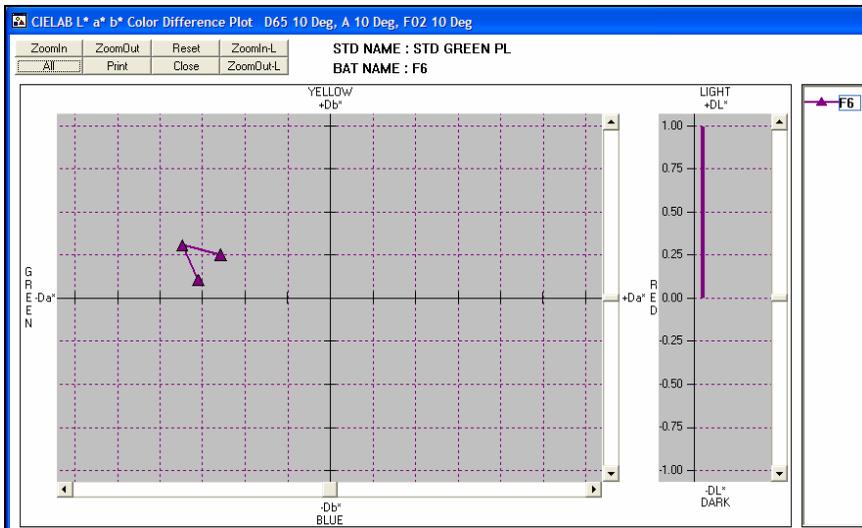


The ellipsoid may be rotated in order to view the shape of the ellipsoid along all of the axes.

Plot Controls

2D Plot Controls

A series of buttons at the top of the window allow you to customize the plot display:



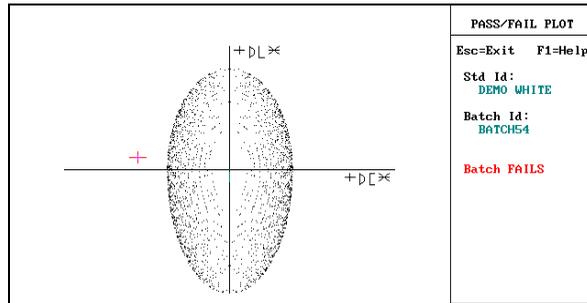
- **Zoom In.** Magnifies the plot area.
- **Zoom Out.** Covers more of the plot area. Reduces size of acceptability area.
- **Reset.** Resets the plot to the default size.

- **All/Single.** If All is displayed, clicking this button displays all desktop batches at one time. If Single is displayed, clicking this button displays only the current desktop batch.
- **Print.** Prints the plot to the current Windows printer.
- **Close.** Closes the plot window.

See also *3D Plot Controls* for information regarding 3D plots.

3D Plot Controls

Rotating the axes to the proper positions can display all views of the ellipsoid. *These plots are not enabled for Datacolor TOOLS^{QCX}.*



The following keys control the operation of the 3D Plots:

- **Num Lock Key On/Off.** Toggles automatic axis rotation
- **Arrow Keys.** Rotate axes
- **+ or – Key.** Zooms in or out
- **Ctrl + Arrow Keys.** Pans view port
- **Home Key.** Restores screen
- **Ins and Del Key.** Increase/decrease rotation speed
- **F1 Key.** Display Help Screen
- **ESC Key.** Exits 3D Plot
 - To rotate the plot, press the **right arrow** key. If Num Lock key is on, the plot will rotate automatically to the right. If the Num Lock key is off, the right arrow key will rotate the plot manually (i.e., each press of the right arrow key will rotate a fixed distance).
 - To halt the rotation, press the **Num Lock** so that it is disabled.

Instrument Menu

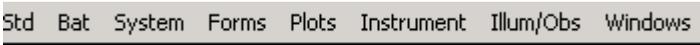
Instrument Menu Options

The instrument options on the menu bar are used to calibrate your instrument, set instrument defaults in the software, and set parameters for measuring whiteness. The Instrument Menu can also be used to make a quick measurement and analyze the data, without naming the sample or storing the data.

NOTE

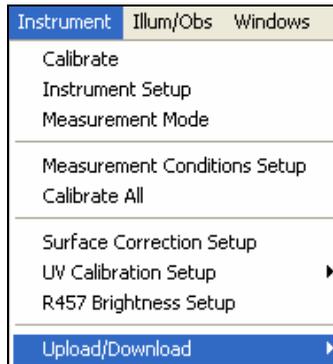
The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.

1. From the menu bar, click **Instrument**.



Std Bat System Forms Plots Instrument Illum/Obs Windows

2. A drop-down list displays with the list of menu options. To select an option, simply click on it.



If a right-facing arrow is shown next to an option, this indicates there is a secondary list of submenu options (e.g., *UV Calibration Setup*, etc.) to be displayed.

NOTES

- The installation of the Datacolor TOOLS software does not include the selection of an instrument model. Following the program installation, select **Instrument Setup** to select the instrument you have attached to the computer.
- Some of the options on the Instrument Menu are used primarily to change or add instruments after the software is installed.

Calibrate

The calibration procedure standardizes the instrument to compensate for any changes in performance over time. Changes in the environment and the age of the instrument can affect the measurement data. The calibration routine produces factors that are applied to the measurement data to adjust the measurement for these changes. This allows you to compare measurements made at different times during the life of the instrument. It also enables you to compare measurements from different instruments.

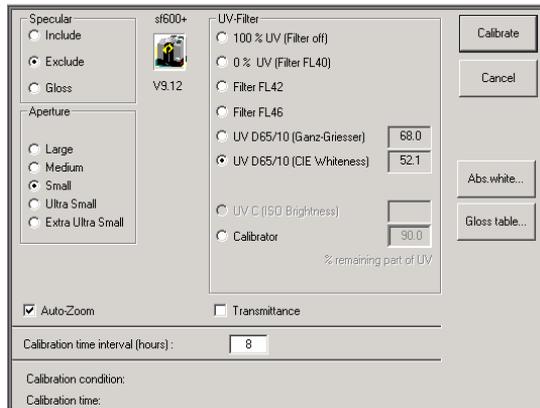
This option is used when you need to calibrate one measurement condition. If you routinely use several different aperture sizes or specular port settings, you should use the **Calibrate All** option.

NOTE

The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.

The calibration procedure requires the selection of a series of instrument settings.

1. From the desktop, move to the button bar, and click the **Calibrate** button. If this button is not on the button bar, select **Instrument Menu, Calibrate**. The Measurement Main Window is displayed:



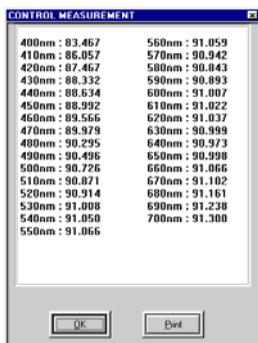
2. Click the **Calibrate** button to start the procedure. The program will prompt you for a measurement of the black trap and white tile.



- Place the black trap over the measurement port and click the **Ready** button. When the measurement is completed, the dialog box below displays:



- Replace the black trap with the white calibration tile and click the **Ready** button again. If you do not have the diagnostic tile test enabled, when the measurement is completed a dialog box containing the values for the white tile is displayed.



- Click the **OK** button to proceed. Click the **Print** button to print the values.

NOTE

Depending on your program configuration, the calibration procedure may prompt you to run a diagnostic tile test. This is an additional tile scan, and the green tile is used to complete this test.

Fields in the Calibration Window

Specular

This field determines the position of the specular port. It is either closed --Specular Included (SCI), or open-- **Specular Excluded (SCE)**. This option is used to include or exclude the surface effects in the measurement. Gloss makes two measurements of the sample; one specular included, and the other specular excluded.

- **Specular Component Included (SCI)**. The specular port is closed and the influence of the surface is included in the reflectance measurement.
- **Specular Component Excluded (SCE)** The specular port is open and the influence of the surface is excluded from the measurement.

- **Gloss** makes two measurements of the sample; one specular included, and the other specular excluded. This information is required to use the gloss compensation feature, which adjusts sample measurements for gloss differences. This measurement condition is used for the gloss compensation feature. You must install gloss data to enable this option. See also *Gloss Table* in this section for instructions to install this data.

Aperture

This is a selection of the measurement port opening and lens position. Some instruments offer multiple apertures sizes while others are fixed at a size and lens position.

XLAV	Extra Large Area View. This is only available with the Datacolor 450X (Elepho) instrument.
LAV	Large Area View.
MAV	Medium Area View.
SAV	Small Area View.
USAV	Ultra Small Area View
XUSAV	Extra Ultra Small Area View

NOTES

- Your sample must completely cover the aperture size you select.
- You should always use the largest aperture size available.

UV Filter Options

These fields on the calibration screen identify the procedure used to adjust the UV filter position. This option is only relevant for instruments fitted with UV filters. See also *Instrument Menu, Calibrate* for information on all of the fields included on the *Calibrate* window.

There are two types of UV filter selections. One identifies the position to be used for the adjustable UV filter. The other identifies a UV cutoff filter to be used for measurements.

See also *Applications Technology, UV Calibration and Whiteness Evaluations* for a detailed discussion of the concept and operation of this option.

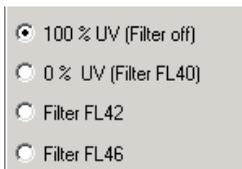
Adjustable Filter Options. The options documented below are used to adjust the UV filter position:



- **UV D65/10 (Ganz-Greisser).** This procedure uses the Ganz-Greisser calibration method. Ganz-Greisser is a separate calibration procedure using a specific equation and instrument-specific factors to determine the correct position of the UV filter. The light source is filtered to simulate the D65 Illuminant, and the target whiteness value is based on 10° standard observer data. The Ganz-Greisser whiteness value for the fluorescent calibration standard is used as the target value.
- **UV D65/10 (CIE Whiteness).** The light source is filtered to simulate the spectral power distribution of the D65 Illuminant. This procedure conforms to ISO 11475, used to obtain a CIE Whiteness evaluation.
- **UV C (ISO Brightness).** The light source is filtered to simulate spectral power distribution of the C Illuminant. This procedure conforms to ISO 2470, used to calculate Brightness.
- **Calibrator.** Identifies the current position of the adjustable UV filter. This is expressed as a percent of the filter extended into the light source path.

UV Cutoff Filter Options

The options below control the selection of *UV cutoff filters* included with the instrument. They are used when evaluating fluorescent samples:



- **100% UV(Filter off).** The UV component in the light source is included. This is the condition of instruments that are not fitted with UV filters.
- **0% UV(Filter FL40).** This is a fixed filter that excludes wavelengths below 400nm. It is the recommended filter position for the *UV-excluded* condition, when evaluating the whiteness of fluorescent samples.
- **Filter FL42.** This is a fixed filter that excludes wavelengths below 420nm.

- **Filter FL46.** This is a fixed filter that excludes wavelengths below 460nm. This selection can be used to identify molecules that absorb energy in shorter wavelengths of the visible spectrum (i.e., above 460nm) and re-emit it in the longer wavelengths (i.e., above 560nm). These wavelengths are associated with the yellow, orange or red regions of the visible spectrum. It is not used for whiteness evaluations.

Auto Zoom

This feature is not enabled.

Transmittance

Some instruments include an option to measure the transmission properties of transparent and translucent samples. This feature is used to measure the *regular* transmittance of transparent solid and liquid samples, as well as the *total* and *diffuse* transmittance of translucent samples.

NOTE

The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}. See *the instrument manual for instructions to install accessories needed to measure transmittance.*

A transmittance measurement is also used for the following evaluations:

- Measurement of haze, in compliance with *ASTM D1003 Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics*. This is used to evaluate materials that exhibit slight light scattering.
- Measurement of the yellowness of transparent, liquid materials, in compliance with the APHA₁₀ Color Scale.

Click on this check box to activate transmittance measurements.

NOTES

- For some instruments an additional **Medium Area View (MAV)** aperture plate is provided for transmission measurements. It is treated with a special barium coating, and **must be used for all transmission measurements.**
- A **Spectralon™ white plaque** is provided for use during transmission calibration. It is similar to the white calibration standard used for reflectance calibration. This white plaque **must be used for transmission calibration,** and for all transmission measurements made using a white tile at the instrument port.
- The sample placement in the transmission chamber depends on the procedure you are trying to execute. Refer to the procedure for instructions regarding whether the sample is placed *close to the lens* or *close to the integrating sphere*. See also the instrument user's guide for instructions to *position the sample properly in the transmission chamber.*
- The APHA₁₀ Color Scale procedure requires a special calibration and measurement procedure.

To calibrate the instrument for transmittance measurements:

1. If the barium-coated MAV aperture plate is included with your instrument, place this plate at the instrument port, and select the MAV aperture condition on the calibration window.
2. Open the transmission compartment and make sure the optical path between the sphere and the lens is clear.
3. Access the calibration procedure in the program you are running.
4. When you are prompted by the program, block the lens using the black card.
5. When the measurement is completed, remove the black card from the transmission compartment.
6. Place the white Spectralon™ plaque at the sample port, and start the next measurement. For some instruments a special white Spectralon® plaque is provided for transmission applications.

NOTE

The white plaque remains at the port for all subsequent measurements.

Calibration Time Interval

This determines when the instrument needs to be recalibrated. This can be customized to the needs of the application. The program will automatically prompt you to recalibrate the instrument when the interval has elapsed. The default is 8 hours. We recommend that as the maximum interval to be set.

Calibration Condition

Identifies the current measurement conditions set for the instrument.. This includes aperture/lens selection, specular port position, UV filter position (where applicable).

Calibration Time

Displays the date and time of the last calibration.

Abs. White Button

Click on this button to view/edit the white tile data used for instrument calibration. The calibration depends upon the accuracy of the white tile data that is used by the program. The values displayed in this option must be the reflectance values for the white tile used for calibration. They are provided on a CD or diskette included with the instrument. A physical copy of the values for the white calibration tile is also provided for reference.

The white tile data must be installed during system setup. *See also Introduction to Datacolor TOOLS, Installing White Tile Data for instructions.*

If the wrong values are used:

- Comparisons of measurements made on the same instrument at different times are not valid
- Comparisons of measurements made using different instruments are not valid

Separate white tile values are stored for *Specular Component Included* and *Specular Component Excluded*.

View Calibration Values

To access the white tile calibration values:

1. Select **Instrument Menu, Calibrate, Abs White**. The window below displays:

Wavelength (nm)	Value								
360 nm	61.736	440 nm	87.097	520 nm	89.771	600 nm	90.585	680 nm	90.829
370 nm	68.448	450 nm	87.513	530 nm	90.017	610 nm	90.625	690 nm	90.786
380 nm	73.487	460 nm	88.120	540 nm	90.123	620 nm	90.614	700 nm	90.920
390 nm	78.231	470 nm	88.582	550 nm	90.309	630 nm	90.614	710 nm	90.896
400 nm	81.965	480 nm	88.926	560 nm	90.381	640 nm	90.556	720 nm	90.832
410 nm	84.340	490 nm	89.140	570 nm	90.414	650 nm	90.373	730 nm	90.855
420 nm	85.741	500 nm	89.464	580 nm	90.408	660 nm	90.465	740 nm	90.813
430 nm	86.674	510 nm	89.623	590 nm	90.424	670 nm	90.733	750 nm	90.724

- **Wavelength Start.** Identifies the lowest wavelength for which calibration data is stored.
- **Wavelength End.** Identifies the highest wavelength for which calibration data is stored.
- **Wavelength Interval.** The distance in nanometers between the reported wavelengths. For most instruments the wavelength interval is 10nm.
- Calibration data is generated for both SCI and SCE conditions.

NOTE

The tile data is generated for use on a wide range of instruments having different wavelength ranges and always includes wavelengths 360 – 390nm and 710nm – 750nm. The program only uses the wavelength data relevant for your instrument.

Edit Calibration Values

The reflectance value for an individual wavelength can be edited by doing the following:

1. Select **Instrument Menu, Calibrate, Abs White**.
2. Select the specular port position (*Specular Component Included* or *Specular Component Excluded*) to be used.
3. Place the cursor in the wavelength field to be edited.
4. Delete the old value and enter the new value.
5. Repeat this for each wavelength to be edited.
6. When you are finished, click **Save** to make the changes permanent.

NOTE

Changing these values has a significant impact on the measurements. You should only edit these values if they do not match the printed values for the calibration tile you are using. If you enter incorrect values, the measurements you generate will not be valid!

Gloss Table

Datacolor TOOLS offers a gloss compensation feature. Enabling the gloss option requires that additional tables be installed on to the system. The gloss data is included on the diskette/CD that contains the white tile data.

1. Click on **Instrument Menu, Calibrate, Abs White** button to view the gloss values being used.

The screenshot shows the 'Calibrate' dialog box in the Datacolor TOOLS software. The interface is divided into several sections:

- Specular:** Radio buttons for 'Include' (selected), 'Exclude', and 'Gloss'.
- Aperture:** Radio buttons for 'Large' (selected), 'Medium', 'Small', 'Ultra Small', and 'Extra Ultra Small'.
- UV-Filter:** Radio buttons for '100 % UV (Filter off)' (selected), '0 % UV (Filter FL40)', 'Filter FL42', 'Filter FL46', 'UV D65/10 (Ganz-Griesser)', 'UV D65/10 (CIE Whiteness)', 'UV C (ISO Brightness)', and 'Calibrator'.
- Values:** Input fields for '68.0', '52.1', and '90.0' are visible next to the UV-Filter options.
- Buttons:** 'Calibrate', 'Cancel', 'Abs.white...', and 'Gloss table...' are located on the right side.
- Checkboxes:** 'Auto-Zoom' is checked, and 'Transmittance' is unchecked.
- Calibration time interval (hours):** A text box containing the value '8'.
- Calibration condition:** A text box for 'Calibration condition:' and another for 'Calibration time:'.

The window below displays:

	DeltaY	GLOSS
1. Point	0.440	10.100
2. Point	1.190	27.000
3. Point	1.690	50.300
4. Point	2.890	74.600
5. Point	3.290	79.500
6. Point	3.540	86.600
7. Point	4.710	91.300
8. Point	4.770	94.400

NOTE

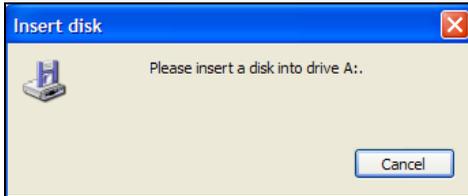
If the fields are empty, the gloss data has not been installed. See *Installation of Gloss Data* below for instructions to install the data.

The *Aperture* and *Geometry* fields on this screen identify the conditions associated with the data displayed on the screen. Each aperture/gloss geometry combination uses a different set of factors to correct the measurement for gloss differences.

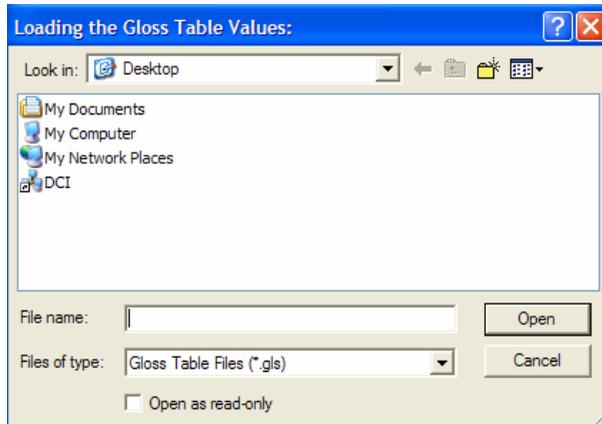
- **Aperture.** This corresponds to the aperture associated with the gloss data displayed.
- **Gloss Geometry.** This corresponds to the geometry associated with the gloss data displayed.

Installation of Gloss Data

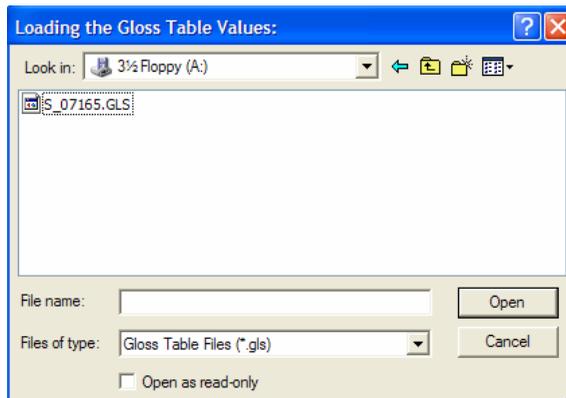
If you click on the **ABS White button** and no gloss data exists, the program will prompt you for a diskette containing the gloss information.



- If you are using a diskette, place it in the drive. The installation procedure will resume immediately.
- If you are using the CD, click **Cancel**. A dialog box will display allowing you to browse to the correct drive and folder:



You are looking for a file with a *.gls extension.



2. Highlight the file and click **Open**. The gloss data will be installed.

NOTE

This data is typically only loaded once. See also *Applications Technology, Gloss Compensation for a detailed explanation of the gloss compensation feature.*

After the data is copied from the diskette, the gloss value table is displayed.

Instrument Setup

This window provides access to 5 tabs that allows you to configure the instrument for measurement. It includes an array of software options for instrument calibration and diagnostic tests.

NOTE

The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.

Instrument Setup

This tab provides access to the basic instrument configuration. It includes the selection of instrument type, communications port and other basic information about the instrument you are using.

- To access this option, select **Instrument Menu, Instrument Setup**. The *Measurement Main Window* opens, and the Instrument Setup tab is displayed.

Measurement conditions:

1... Specular: INCL 2... Aperture: LAV 3... Flashes: 2
4... UV %: 68.00 6... Cut-off: NONE

Single Multiple Until Tol. Calibrate Instruments Setup General Options UV

Instrument type: SF600 : DCI Spectraflash 600

Driver requested: Unispef32.dll

Communication parameters: COM1:19200,N,8,2

Communication port: COM1
Bits per Seconds: 19200 Advanced...
Data bits: 8
Parity bit: N
Stop bit: 2

Serial Number: 123455

Save Setup Close

Current Measurement Conditions

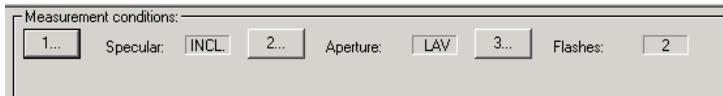
The fields at the top of the window, numbered 1-6, display the current selections for the instrument.

- **Specular.** Identifies whether the specular port is closed (**Specular Component Excluded**) or open (**Specular Component Included**).
- **Aperture.** This is a selection of the measurement port opening and lens position. Some instruments offer multiple apertures sizes while others are have a single, fixed size and lens position.
- **Flashes.** Identifies the number of times the light will flash for each measurement. Using multiple flashes enhances the illumination of the sample, and is typically used when measuring dark samples. The default is 1 and the maximum number of flashes is 9.
- **UV %.** Identifies the current position of the adjustable UV filter. Only valid for instruments equipped with an adjustable UV filter. *See also Applications Technology, UV Calibration and Whiteness Options for a detailed discussion of this feature.*
- **Cutoff.** Identifies the cutoff UV filter currently in position. When no cutoff filter is select, NONE displays in this field. Only valid for instruments equipped with an UV cutoff filters. *See also Applications Technology, UV Calibration and Whiteness Options for a detailed discussion of this feature.*

Editing Measurement Conditions

To change any of the current conditions:

1. Click in the numbered button (1, 2 or 3) for the measurement condition.



A dialog box similar to the one below displays:

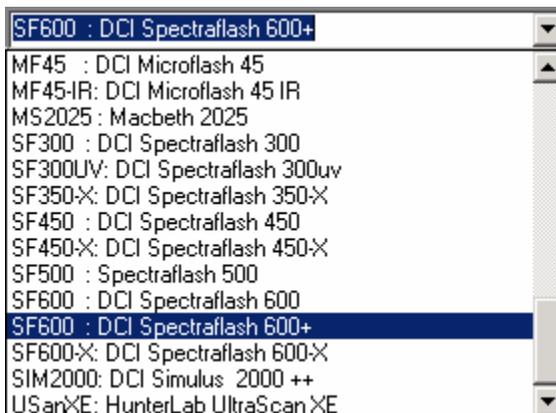


2. Make the required changes and click **OK**. The dialog box will close, and the Measurement Main Window will be displayed.
3. On the Measurement Main Window, click **Save Setup** to save the changes. The new conditions will become the active conditions.

Instrument Type

This field is used to identify the instrument you are using.

1. On the Instrument Setup tab, click the down arrow next to the *Instrument Type* field to display the list of available instruments,.
2. To view the complete list of instruments, move the scroll bar on the right up/down.
3. When the correct instrument displays, click to highlight it.



Communications Port

This field identifies the port connected to the instrument.

NOTE

If you are connected to a USB port, the USB port is assigned to a com port. See also the *instrument User's Guide, USB Cable Installation for instructions to obtain the com port assignment for the port.*

- Click the down-arrow next to the Communication Port field to view the available ports. Click to highlight the port to be used.



Serial Number

This field identifies the instrument serial number.

1. In the *Serial Number* field, enter the serial number of the instrument. (For Datacolor instruments, this is usually on a label on the back of the unit.)

Serial Number	7165
---------------	------

2. When all selections are made, click the **Save Setup** button.

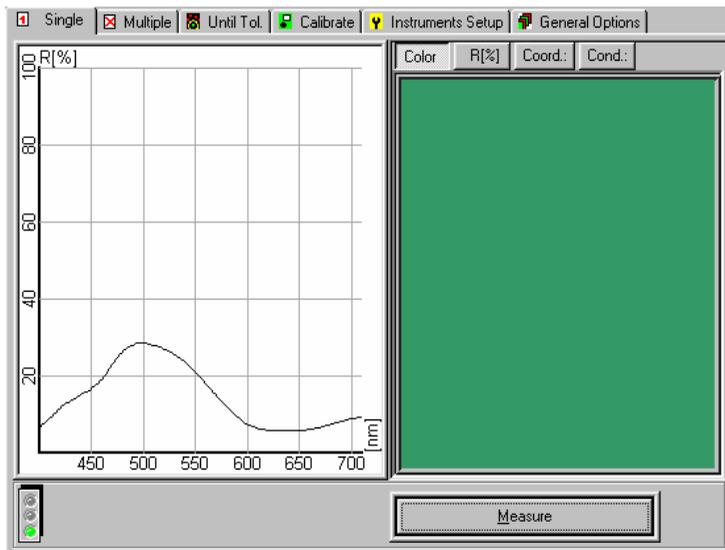
Single Tab

This tab allows you to make a single measurement. There is no capability to enter a sample name, or store the data. It can be used to quickly check the measurement of a sample, without leaving the Instrument Menu. This window provides several options for displaying the spectral and colorimetric data from the measurement.

1. In the Measurement Main Window, click the **Single** tab.
2. Position the sample at the instrument port, and click **Measure**.
3. The buttons in the right window pane control the type of data to be displayed (**Color**, **R%**, **Coordinates**, **Condition**). Click a button to select a display type.

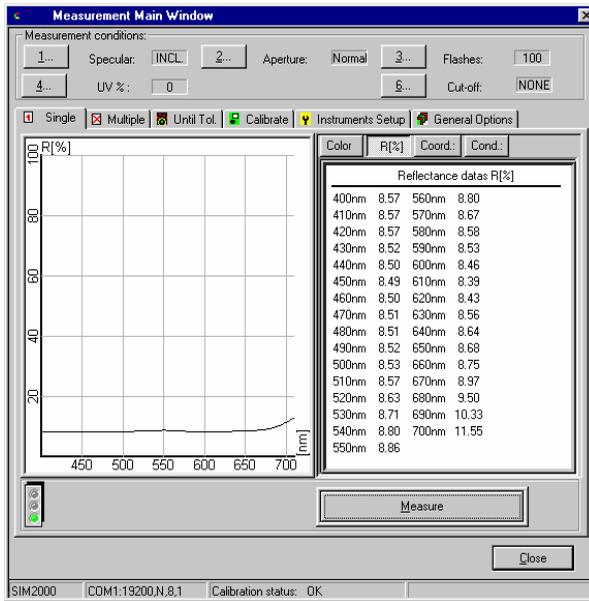
Color

Displays a reflectance curve plot and a color patch for the measured sample.



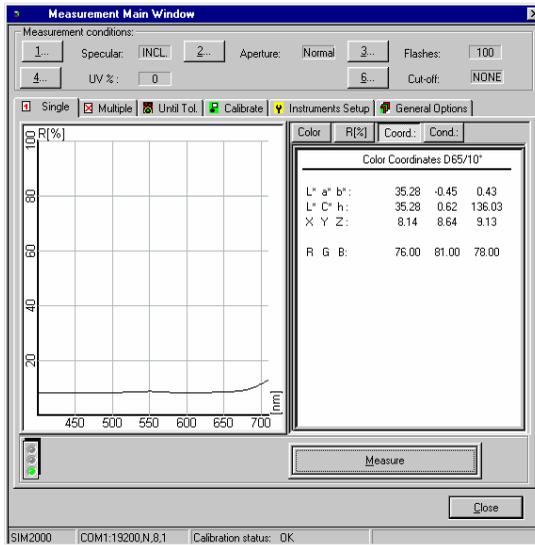
R%

Displays a reflectance curve plot and reflectance values for the measured sample.



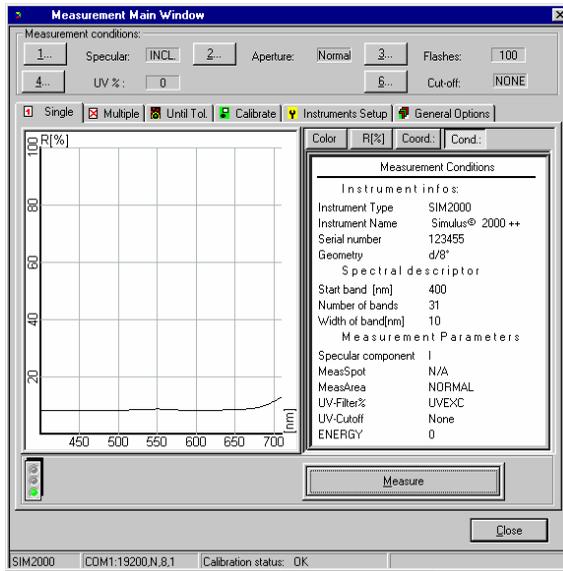
Coord

Displays a spectral curve, and the color coordinates for the measured sample.



Cond

Displays instrument conditions for the measured sample.



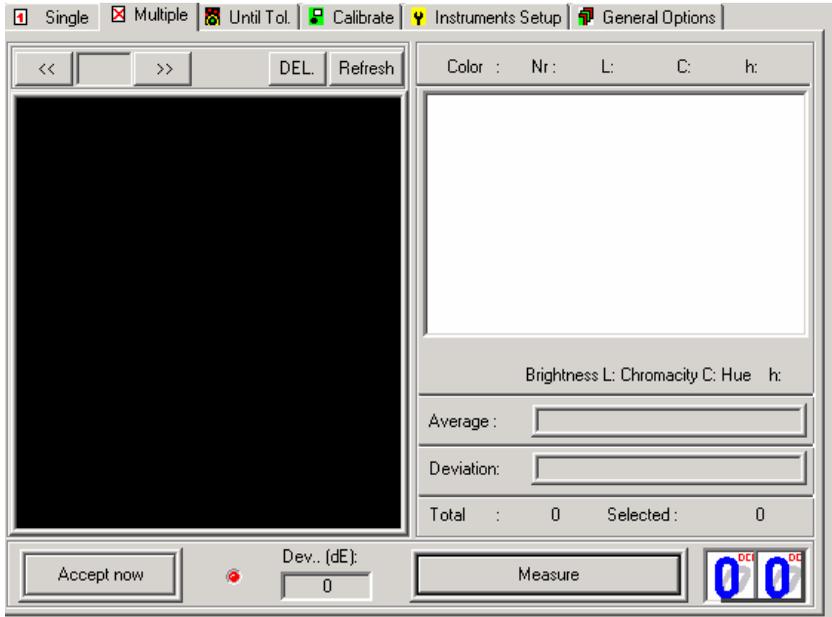
Multiple Tab

This tab provides a diagnostic tool that evaluates the accuracy of averaging a series of measurements to describe a single sample. One use of this option is to verify that the number of measurements being averaged produces a representative measurement of the sample. This is useful when measuring textiles, textured paint, and other samples whose surface is not uniform.

This option executes the number of scans defined for multiple measurements and calculates the standard deviation between the composite scan and each individual scan included. The standard deviation should be significantly lower than the acceptability tolerance you are using to evaluate the sample.

The number of scans to be averaged can be determined using the *Until Tolerance* feature. Once the number of scans is identified, you can define the number of scans to be used for multiple measurements (**Instrument Setup, General Options**). You can use this feature to quickly check whether the standard deviation between measurements is at an acceptable level across a larger sampling of colors.

Below is the Multiple tab window:



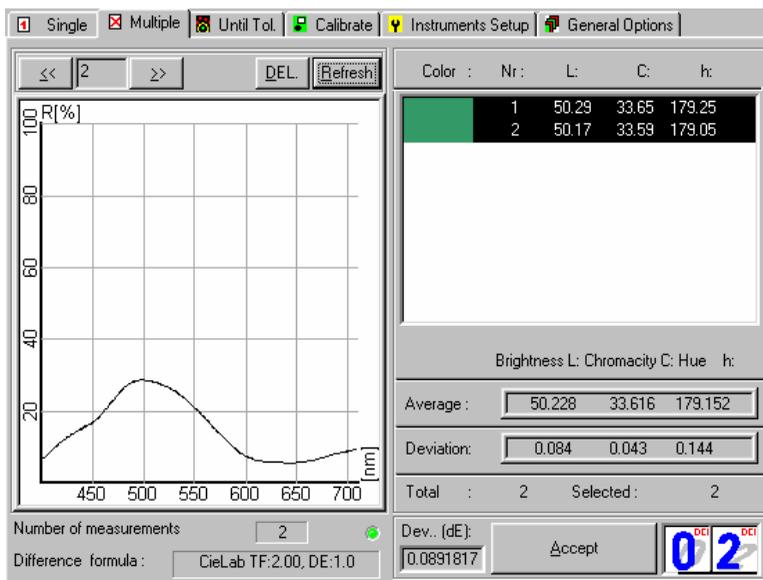
NOTES

- The measurements made in this option are not named.
- The measurements made in this option are not stored, and cannot be retrieved for use at a later time.
- The measurements made in this option do not appear on the desktop.
- The number of measurements used for measurement averaging is selected in the **General Options** tab.

To start the measurement process, do the following:

1. Position the sample at the port. You may want to track the orientation of the sample by placing an arrow or some other marking on the back of the sample.
2. Click the **Measure** button.

3. For the next measurement, reposition the sample at the port, and click the **Measure** button again. After each measurement, the average of the scans is calculated. The deviation between each individual scan is calculated, based on L, C, h values, and is expressed as Delta E. There is also a counter displaying how many measurements have been taken.
 - To exclude an invalid measurement, highlight the invalid measurement, and click the **DEL** button.
 - To recalculate the average after a measurement is deleted, click the **Refresh** button. The *Average* and *Deviation* information is recalculated.
4. Click **Accept** to accept the results. This stops the measurements and includes the last calculated average.



NOTE
The number of measurements to be used for measurement averaging on the desktop is entered from the *General Options* tab.

Until Tolerance Tab

When multiple measurements need to be averaged for a single sample, this option is used to determine the number of measurements required to accurately describe the sample. It is commonly used to establish a procedure for measuring samples that do not have a uniform surface. A color difference tolerance is used to specify the amount of deviation that an individual measurement can introduce into the average measurement. When the deviation is less than the specified tolerance, the averaged measurement is an acceptable representation of the sample.

NOTE
The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.

This procedure requires a minimum of two (2) measurements. To start the measurement process:

1. Place the sample at the instrument port, and click the **Measure** button.
2. When the measurement is completed, the fields containing colorimetric data will be updated. Reposition the sample, and click the **Measure** to start the next scan.
3. Repeat the sequence. When the tolerance is satisfied, the label on the *Measurement* button changes to *Accept*. The number of readings performed is displayed in the lower right corner of the window. Note the number of measurements made, and click **Accept**. The window will close and the desktop is displayed.

Buttons on the Until Tolerance Window

- **VCR Buttons.** Allows you to browse through the scans made for the current sample.
- **DEL.** Allows you to delete an individual scan from the measurement. When you know that there is an error in an individual scan, you can delete it rather than repeating the entire procedure.
- **Refresh.** Resets the display.
- **Accept Now.** This allows you to accept the composite measurement regardless of whether the tolerance has been met.
- **Measure/Accept.** This button is used to start each individual scan. When the tolerance has been satisfied, the button label changes to **Accept**. Click on **Accept** to complete the procedure.

Calibrate Tab

This option starts the calibration procedure. When selected the calibration window displays:

The screenshot shows the 'Calibrate' dialog box. It features several sections: 'Specular' with radio buttons for 'Include' (selected), 'Exclude', and 'Gloss'; 'Aperture' with radio buttons for 'Large' (selected), 'Medium', 'Small', 'Ultra Small', and 'Extra Ultra Small'; a checked 'Auto-Zoom' option; 'UV-Filter' with radio buttons for '100 % UV (Filter off)' (selected), '0 % UV (Filter FL40)', 'Filter FL42', and 'Filter FL46'; a 'UV D65/10 (Ganz-Griessen)' field with a value of '68.00'; a 'UV D65/10 (CIE Whiteness)' field; a 'UV C (ISO Brightness)' field with a value of '0.00'; a 'Calibrator' field with a value of '0.00'; a '% remaining part of UV' label; a 'Transmittance' checkbox; a 'Calibration time interval (hours):' field with a value of '8'; and 'Calibration condition:' and 'Calibration time:' labels at the bottom. On the right side, there are 'Calibrate', 'Cancel', 'Abs white...', and 'Gloss table...' buttons.

See also *Instrument Menu, Calibrate* for information on the fields in the window, and for step-by-step instructions to perform the calibration.

NOTE

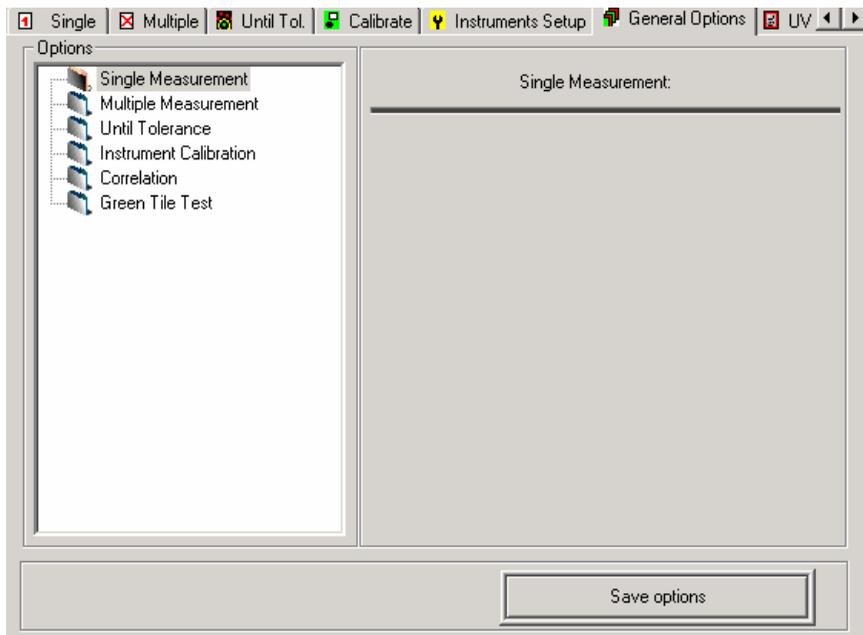
The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.

General Options Tab

The fields on this tab define the parameters used for single measurement, multiple measurements, until tolerance, instrument calibration, correlation and green tile test options.

NOTE

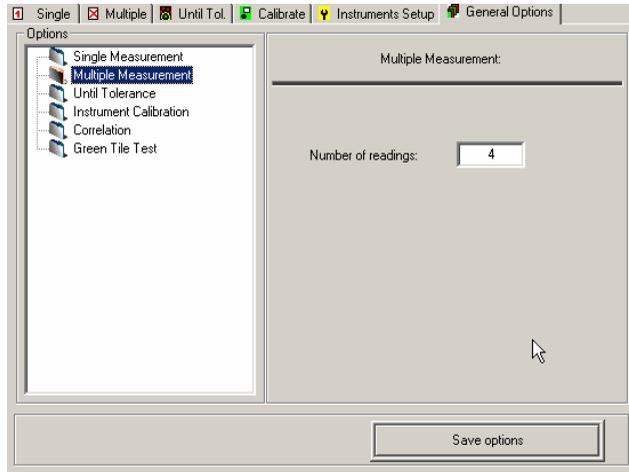
The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.



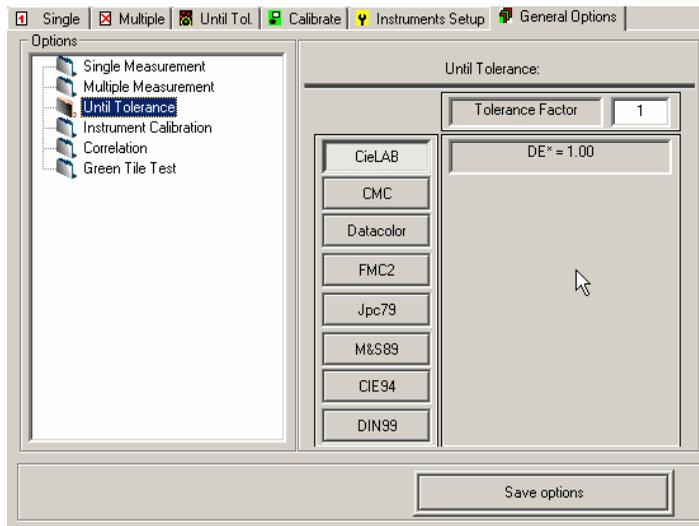
To view the fields for each option, click on the option heading in the left window.

- **Single Measurement.** *There is currently no user input for this option.*
- **Multiple Measurements.** This window specifies the number of default readings to take when multiple measurements are used. This information is used when the standard or batch measurement type is set to *Instrument Averaging*.

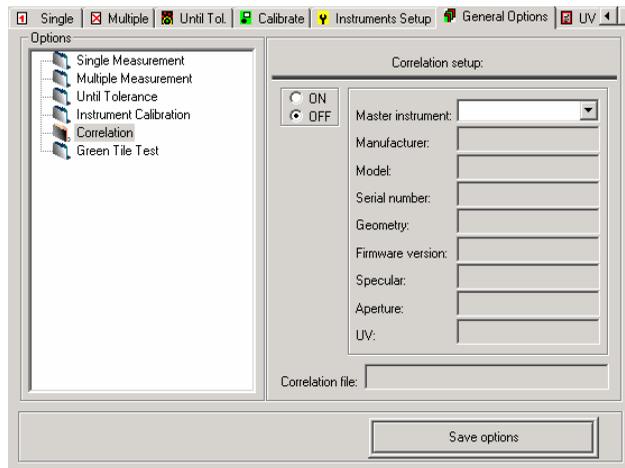
See also Datacolor TOOLS Desktop, Measuring Samples for information to enable measurement averaging for the standard and batch.



- **Number of Readings.** Enter the number of scans to be averaged for a single sample.
- **Save Options.** Click on this button to save any changes you have made.
- **Until Tolerance.** When you are running the *Until Tolerance* option you need to set an acceptability tolerance factor. *See also Instrument Menu, Instrument Setup, Until Tolerance Tab for a detailed explanation of this feature.*

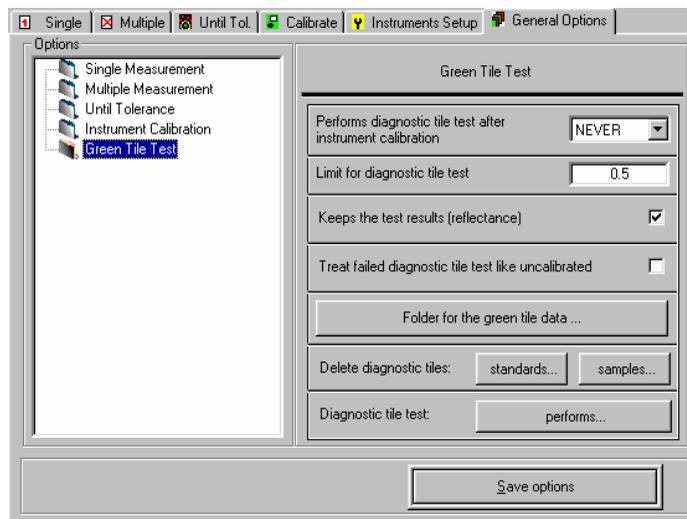


- **Color Space Selection.** Click on the color difference equation to use (e.g., CIELAB, CMC, etc.).
- **Tolerance Factor.** To change the size of the tolerance, enter a different value into the *Tolerance Factor* field. In the example above, the CIE Lab DE* tolerance of "1" will be multiplied by "1".
- **Save Options.** If you have made any changes, you must click on this button to activate the changes.
- **Correlation.** The fields on this window enable/disable the instrument correlation feature, and provide information required to use the option. *It is only valid for systems that use the Datacolor MAESTRO program.*



- **ON/OFF.** Click in the *On* field to enable correlation. Click in the *Off* field to disable instrument correlation. When enabled, every measurement made will be adjusted based on the correlation data in the file identified at the bottom of the window.
- **Master Instrument.** You must identify the master instrument. This is the instrument used to generate the master measurements for the reference tile set. Click on the down arrow, and make the selection.
- **Manufacturer.** Identifies the manufacturer of the instrument being correlated.
- **Model.** Identifies the model of the instrument being correlated.
- **Serial Number.** Identifies the instrument serial number of the instrument being correlated.
- **Geometry.** Identifies the measurement geometry used by the instrument to generate the correlation data.
- **Firmware version.** Identifies the firmware version used to generate the correlation data.

- **Specular.** Identifies the specular port selection used to generate the correlation data.
- **Aperture.** Identifies the aperture plate used to generate the correlation data.
- **UV.** For UV-enhanced spectrophotometers, identifies the position of the UV filter/cutoff filter used to generate the correlation data.
- **Correlation File.** Identifies the set of correlation data being used.
- **Instrument Calibration.** *Not currently enabled.*
- **Green Tile Test Setup.** A green diagnostic tile is included with most Datacolor instruments, and is used to perform a routine check on the instrument during calibration. This option sets up the parameters for the diagnostic test. It also provides the ability to store the diagnostic test results together in a single location.



- **Performs diagnostic tile test after instrument calibration.** Options include the following:
 - Never.* Following the normal calibration procedure, the program does not ask for the measurement of the diagnostic tile.
 - Always.* Following the normal calibration procedure, the program asks for a measurement of a diagnostic tile. This is the default selection.
 - Optional.* Following the normal calibration procedure, the user chooses whether or not to measure the diagnostic tile.
- **Limit for diagnostic tile test.** This defines the acceptable color difference between the current measurement of the diagnostic tile and the stored measurement of the tile. It is expressed in CIEL*a*b* values.

- **Keeps the test results (reflectance).** Saves the measurement results of every green tile test.

NOTES

- In the textile database structure, the diagnostic test data is stored into the database.
- In the pigment database structure, the diagnostic test data is stored in an ASC file format that can be accessed by other 3rd party software programs.
- *See also Program Features, The Datacolor TOOLS Database for a discussion of the database structure.*

- **Treat failed diagnostic tile test like uncalibrated.** If the diagnostic tile test exceeds the Delta E limit, it flags the instrument as *not calibrated*.
- **Folder for the green tile data.** Defines the folder name to store all diagnostic tile measurements.
- **Delete diagnostic tiles.** Two options are available:
 - Standards.* When selected, the program deletes the first stored measurement of the diagnostic tile from a data folder.
 - Samples.* When selected, deletes one or more subsequent measurements of the diagnostic tile from a data folder.
- **Diagnostic tile test.** *Currently disabled.*
- **Save options.** Saves the changes to green tile test setup.

UV Calibration Tab

For instruments that have adjustable UV filters, this tab allows you to calibrate the UV filter position.

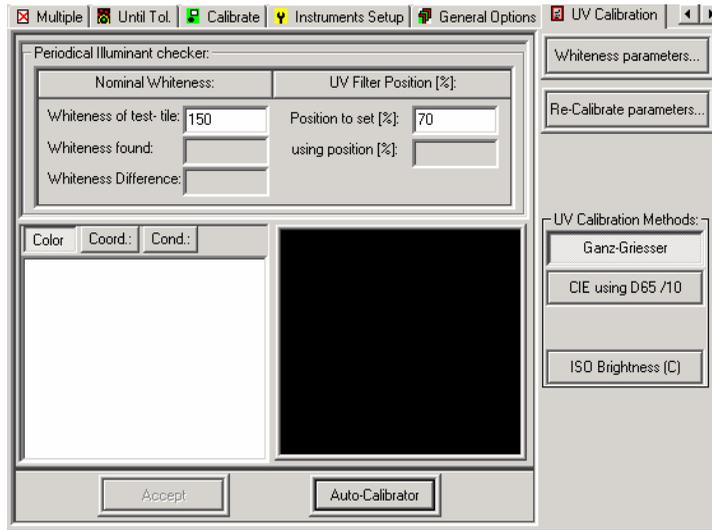
See also Applications Technology, UV Calibration and Whiteness Options for a detailed discussion of this feature, and all program options that are used.

NOTE

The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.

To access this option:

- Select **Instrument Menu, Instrument Setup, UV Calibration Tab**. The window below displays:



Fields on the UV Calibration Tab

Nominal Whiteness

- **Whiteness of Test Tile.** Enter *the target whiteness value* for the fluorescent calibration standard you are using. If you are using the Illuminant Checker provided by Datacolor, the target values are included on a sheet labeled *Instrument Ultra Violet Calibration*.

There are several different filter calibration procedures. The calibration procedure you are using determines the target value you should use for the calibration (e.g., ISO Brightness, Ganz-Griesser, etc.). Check to be sure you are using the correct target value. *See also Applications Technology, UV Calibration and Whiteness Options for a complete discussion of this option.*

- **Whiteness Found.** Displays whiteness value calculated for the fluorescent standard during UV calibration. This value must be within 1.5 units from the target whiteness in order for the calibration to be successful. When there is more than 1.5 units' difference, the program repositions the UV filter, and you must perform the calibration again.

- **Whiteness Difference.** This is the difference between the target *whiteness* value entered for the test tile, and the whiteness value currently measured for the test tile. When this value is less than 1.5 units, the UV filter is in the correct position and the calibration is successful. If the value is greater than 1.5 units, the program repositions the UV filter, and you must perform the calibration again.

UV Filter Position

- **Position to Set.** Rather than entering a target value for the UV calibration standard, you can enter a filter position, and calculate the resulting target value for the calibration standard.
 - Enter a starting filter position for the UV calibration. This value is expressed in percent, with *0* indicating that none of the UV light is filtered from the source, and *100* indicating that the UV light in the source is completely excluded.
- **Using Position.** This is the UV filter position used to generate the current value for the test tile.

Buttons

- **Auto Calibrator.** Click this button to start the UV calibration.
- **Whiteness Parameters.** This option is used to store or edit the Ganz-Griesser whiteness constants specific to your instrument.

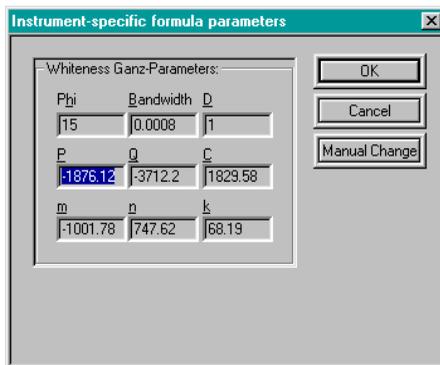
Storing Whiteness Parameters

NOTES

- These values must be stored when you receive the instrument. They should only be changed if the instrument undergoes a major repair, if you change instruments, or if you obtain a new set of Hohenstein samples to generate new parameters.
- For Datacolor instruments, these values are supplied on the *Instrument Ultra Violet Calibration* form supplied with the instrument.

To enter these values into the program:

1. From the main window, move to the menu bar and select **Instrument, UV Calibration Setup, Ganz-Griesser Parameters**. The Instrument-specific formula parameters dialog box displays.



2. Click the **Manual Change** button. Enter the Ganz-Griesser values from the Instrument Ultra Violet Calibration sheet, supplied with your instrument.
3. When all values have been entered, click **OK**.

Once the parameters are entered, you can perform the Ganz-Greisser filter calibration and the Ganz Whiteness evaluation.

Recalibrate Whiteness Parameters

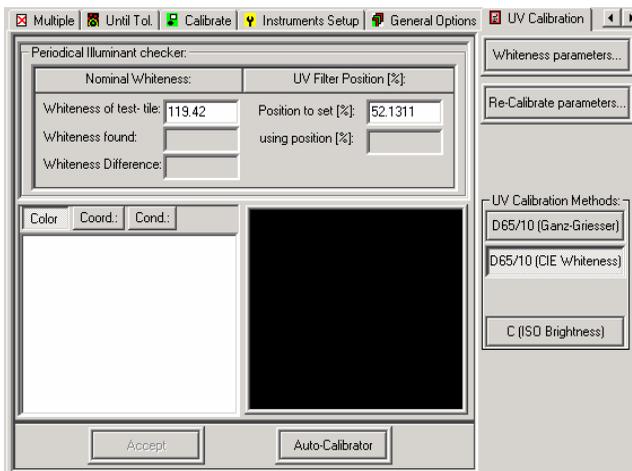
This option is used to generate instrument-specific Ganz-Griesser values. It requires a set of *Hohenstein* standards designed specifically for the Ganz-Griesser calibration. This procedure is typically performed once for an instrument to generate the parameters. These parameters are then input into the program, and used during the Ganz-Griesser filter calibration procedure. *See also Applications Technology, UV Calibration and Whiteness Options for a complete discussion of this option.*

- If you have purchased your instrument from Datacolor, **you do not have to perform this calibration.** The parameters are generated at the factory, and are included on the *Ultra Violet Certification* sheet. However, they must be entered into the program. *See Whiteness Parameters* for instructions to enter the Ganz-Greisser parameters specific to your instrument.
- If Datacolor did not supply your instrument, or if you need to recalibrate the whiteness parameters, you must use the standards specifically produced for the Ganz-Griesser calibration, and run this program option. If you must generate the Ganz-Greisser parameters, follow the instructions below to generate the parameters.

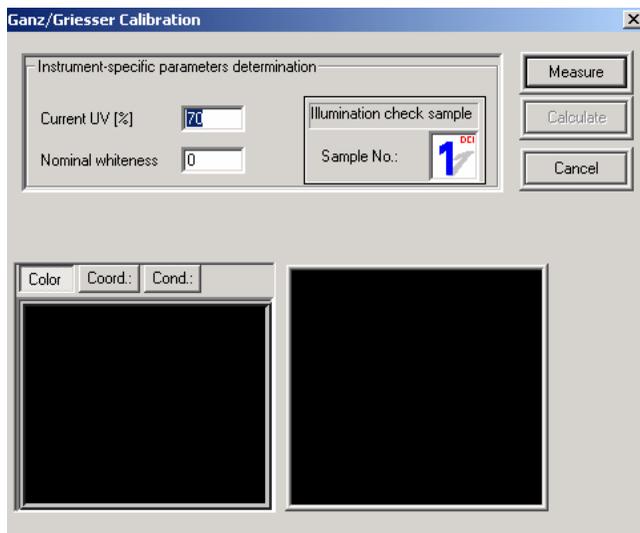
To generate these instrument-specific values:

1. Obtain a set of Hohenstein textile samples.
2. Calibrate the instrument using your normal UV calibration condition. If this is the first time that you are doing a Ganz-Griesser calibration, use the default UV filter position.

- From the main window, move to the menu bar, and select **Instrument Menu, Instrument Setup, UV Calibration Tab**. The window below displays:

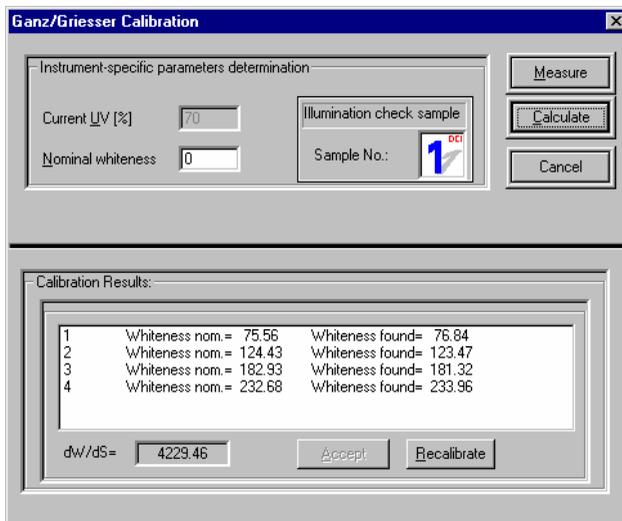


- Select **Re-calibrate Parameters**. The window below displays:



- The **Current UV %** field displays the current UV filter position. This number indicates the portion of the UV filter extended into the light path. If this is the first time that you are performing the calibration, use the default setting. If you have previously performed this calibration procedure, use the value from the previous calibration.

6. The whiteness samples must be input in order of lowest to highest target value. Start with the sample having the lowest whiteness value first. Input the Ganz-Griesser Whiteness Value of the first sample into the field for **Nominal Whiteness**.
7. Place the first whiteness sample at the instrument port and click on the **Measure** button. The measurement will be taken and the Sample No. will increment to 2.
8. Enter the whiteness value for the next sample, and then measure that sample. Continue this process until you have input at least 4 samples. The maximum number of samples is 12. When you have input the minimum number of samples, the **Calculate** button will become available.
9. After you have input all your samples, click on the **Calculate** button. This calculates the dW/dS and the whiteness values of the samples based on your UV filter position.



10. The dW/dS should be 4000 +/- 10. If it is within these limits, the **Accept** button will be available. Click **Accept** to save the values for use with Ganz-Griesser calibration, and the calculation of Ganz-Griesser whiteness and tint values.
If the dW/dS is outside the required limits, click on the **Recalibrate** button. The program selects a new position for the UV filter. You must then repeat the measurements.

11. Follow the procedure until dW/dS is within limits (a value of 4000 +/-10), and click **Accept**. The program will store the Ganz-Greisser Parameters that have been calculated.

NOTES

- If the dW/dS is too low, there is too much UV in the light. The program will decrease UV% to reduce the amount of UV. If the dW/dS is too high, there is not enough UV in the light. The program increases the UV %.
- When you select **Recalibrate**, the program expects to receive the samples in the reverse order from the last presentation. For example, if sample #4 is the last sample presented, the program will expect #4 to be the first sample presented in the new procedure. If you select **Recalibrate** a third time, the program reverses the order of the samples again, and sample #1 becomes the first sample presented in the sequence.
- When you select **Recalibrate**, the program retains the nominal whiteness value for each of the samples presented. You do not have to enter them again.

To view the new Ganz-Greisser parameters:

- Click the **Whiteness Parameters** button on the UV Calibration tab. The dialog box below displays:

Whiteness Ganz-Parameters:		
Phi	Bandwidth	D
15	0.0008	1
P	Q	C
0	0	0
m	n	k
0	0	0

These are the Ganz-Griesser instrument-specific parameters. Use the **Manual Change** button to enter new values from the keyboard.

NOTE

If you have generated new Ganz-Griesser parameters, we recommend that you record these values for reference purposes.

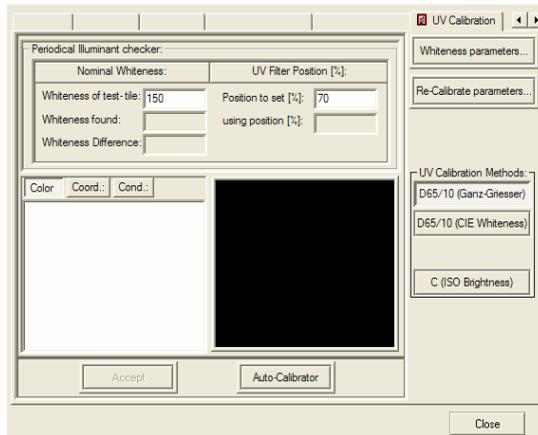
UV Calibration Methods

Three calibration procedures are available to calibrate the adjustable UV filter. The whiteness evaluation you run defines which of the calibration procedures to use. See also *Applications Technology, UV Calibration and Whiteness Options for a complete discussion of this option.*

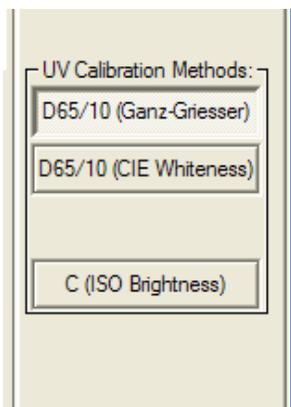
NOTE

The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.

1. Select **Instrument Menu, Instrument Setup, UV Calibration** tab. The window below is displayed:



Three buttons on the right pane are used to select the UV calibration procedure to be used.



2. Click on the UV calibration method to use.

3. In the *Whiteness of Test Tile* field, enter the target whiteness value for the fluorescent standard. This value changes depending on the UV calibration selected. **Be sure that you use the whiteness value that corresponds to the calibration method selected.**
4. Place the fluorescent calibration standard at the port and click **AutoCalibrator**. The standard is measured. The Whiteness Found, and Whiteness Difference values are updated.
 - **Whiteness Found.** Displays the whiteness value for the fluorescent standard, based on the new measurement.
 - **Whiteness Difference.** This is the difference between the target *whiteness* value entered for the test tile, and the whiteness value currently measured for the test tile. When this value is less than 1.5 units, the UV filter is in the correct position and the calibration is successful. If the value is greater than 1.5 units, the program repositions the UV filter, and you must perform the calibration again.
5. When the whiteness value is within the acceptable range, the *Accept* button is enabled. Click **Accept** to complete the calibration.

See also Applications Technology, UV Calibration and Whiteness Options for a detailed discussion of the UV filter calibration options and their applications.

Measurement Mode

This function specifies whether you want to take measurements manually or automatically, at timed intervals. It allows you to repeat the same measurement over time, and evaluate the repeatability of the measurement.

NOTES

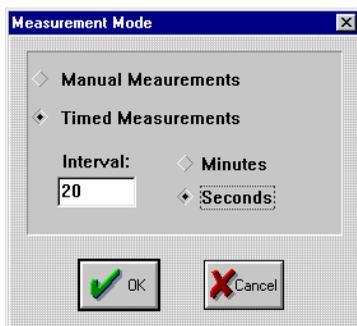
- The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.
- The settings here are applied to batch measurements only. You must manually measure, or recall a standard before you initiate this option.
- To use this option, you must add two buttons, **Start Timed Meas** (Timed Meas On) , **End Timed Meas** (Timed Meas Off) to the Datacolor TOOLS button bar. *See also Editing Button Bars for instructions to add these buttons.*
- The **Timed Meas On** and **Timed Meas Off** command buttons are found on the screen form *QC INPUT - Diagnostic*. They can also be added as command buttons to a form.
- We recommend that you enable batch auto numbering for this feature. *See also Batch Menu, Batch Defaults for instructions to configure this option.*

To configure the measurement mode:

1. Move to the menu bar, and select **Instrument Menu, Measurement Mode**.



The Measurement Mode dialog box is displayed.



- **Manual measurements.** Allows the user to initiate a measurement either from the software or from a measure button on an instrument.
- **Timed Measurement.** Automatically sets the instrument to take measurements at an interval specified by the user. When the Timed Measurements option is selected, you must complete the following fields:
 2. Click the radio button for the preferred measurement type: *Manual* or *Timed*.
 3. If you have selected **Timed**, you must specify an interval.
 - In the *Interval* field, enter the time interval.
 - Click the appropriate interval: Minutes or Seconds. (In this example, the interval is set to 20 seconds.)
 4. When all selections/entries are made, click **OK**.

This option is initiated as follows:

1. Recall the standard to the desktop.
2. Click the **Timed Meas On** command button on the desktop.
3. Measure or retrieve the standard to be used. The batch measurements will automatically follow, and continue at the specified interval.
4. To stop timed measurements, click the **Timed Meas Off** button.

Measurement Conditions Setup

For most applications you will need more than one measurement condition to perform all of the color and appearance evaluations required. For example, you may use a *Large Area View* aperture to measure production standards, but may need to switch to a *Small Area View* aperture to measure a smaller sample provided by a customer. This feature allows you to create multiple conditions, calibrate multiple measurement conditions, and switch between the measurement conditions.

NOTE

The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.

The information entered into this option includes the following information for each calibration condition:

- Aperture size
- Position of the specular port (Specular Component Included (SCI), or (Specular Component Excluded (SCE).
- UV filter position settings

NOTE

This option should be used by all applications performing whiteness evaluations on fluorescent samples. *See also Applications Technology, UV Filter Calibration and Whiteness Options for additional information.*

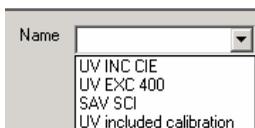
Select an Existing Measurement Condition

To view, edit, or select a measurement condition already stored, do the following:

1. Click on **Instrument Menu, Measurement Conditions Setup**. The window below displays:



2. Click on the drop-down list arrow in the *Name* field to display the conditions stored:

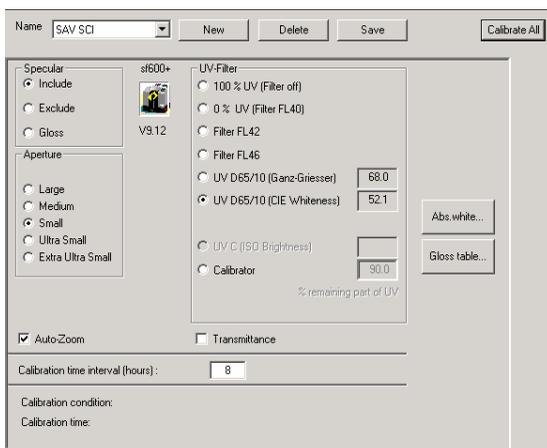


3. Click on one of the conditions. The window will refresh, and display the details stored with the condition selected: You can edit, delete, or set the selected measurement condition as **Current**.

Store a New Measurement Condition

To store a new condition:

1. Enter a name in the *Name* field, and click the **New** button. The screen refreshes, displaying all of the fields needed to define a new measurement condition:



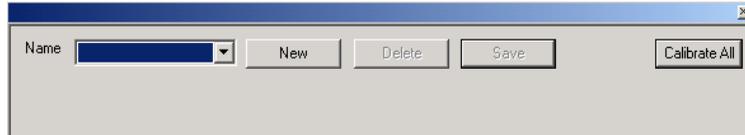
2. When all of the selections are made, click **Save**.

See *Instrument Menu, Calibrate, Fields on the Calibration Window* for details on each field that displays in this window.

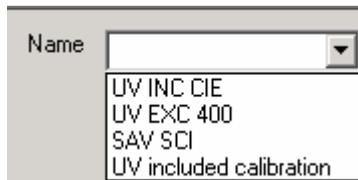
Delete Measurement Condition

To delete a measurement condition stored in the system:

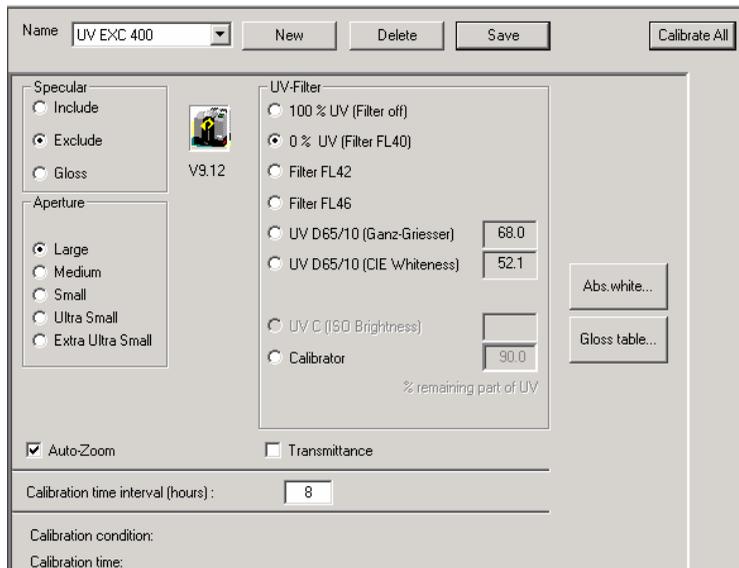
1. Click on **Instrument Menu, Measurement Conditions Setup**. The window below displays:



2. Click on the down arrow in the *Name* field to list the stored measurement conditions.



3. Click to highlight the measurement condition to be deleted. The screen will refresh, and all of the settings for the condition will be displayed.



4. Click **Delete**.

Save Measurement Condition

This option can be used to save a new measurement condition, or to save changes made to a measurement condition previously stored.

1. Click on **Instrument Menu, Measurement Conditions Setup**. The window below displays:



2. Click to highlight the measurement condition to be deleted. The screen will refresh, and all of the settings for the condition will be displayed.
3. When you are finished making changes on the Measurement Condition window, click on the **Save** button.

Set As Current

You must set one of the stored measurement conditions as *current*. This will be the measurement condition the program expects to use for all measurements. Each time you make a measurement, the program will verify that the correct aperture plate, lens selection and specular port position are being used for the *current* condition.

NOTES

- If you change the *current* measurement condition, the program may prompt you to change the aperture plate at the port.
- You may also be required to calibrate the instrument when the measurement condition changes. *See also Instrument Menu, Calibrate All for instructions to calibrate multiple measurement conditions at the same time.*

To enable a measurement condition as *current*, do the following:

1. Click the drop-down list arrow in the *Name* field, and highlight the measurement condition to be the active condition:



2. Click the **Save As Current** button at the bottom of the window.

3. Click **Close**.

NOTE

Some of the whiteness evaluations used in textile and paper applications require two measurements of the sample, using two different measurement conditions. When these options are run, the program will override the *Current* calibration condition selected here. *See also System Menu R457 Brightness Setup, and Applications Technology Advanced Options, UV Calibration and Whiteness Options for more information on the software configurations needed to perform these evaluations.*

Calibrate All

If you routinely use several different measurement conditions, you need to calibrate the instrument for each of the measurement conditions you use. This feature automates that calibration process. When you select **Calibrate All**, every measurement condition you have stored will be calibrated. This should be done once every 8 hours to keep the instrument calibrated for every condition you use.

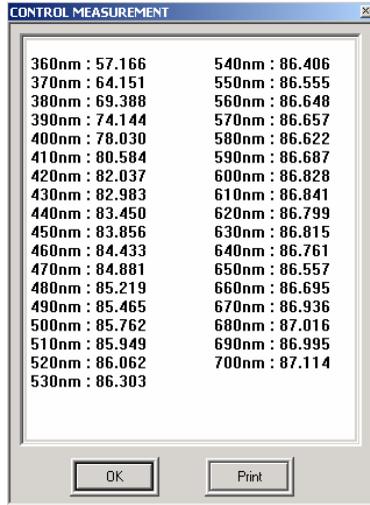
NOTES

- The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.
- A **Calibrate All** button can be added to the button bar. *See System Menu, Edit Button Bars for instructions to add/change the buttons on the button bar.*
- **Calibrate All** does *not* reset the UV filter position for changes in the UV content of the light source. It performs the standard instrument calibration, using the standard (non-fluorescent) white tile as the calibrating standard, and the current position for the adjustable UV filter. If your instrument is fitted with an adjustable UV filter, the UV filter calibration is performed separately. It is accessed from Instrument Menu, UV Calibration Setup.

Calibrate All Procedure

1. Select **Instrument Menu, Calibrate All** or click the **Calibrate All** button on the button bar.
2. The program will perform the normal instrument calibration, prompting you for the correct aperture plate for each condition, as well as the black trap, white tile and diagnostic tile.

The white tile is measured for each measurement condition. If the diagnostic (green) tile test is not enabled, the screen below displays after the first white tile measurement.



3. Do not remove the white tile. Click **OK**. This will begin the measurement of the white tile for the next measurement condition. This is repeated for each measurement condition stored in the program.

NOTES

- The black trap is measured once, regardless of the number of measurement conditions to be calibrated.
 - If the program prompts you for the diagnostic tile, go to step #5 below.
 - If the next measurement condition requires an aperture change, the program will prompt you to switch the aperture plate.
4. If you have the diagnostic tile test enabled, the program will not display the *Control Measurement* dialog box. Instead, it will prompt you for the diagnostic (green) tile.



5. Do not remove the green tile. Click **OK**. The green tile will be re-measured for the next measurement condition, and this window will display again. This is repeated for each measurement condition stored in the program.

6. When the procedure is completed, the instrument does not have to be calibrated for 8 hours, unless you add a new measurement condition.

See also **Instrument Menu, Measurement Condition Setup** for instructions to create and edit multiple measurement conditions.

Surface Correction Setup

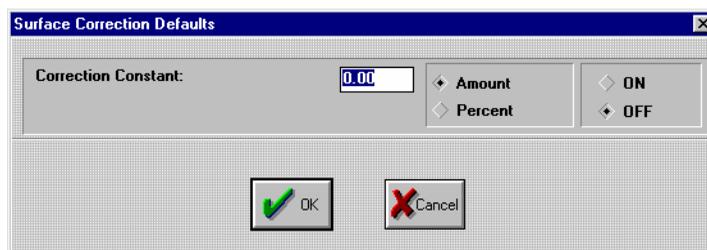
This function provides the user with the ability to automatically adjust *spectral data* when a sample is measured. Each time a measurement is taken, the spectral data is adjusted by the correction constant (specified in reflectance units) at each wavelength.

NOTE

The capability to measure a sample is disabled for Datacolor TOOLS^{WORKSTATION}. Surface Correction Setup is disabled for Datacolor TOOLS^{QCX}.

To access this option:

1. Select **Instruments, Surface Correction Defaults**. The Surface Correction Defaults dialog box is displayed.



- **Correction Constant.** Enter the number you want to use as the correction factor. A positive number adds energy to the curve, and a negative number subtracts energy from the curve.
 - **Amount or Percent.** Indicates if the correction constant represents a percent or an amount. Click the radio button for the applicable value.
2. To enable the option, click the radio button for **ON**. Click **OFF** to disable the surface correction option.
 3. When all selections/entries are made, click **OK**.

NOTE

When enabled, the adjustment is made to the next measurement(s). Measurement data for current samples on the desktop are not adjusted when this option is activated. The unadjusted measurement data is stored to the database.

UV Calibration Setup

This option is used to select the UV calibration procedure to use. See also *Applications Technology, UV Calibration and Whiteness Evaluations* for a detailed explanation of the UV filter calibration, and the procedure for correctly implementing the whiteness options.

NOTE

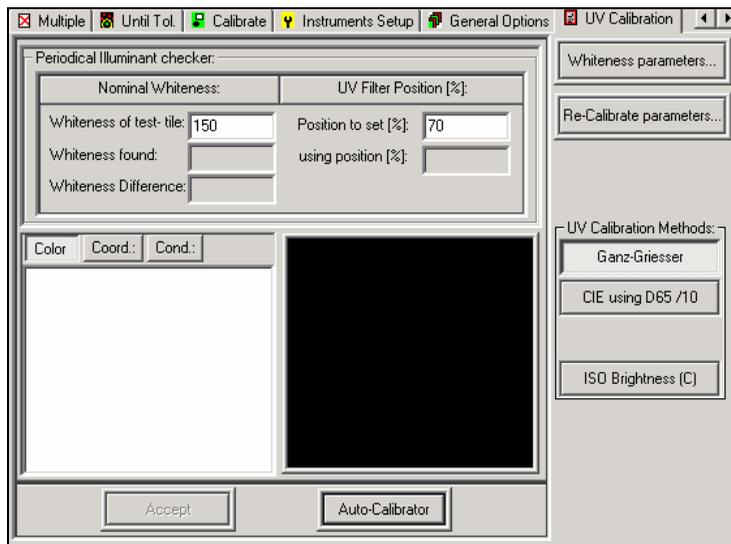
The capability to measure a sample is disabled for Datacolor TOOLS^{WORKSTATION}.

1. Select **Instrument Menu, UV Calibration Setup**. The following window displays:



There are several *UV Calibration Methods* displayed. The procedure you are using determines the calibration method and target value you should use (e.g., ISO Brightness, Ganz-Griesser, etc.). Refer to the whiteness standard you are using to determine the calibration method and target value to be used.

2. Select one of the calibration procedures.



- **UV D65/10 (CIE Whiteness).** When this calibration is performed, the light source is filtered to simulate the spectral power distribution of the D65 illuminant. This is the procedure to use for performing a CIE Whiteness evaluation (ISO 11475). The CIE target whiteness is used. When using the fluorescent calibration tile provided by Datacolor, the Paprican Standard D65/10 Whiteness value is used.

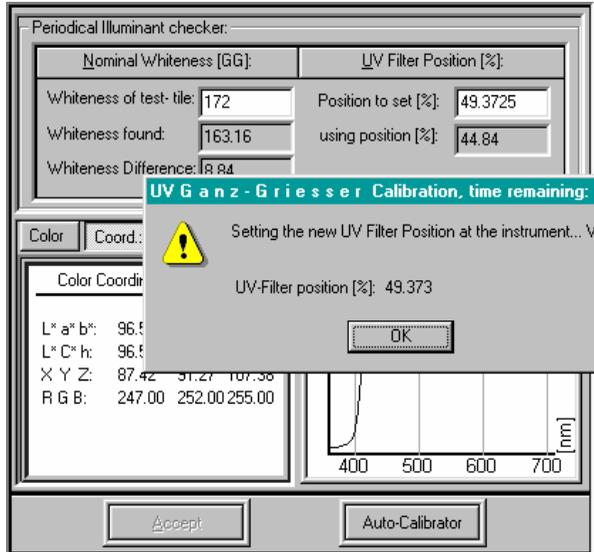
NOTE

If you are trying to stay consistent with CIE Whiteness values generated using Datacolor legacy products, you must use the D65/10 CIE Whiteness* value listed on the instrument *Ultra Violet* certificate. If you do not, any comparison between historical CIE Whiteness values and current values is **NOT** valid.

- **UV C (ISO Brightness).** The light source is filtered to simulate the spectral power distribution of Illuminant C. This is the procedure used for ISO 2470 (Brightness). The ISO target whiteness is used. When using the fluorescent calibration tile provided by Datacolor, the Paprican Standard C/2 ISO Brightness value is used.
 - **UV D65/10 (Ganz-Greisser).** This procedure uses the Ganz-Greisser calibration method. Ganz-Greisser is a separate calibration procedure using a specific equation and instrument-specific factors to determine the correct position of the UV filter. The light source is filtered to simulate Illuminant D65, and the target whiteness value is based on 10° Standard Observer data. The Ganz-Greisser whiteness value for the fluorescent calibration standard is used as the target value. When using the fluorescent calibration tile provided by Datacolor, the D65/10 Ganz-Greisser Whiteness value is used.
3. **Ganz-Greisser Parameters.** This is not a UV calibration option. This selection displays the current Ganz-Greisser Parameters. *See Instrument Menu, Instrument Setup, UV Calibrator Tab, Whiteness Parameters for details on this option.*

In the *Whiteness of Test Tile* field, enter the whiteness value appropriate for the UV calibration method you are using.

4. Click the **Autocalibrator** button to begin the calibration. The instrument will measure the fluorescent calibration standard and calculate the *Whiteness Found* using the procedure you have selected. This value is compared to the target value
- If the *Whiteness Difference* is more than 1.5 units, the UV filter position must be changed.
 - On instruments with automatic UV filter wheels, the software can automatically change the UV filter position to adjust the amount of UV in the light source. A message will be displayed, indicating the filter position is being changed.



- For instruments that require a manual adjustment of the UV filter, the program will pause to allow time for you to manually adjust the filter position.

5. When the *Whiteness Found* is within 1.5 units from the *Whiteness Test* value, the *Accept* button at the bottom of the window becomes active.

The current filter position displays in the *Using Position %* field. This value is saved, and the filter remains in this position until the next UV filter calibration.

6. Click the **Accept** button to stop the calibration procedure.

See *Instrument Menu, UV Calibrator Tab* for a detailed explanation of each field on the UV calibration window.

See also *Applications Technology, UV Calibration and Whiteness Options* for step-by-step instructions to configure the program to calibrate the adjustable UV filter and perform whiteness evaluations.

R457 Brightness Setup

R457 Brightness (ISO 2470/Tappi) and CIE Whiteness (ISO11476) each specify the use of two measurements:

- Sample measured with adjustable UV filter properly calibrated.
- Sample measured with 395nm cutoff filter in place. For Datacolor instruments, the FL40 (400nm cutoff) is used.

This option is specifically designed for these evaluations. It allows you to select two measurement conditions for use with **each** of the evaluations. When you enable either of the selections, and select a form to perform the evaluation (e.g., *QC INPUT*, *Paper 457 Brightness*), the program will use these measurement conditions and measure each sample twice. This saves you the step of manually changing the current measurement condition for each measurement required by the procedure.

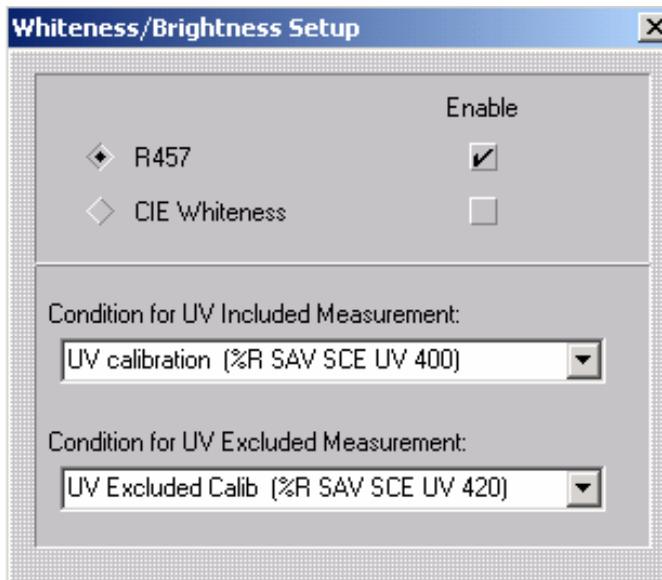
NOTES

- R457 Brightness/CIE Whiteness is not enabled for Datacolor TOOLS^{QCX}.
- The capability to measure samples is disabled for Datacolor TOOLS^{WORKSTATION}.
- The measurement condition you have *Set As Current* on the Measurement Conditions Setup window is overridden when these options are enabled. When they are disabled, the condition you have *Set As Current* again becomes the current condition.

See also *Applications Technology, UV Calibration and Whiteness Options for step-by-step instructions to configure the program to calibrate the adjustable UV filter and perform whiteness evaluations.*

To access this option, do the following:

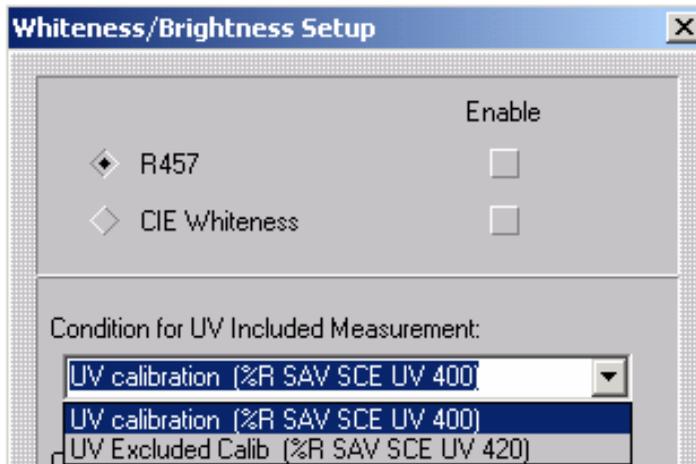
1. Click on **Instrument Menu, R457 Brightness Setup**. The window below displays:



2. Select two measurement conditions for each whiteness evaluation.

Fields on the Whiteness/Brightness Window

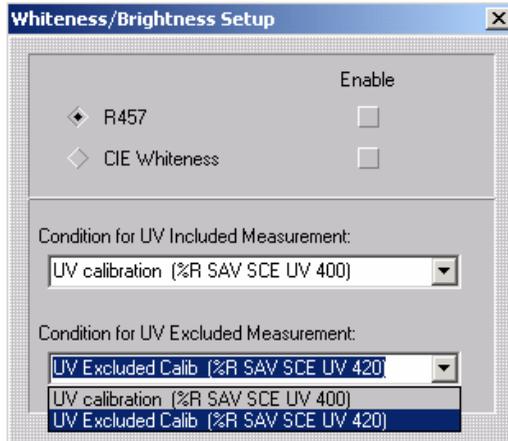
- **R457/CIE Whiteness.** To select the measurement conditions for R457 Brightness, click the radio button for R457. To select the measurement conditions for CIE Whiteness, click the radio button for CIE Whiteness.
- **Enable/Disable.** You must enable and disable the use of these selections. The measurement condition you have *Set As Current* in the Measurement Conditions Setup (**Instrument Menu, Measurement Conditions Setup**) window is overridden when these options are enabled. When they are disabled, the condition you have *Set As Current* again becomes the current condition.
- **Conditions for UV Included Measurement.** Click on the down arrow to view the available measurement conditions. The condition you select should be one of the UV filter calibration options.



NOTE

The R457 and CIE Whiteness procedures must share the same condition for the *UV Included* measurement.

- **Conditions for UV Excluded Measurement.** Click on the down arrow to view the available measurement conditions. The condition you select should be one of the UV cutoff filter options.



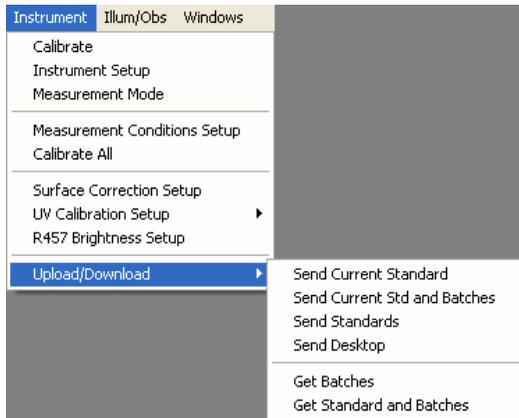
NOTE

The R457 and CIE Whiteness procedures can use different conditions for the *UV Excluded* measurement.

See also Applications Technology, UV Calibration and Whiteness Options for instructions to configure the program to calibrate the adjustable UV filter, and to perform these whiteness evaluations.

Upload Download

The upload/download options offer two types of functions to move data between the portable instruments and the Datacolor TOOLS desktop.

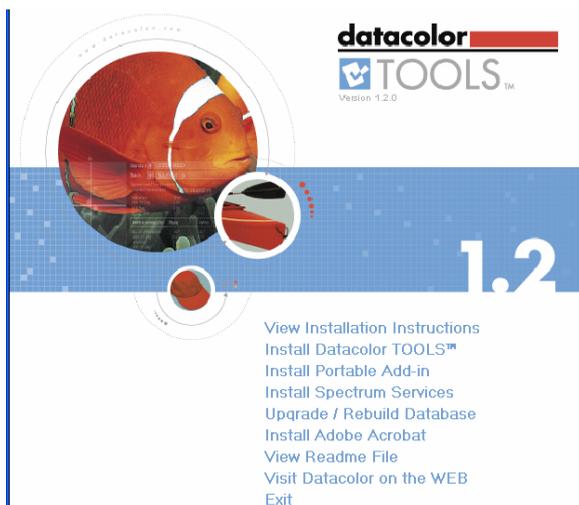


- **Send Options.** These options send data from the TOOLS desktop to the portable unit.
- **Get Options.** Transfer data from the portable unit to the TOOLS desktop.

The instruments supported by this option include:

- Datacolor CHECK (all models)
- Mercury (all models)
- Datacolor 110P
- Microflash. This instrument only accesses two options on the submenu, *Send Standards* and *Get Batches*.

You must install an additional program module to activate the upload/download feature. The program module, *Install Portable Add-In*, is found on the Datacolor TOOLS CD:



NOTE

If the *Send/Get submenu* is grayed out, you are missing the Portable Add-In program module.

To install this module:

1. Close TOOLS and launch the Datacolor TOOLS CD.
2. From the installation menu, click **Install Portable Add-In**. The module will install.

Microflash Requirements

- **Firmware.** The Microflash must have firmware with a version number of 4.02 or later. Earlier firmware does not communicate properly with Datacolor TOOLS.
- **Measure / Trigger button.** The Microflash *Trigger* mode should be set to **Auto** with firmware versions 4.02 or later. The *Auto* setting will allow the Microflash trigger or fire button to activate standard or batch reads.
- **Communication Parameters / Baud Rate.** The Microflash firmware is set up for 9600 baud rate, when the Microflash is in *Host* mode. The baud rate (Instrument Menu, Instrument Setup), should also display **9600**. A dropdown list box is available to change it, to agree with the baud rate displayed on the Microflash Host Mode screen.

Data Transfer Procedure for Microflash

To transfer the data, you must do the following:

1. Place the Microflash in *Host* mode (see below).
2. Run Datacolor TOOLS.
3. From the **Instrument Menu**, select **Upload/Download, Send or Get** options, depending on the work you are doing. *See also Send Options and Get Options in this section for details to execute these functions.*

To place the Microflash in Host mode, do the following:

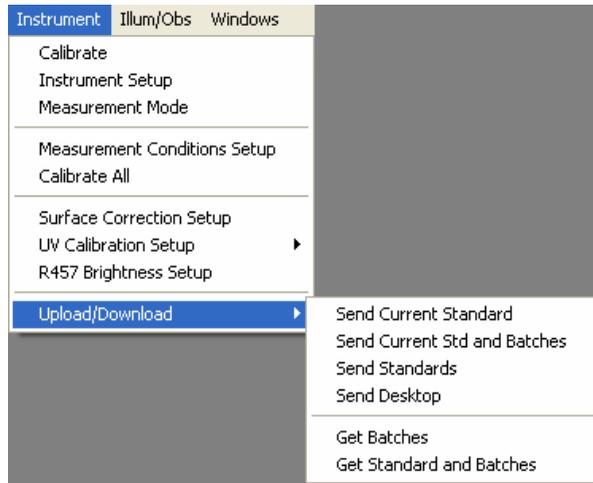
1. Press the **MENU** button to get to the **SETUP** menu.
2. Press the **SETUP** button.
3. Use the **↑** and **↓** buttons to highlight "Host Mode".
4. Press the **SEL** button.

You are now in data transfer "Host Mode" on the Microflash.

Data Transfer Procedure for Datacolor CHECK, 110P and Mercury

To access these options:

- Click **Instrument Menu, Upload/Download**. A submenu is displayed:



NOTES

- You must have the instrument attached to the system to activate these options.
- For Mercury, Datacolor 110P and Datacolor CHECK models, you must install the Palm® software to perform the synchronization. This is found on a Palm CD included in the shipment. This must be installed **before** the Datacolor Portables program.
- For Mercury, Datacolor 110P and Datacolor CHECK models, you must install the Datacolor Portables or the Mercury Desktop program on the system to operate the feature. This must be installed **after** the PALM software. It is found on a CD supplied by Datacolor.
- The first time a Mercury, Datacolor 110P, or Datacolor CHECK instrument is synchronized with the system, the synchronization runs twice.

Send Options

These options are used to transfer data from the TOOLS desktop to the portable unit.

NOTES

The program may find duplicate standard and/or batch names on the portable unit during this transfer. When this happens, the data on the portable is automatically overwritten by the data sent from TOOLS.

If you are using a Microflash, you can only use *Send Current Standard* or *Send Standards* options.

Send Current Standard

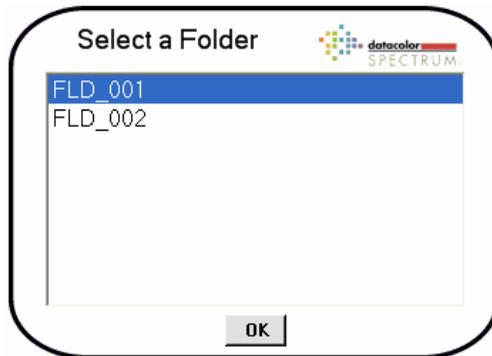
This option sends only the current standard. It will not transfer any batches associated with the standard, or any other standards on the desktop.

1. On the TOOLS desktop, measure or retrieve the standard to be transferred to the portable unit.
2. Click on **Instrument Menu, Upload/Download, Send Standard**.

NOTE

If the instrument is not attached, the user is prompted to connect the instrument. This completes the procedure for Microflash users. There are no options to select folders or standards on a Microflash.

3. If there are multiple folders on the Mercury or Check instrument, the program will prompt you to identify the folder where the information is to be stored on the unit:

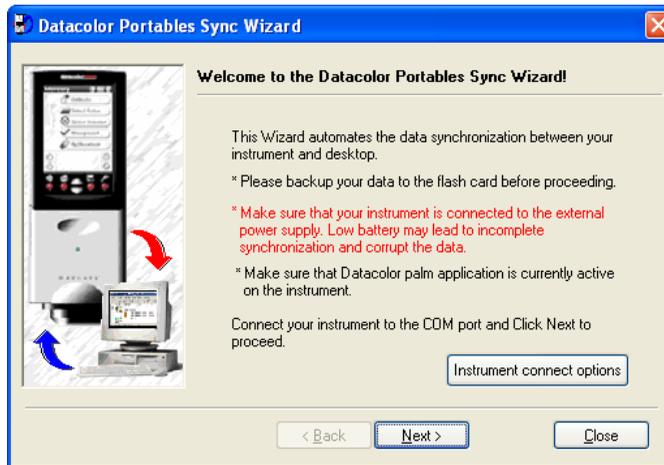


4. Highlight the folder and click **OK**.

NOTE

This dialog box does not display if there is only a single folder. If the standard already exists on the portable unit, it will be overwritten by the data sent from TOOLS.

The Datacolor Portables Sync Wizard will be displayed.



The *Instrument connect* options button is used to troubleshoot the connection when communication between the instrument and the system is not successful.

5. Click **Next**. The synchronization starts.



NOTE

The first-time synchronization will include some additional screens. See also *First Time Synchronization* in this section for the additional prompts displayed during the initial synchronization.

When the synchronization is finished, the dialog box below is displayed:



6. Click **Close**. The Sync Wizard closes. The data can be found on the portable unit, in the designated folder.

Send Current Standard and Batches

This option transfers a single standard and all associated batches on the TOOLS desktop to the portable unit. See also **Send Current Standard** for step-by-step instructions to complete this function.

NOTE

This option is not available for Microflash users. If a duplicate name exists on the portable, it is automatically overwritten with the data sent from TOOLS.

Send Standards

This option transfers all standards from the TOOLS desktop to the portable unit. Batches are NOT included in the transfer. See also **Send Current Standard** for step-by-step instructions to complete this function.

Send Desktop

This option transfers **all data** on the TOOLS desktop to the portable units. See also **Send Current Standard** for step-by-step instructions to complete this function.

NOTE

This option is not available for Microflash users. If a duplicate name exists on the portable, it is automatically overwritten with the data sent from TOOLS.

Get Options

This group of options transfers data from the portable unit to the TOOLS desktop. In both the TOOLS program and the Datacolor Portables/Mercury Desktop program, batches are always associated with a standard. This connection between standards and batches is preserved in the data transfer option. As a result, on the TOOLS desktop, you must select the standard associated with the batches to be transferred, as the active standard on the desktop. If you do not select the correct standard:

- You may receive an error message that the data transfer cannot be completed
- The data may be transferred and attached to the wrong standard on the TOOLS desktop.

Get Batches

This option transfers data from the portable instrument to the TOOLS desktop. It transfers batches for a single standard. This option does not transfer any standards from the portable to the TOOLS desktop. You must have the correct standard selected.

NOTES

- If you are using a Microflash, you must select each standard on the TOOLS desktop, and repeat this procedure for each group of batches that you are transferring to TOOLS.
 - If you are using a Datacolor CHECK or Datacolor 110P and need to transfer batches for several standards on the portable, you should use **Get Standards and Batches**.
1. Open TOOLS and verify that the standard associated with the batches to be transferred is on the desktop.
 2. Click **Instrument Menu, Upload/Download, Get Batches**.
 - *Microflash* users. The process will be completed without any additional screens or prompts displayed.

- *Datacolor CHECK/Datacolor 110P* users. The Sync Wizard is displayed:



3. Click **Next**. The synchronization starts.



When the process is completed, the window below is displayed:

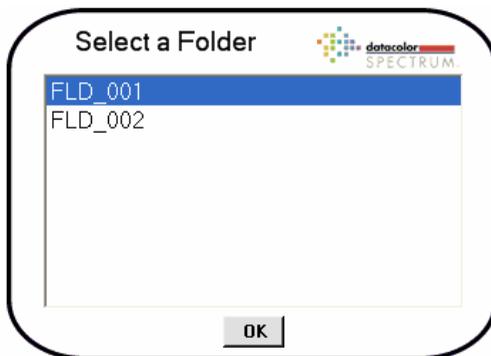


4. Click **Close**.

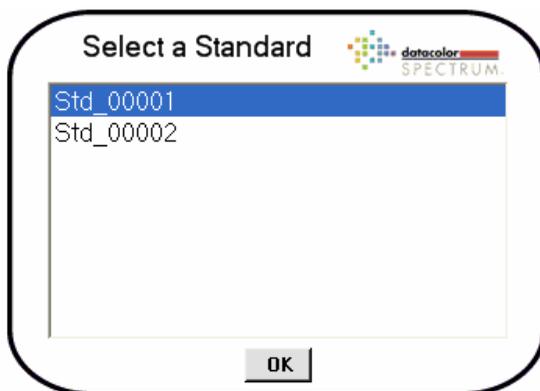
The program matches the standard on the TOOLS desktop with the batches transferred from the portable unit.

- If no standard exists on the TOOLS desktop, you will be asked for the folder containing the data to be transferred.
- If the standard name on the TOOLS desktop is found in several folders on the portable unit, you must select the folder containing the data to be transferred.

In either instance, the window below displays.



5. Click on the folder data to be transferred, and then click **OK**. If no standard is specified on the TOOLS desktop, you must identify the standard associated with the batches to be transferred. In this case, the dialog box below is displayed:



6. Make the selection, and click **OK**. The transfer is completed, and the batches are sent to the TOOLS desktop.

NOTE

This process is done individually for each folder. If you want to transfer the data from another folder, you must repeat the entire synchronization procedure.

Get Standards/Batches

This option transfers all standards and batches from the portable unit to the TOOLS desktop.

NOTES

- This option is not valid for Microflash.
- If the standard already exists on the TOOLS desktop, you may see a duplicate standard warning during this procedure. You must direct the system regarding the action to be used for the duplicate.
- If any of the batches already exist on the TOOLS desktop, you may see a duplicate batch warning during the procedure. You must direct the system regarding the action to be used for the duplicate.

1. Connect the portable unit to the system.
2. Launch Tools and click **System Menu, Upload Download, Get Standards and Batches**.



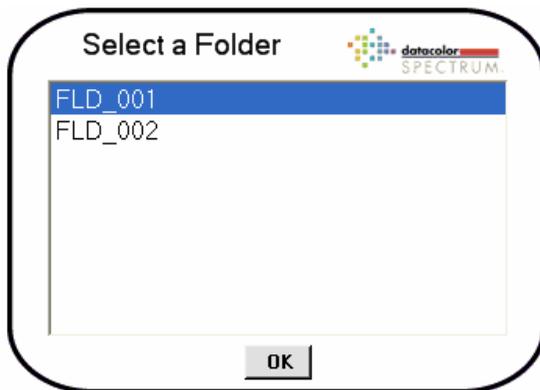
3. Click **Next**. The synchronization begins:



When the synchronization is completed the window below is displayed:



4. Click **Close**.
5. If the portable unit has more than one folder, you must select the folder containing the data to be transferred to TOOLS:



6. Highlight the folder to be transferred and click **OK**.

NOTE

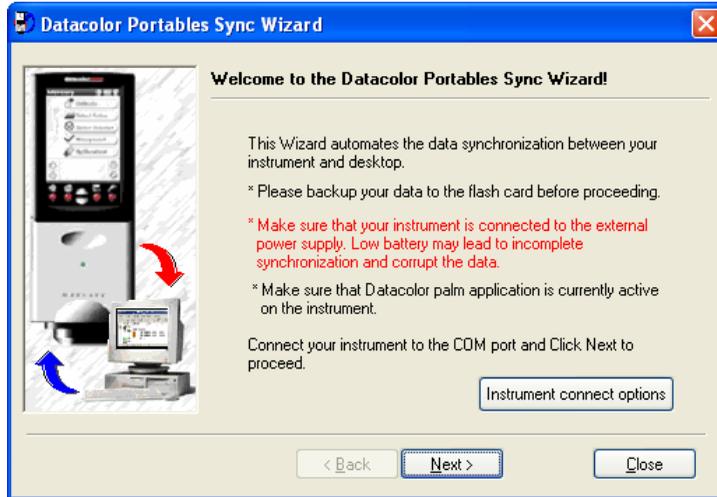
This process is done individually for each folder. If you want to transfer the data from another folder, you must repeat the entire synchronization procedure.

7. When the transfer is completed, the standard and batches transferred will be added to the TOOLS desktop.

First-Time Synchronization

The first time you run the Upload/Download options in TOOLS you will be asked to create an account.

1. Click on **Instrument Menu/Upload Download**, and select the option to be used. The window below is displayed:



The dialog below is displayed:



2. You must create an account on the computer. Click **OK**. This account is automatically assigned the serial number of the portable instrument that is connected.



When the synchronization is finished the window below is displayed:

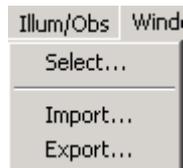


The first synchronization is completed, and automatically starts a second time.

Illum/Obs Menu

This option allows you to select and change the Illuminant/Observer conditions that the QC program uses. You can use up to 5 illuminant/observers at a time.

- From the menu bar, click **Illum/Obs**. A drop-down menu displays:

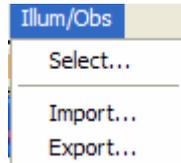


See also Applications Technology, Illuminant Observer Specification for a detailed explanation of the Illuminant/Observer selection.

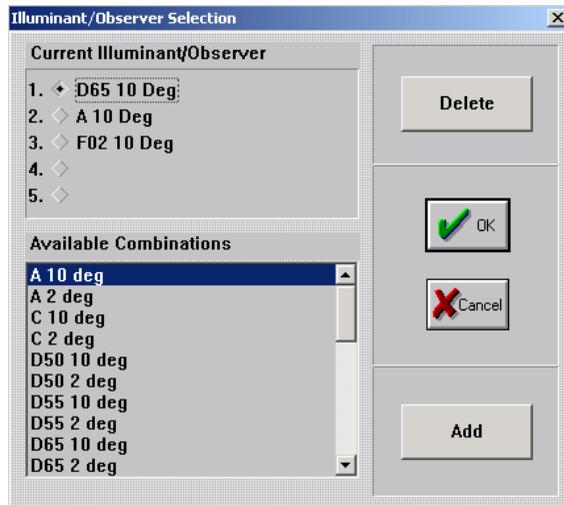
Select

This menu enables you to change the active Illuminant/Observer selection. In many industries you must use different Illuminant/Observer combinations for different evaluations, or for different products.

1. Click **III/Obs Menu, Select**.



The window below displays:



2. In the *Current Illuminant/Observer* field click the radio button next to the selection you want to change. This can be a position that currently has a combination defined, or one this is blank.



3. Highlight a selection in the *Available Combinations* field. This will be substituted for the current Illuminant/Observer condition. The screen will update immediately.
4. Click **OK** to complete the procedure.
5. To add more Illuminant/Observer combinations to the list:
 - Click the radio button next to a blank entry.
 - Move to *Available Combinations* listing, and click to highlight the combination you want to add at the selected position under the *Current Illuminant/Observer* list.
 - Click **Add**. The selected combination now displays in the list.
6. To delete an option from this list, simply click the radio button next to the option, and click **Delete**.
7. The selection in position #1 is not the primary Illuminant/Observer combination. The radio button is used to designate the primary illuminant. Click the radio button next to the combination you want to designate as the primary illuminant.
8. When all selections/entries are made, click **OK**.

NOTE

You can add or delete Illuminant/Observer combinations from the *Available Combinations* list.

Import

This option allows you to import Illuminant/Observer data. You may be required to provide color evaluations using an illuminant that is not included in the standard installation. This feature enables you to include illuminants that are not currently offered. When a condition is imported, it displays in the *Available Combinations* list. This data is stored in folders in the Datacolor TOOLS folder.

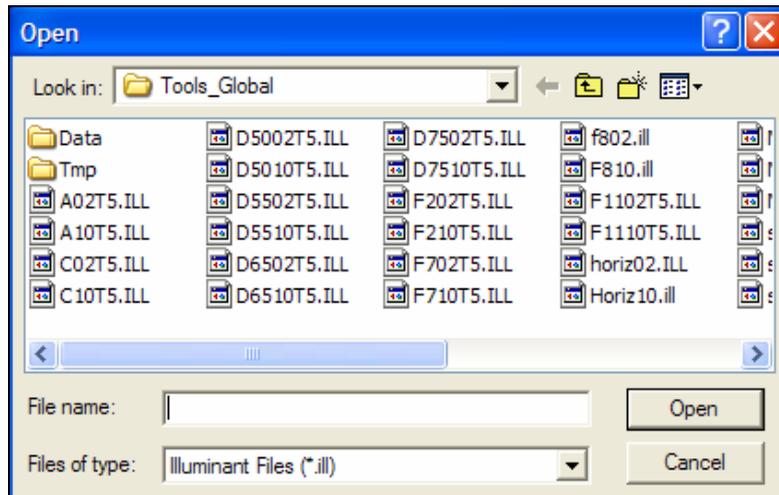
NOTES

- This option is not enabled for Datacolor TOOLS^{QCX}.
- If you have a custom illuminant that you need to add, you must send it to Datacolor for formatting. There is a fee involved in formatting this data. Contact your Datacolor sales representative for information.
- The database limits the number of illuminants that can be stored in the database.

1. To access this option, click on **Illum/Obs Menu, Select:**



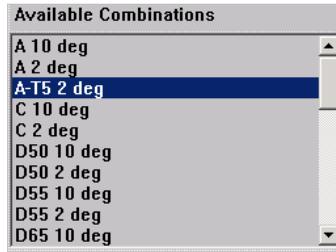
The program displays the illuminant folders currently stored in the Datacolor TOOLS folder:



The folder name identifies the contents. For example, folder **A02T5.ILL** contains Illuminant/Observer data for Illuminant A, 2^o Standard Observer, Table 5 data. This is identified through the folder name as follows:

- | | |
|--|---|
| 1st - 3rd character | Up to 3 characters are used to Identify the illuminant (e.g., A, C, D65, D55, etc.) |
| Characters 4 & 5 | Identifies the standard Observer data (e.g., 02 or 10). |
| Characters 6 & 7 (where included): | Identifies the data as Table 5 data (e.g., T5). When no notation exists, the data is Table 6 data. See also <i>Applications Technology, Table 5 vs. Table 6 Data for an explanation of the differences in data.</i> |

2. Highlight the folder to be imported.
3. Click **Open**.
4. The new illuminant will automatically appear in the *Available Combinations* list:



5. You can now select it for use in color evaluations.

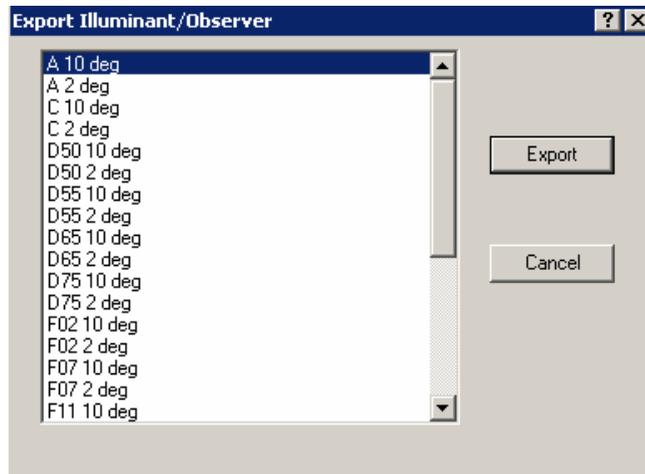
Export

If you have created custom Illuminant/Observer combinations, this feature is used to share that data with other locations. You can export it from one location, and import it to another.

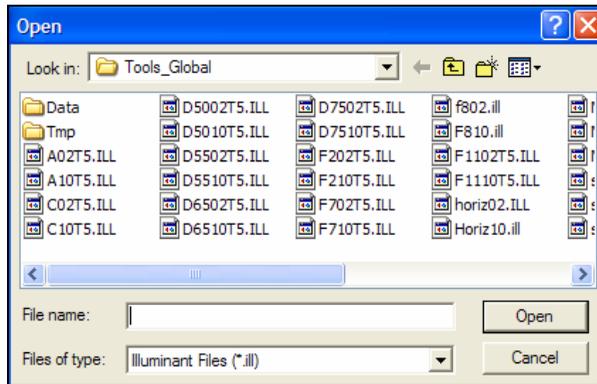
NOTES

This option is not enabled for Datacolor TOOLS^{QCX}.

1. To access this option, select **III Obs Menu, Export**. The program displays the combinations available on your system.



2. Highlight the folder to be exported.
3. Click **Export**. A dialog box opens.
4. Select the folder to receive the exported data.



5. After the folder is selected, click **Save**. The program will display a dialog box confirming that the export was successful.

NOTES

Applications Technology

Overview

This section provides explanation of some of the advanced options offered in the program. In some cases, the options are not commonly used by all industries. In other cases, the options require detailed explanations, and/or involve the use of several program options to be properly implemented. The options documented in this section include:

- Data Security
- Data Management
- Interpreting Color Differences
- Acceptability Tolerances
- Artificial Intelligence Tolerancing
- Datacolor Tolerance
- Shade Sorting
- Artificial Intelligence Shade Sorting
- Strength
- UV Calibration Option/Whiteness Evaluations
- Exchanging Data with Other Datacolor TOOLS Users
- Working/Master Standard Correlation

Data Security

Datacolor TOOLS includes the capability to limit a user's access to the data management functions. This feature is referred to as *data security*, and was created to protect proprietary color data, such as standard measurements and colorant data, that you generate using the program. The data security feature is configured from **System Menu, User Configuration Utility**:



NOTE

A user must have Administrator Rights to have access to the data security options.

Pigment vs. Textile Database Configuration

The features of the data security option are the same for both the *pigment* and *textile database configurations*. However, there are some differences regarding the feature access, default user names and default folder names used by each configuration. Throughout this discussion those differences will be noted as they arise, and examples of each will be provided. See also *Introduction to Datacolor TOOLS*, *Launching Datacolor TOOLS* for additional information on the two database configurations available.

Users, User Groups and Permissions

To implement the data security feature, you will work with *users*, *user groups*, and *folder permissions*.

Users

Two default users having administrator rights are provided with the program installation. The user names for Datacolor MATCH^{PIGMENT} are not the same as those for Datacolor MATCH^{TEXTILE}.

Pigment Users

The default users created for the Pigment database includes the following users:

- **Admin.** This user is assigned to the Administrator user group. This is a special user that cannot be deleted or removed. You cannot apply any restrictions to the Admin user permissions, and the Admin user cannot be deleted.

- **User.** This user is assigned to the Administrator user group. The default password for this user is “CC3”. This user can be removed from the Administrator user group, and deleted from the system.

Both default users are assigned to the Administrator user group, and have full administrator rights. This includes full access to data types and folders, and rights to create users and user groups, and to assign folder permissions.

Textile Users

The default users created for the textile database includes the following users:

- **Admin.** This user is assigned to the Administrator user group. This is a special user that cannot be deleted or removed. You cannot apply any restrictions to the Admin user permissions, and the Admin user cannot be deleted.
- **dci.** This user is assigned to the Administrator user group. There is no default password for this user. This user can be removed from the Administrator user group, and deleted from the system.

Both default users are assigned to the Administrator user group, and have full administrator rights. This includes full access to data types and folders, and rights to create users and user groups, and to assign folder permissions.

User Groups

When Datacolor TOOLS is installed, the same two *user groups* are provided for each program configuration:

- **Administrator.** This is the only user group that is active in the default program configuration. Both default users are assigned to this group.
 - No restrictions can be assigned to this user group regarding data object and folder access. Data security features can only be applied to non-administrator groups.
 - Placing a user in this group removes all restrictions.
 - You cannot create another *Administrator* group. Additional user groups created are non-administrator user groups.
 - This user group cannot be deleted.
 - Users can be removed from this group.

NOTES

- For Datacolor MATCH^{PIGMENT} program upgrades, all existing *Admin* users are automatically made members of the Administrator group.
- For Datacolor MATCH^{TEXTILE} program upgrades, the *dci* user is assigned to the *Admin* group.

- For Datacolor MATCH^{PIGMENT} program upgrades, all existing *non-admin* users are automatically made members of the General Users group.
- For Datacolor MATCH^{TEXTILE}, All users except *dci* are assigned to the *General Users* group.
- **General Users.** Users assigned to this group do *not* have administrator rights. They cannot create users or user groups, and they cannot assign permissions to user groups. In the default program configuration, there are no users assigned to this group.

User Permissions

Permissions to access data are applied to two data categories:

- **Data Type.** These are specific data objects created and used by Datacolor programs such as standards, batches and substrate data. You can selectively expand or restrict access to individual data objects.
- **Folder.** Permissions are selectively assigned with regard to viewing and editing contents of specified folders used by the program.

Implementing the Data Security Option

When Datacolor TOOLS is installed, the default program configuration assigns the two default users to the Administrator user group. These users have full permissions to access data. To protect your valuable data, we strongly encourage you to review the users, user groups and user permissions configured for your system, and customize these configurations to your needs.

The procedure to configure users and assign data permissions includes the following tasks:

- Create *users* as needed.
- Create *user groups* as needed.
- Assign *users* to the appropriate *user group*.
- Assign permissions to each user group.

There is no specified order in which these tasks must be performed.

NOTE

To work with the data security feature, you must have administrator rights. The default program logins, *User (Pigment)* and *dci (Textile)* each have full administrator rights.

As you continue to work with this program, you might need to create additional users and user groups, and selectively enable/disable access to specific data types and data folders for each group. These changes can be made at any time, by any user that has administrator rights.

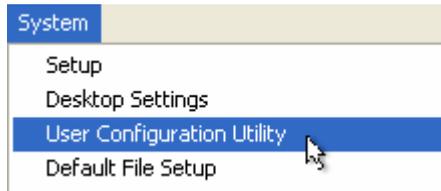
Getting Started

Access to the Data Security options differs for pigment and textile program configurations. Once inside the module, the fundamental program operation is the same.

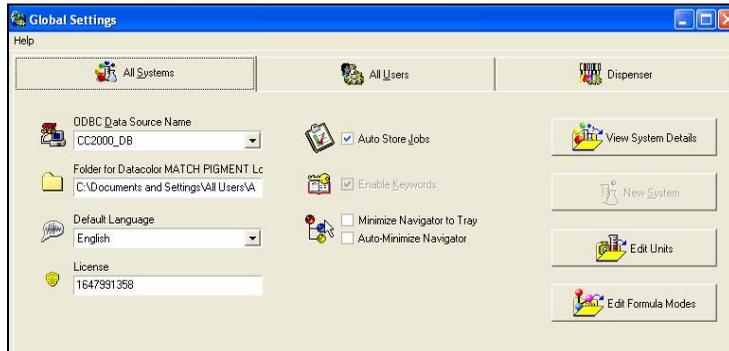
Launching Data Security for Pigment Users

To access the Data Security options:

1. Click on **System menu, User Configuration Utility**.



The window below is displayed:



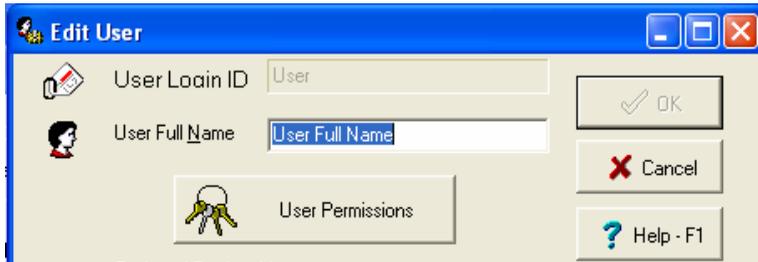
2. Click the **All Users** tab:



At the bottom of the window is a list of the existing users:

Admin	Login Name	Full Name	Modified	Modified by	Created	Created by
Admin	User	User Full Name	8/21/2007 1:22:49 PM	dci	2/28/2001 5:53:18 PM	dci
	Bill		8/21/2007 1:21:04 PM	User	8/21/2007 1:21:03 PM	User
	Patrick		8/21/2007 1:21:05 PM	User	8/21/2007 1:21:05 PM	User
	Sandy		8/21/2007 1:21:06 PM	User	8/21/2007 1:21:06 PM	User
	Bob		8/21/2007 1:21:07 PM	User	8/21/2007 1:21:07 PM	User
	Eugene		8/21/2007 1:21:08 PM	User	8/21/2007 1:21:08 PM	User

3. Select a user from the list, and click on **View Details**. The following program options are displayed:



4. Click on **User Permissions**. The User/Group Administration window displays. *See also User/Group Administration Window for information to access specific data security options in this window.*

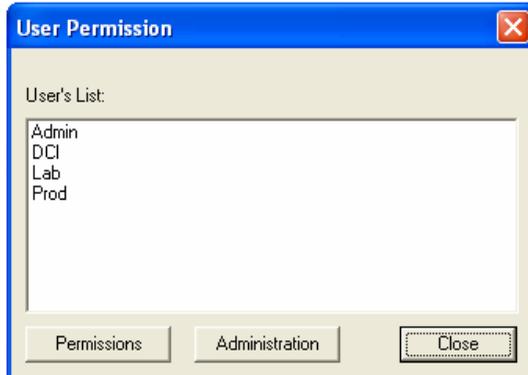
Launching Data Security for Textile Users

To access the Data Security options:

1. Click on **System menu, User Configuration Utility**:



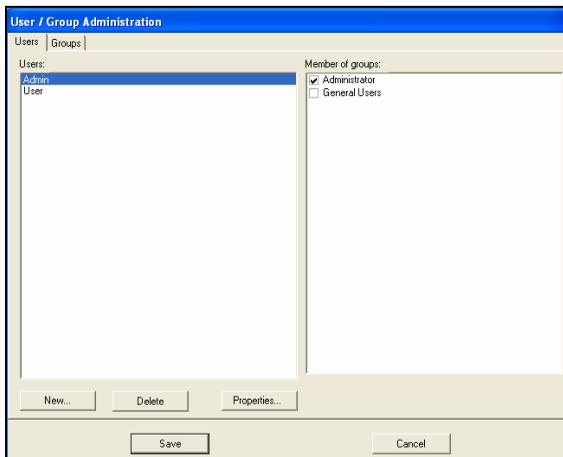
The User Permission dialog displays:



2. Highlight a user and click on one of the buttons at the bottom of the dialog box, to access the data security features.
 - **Administration.** This opens the User/Group Administration window. *See also User/Group Administration below for additional information.*
 - **Permissions.** This opens the Group Permissions window. *See also Folder Permissions below for additional information.*
 - **Close.** Closes the Data Security options.
3. The User/Group Administration window displays. *See also User/Group Administration below for information to access specific data security options in this window.*

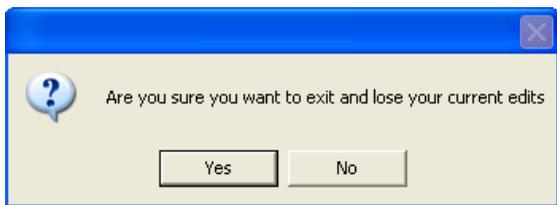
User/Group Administration Window

This window is used by both the pigment and textile program configurations:



This window includes two tabs, *Users* and *Groups*. These two tabs provide access to all of the program options used to implement the data security option.

When you have made all of the selections to customize the data security, *you must click the **Save** button at the bottom of the window.* If you click **Cancel**, the dialog below is displayed:



- Click **Yes** to close the User/Group Administration window *without* saving the changes.
- Click **No**. The dialog box closes, and User/Group Administration window remains open.

See also [Configuring a User Group](#) for instructions to create user groups and to assign users.

See also [Folder Permissions](#) for instructions to selectively enable/disable user access to data types and data folders.

User Configuration

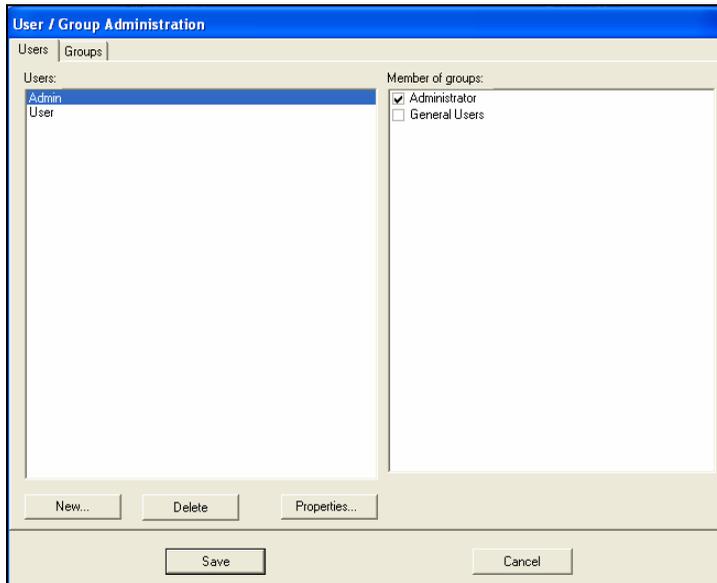
This section provides step-by-step instructions to create, edit, and delete users. See *also [Data Security Overview](#), [Users](#) for additional information regarding users.*

NOTE

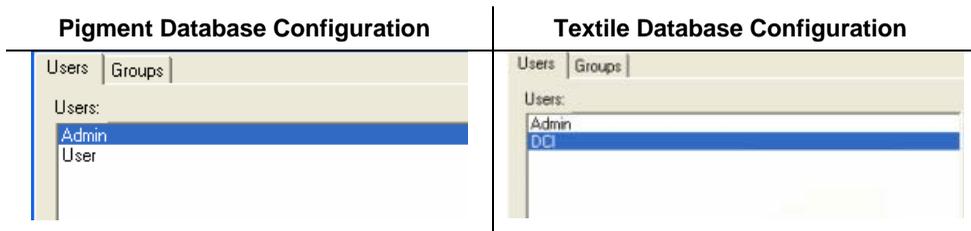
The operation of these features is identical for both *Pigment* and *Textile* configurations.

User Configuration Window

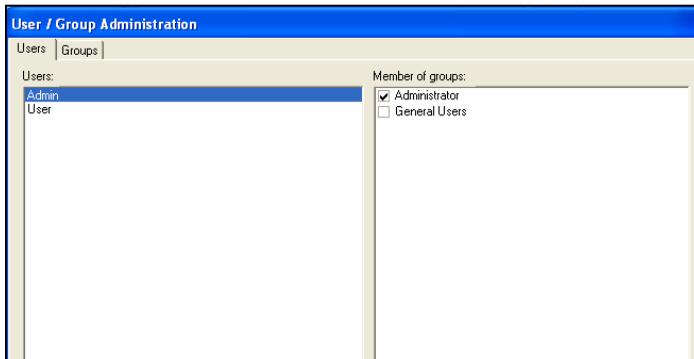
The User/Group Administration window includes a *Users* tab and a *Groups* tab:



- On the User/Group Administration window, click on the *Users* tab. The existing (default) users are displayed in the *Users* (left) pane:



The list of existing (default) user groups is displayed In the *Member of groups* (right) pane:



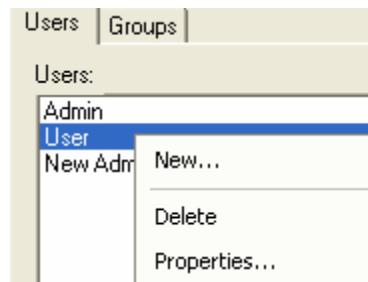
- A check identifies the groups that include the highlighted user. A user can be assigned to multiple groups.
- Buttons along the bottom of the window are used to configure and edit users:



- **New.** Opens the new user dialog. *See Create User for instructions.*
- **Delete.** Deletes the user currently selected. *See Delete for instructions.*
- **Properties.** Opens the edit user dialog. *See Edit User below for instructions.*

These functions can also be accessed from a menu. To access this menu:

- Highlight a user and right-click on it. The menu displays:



Create a User

If you have a large number of program operators, you can create several users and several user groups. Each group can be assigned different permissions. You can then assign each user to a group having the appropriate data access permissions.

To create a new user:

1. On the Users tab, click the **New** button. The dialog below displays:



2. **User Name.** This name is input as the login when the program is launched. Enter a user name that contains 3-25 alpha-numeric characters.
3. **Password.** This password is input for this user when the program is launched. This cannot be the same as the user name, and should contain 3-25 alpha-numeric characters.
4. **Confirm Password.** Re-enter the password.
5. **Automatically create in General Users group.** Place a check in this box to automatically assign this user to the *General Users* group. The *General Users* group does **not** have administrator rights.

NOTES

If you do not place a check in this box, the user will not be assigned to the default user group. You will have to manually assign the user to a group.

You must assign a user to a group to complete the record and make the user available.

6. Enter information for the *User Name* and *Password*.
7. Click **OK** to close the dialog box.
8. Assign the user to a user group. *See also Create a User Group, Assign User for instructions.*

9. On the User Group/Administration window, click **Save** to save these changes to the database.

NOTE

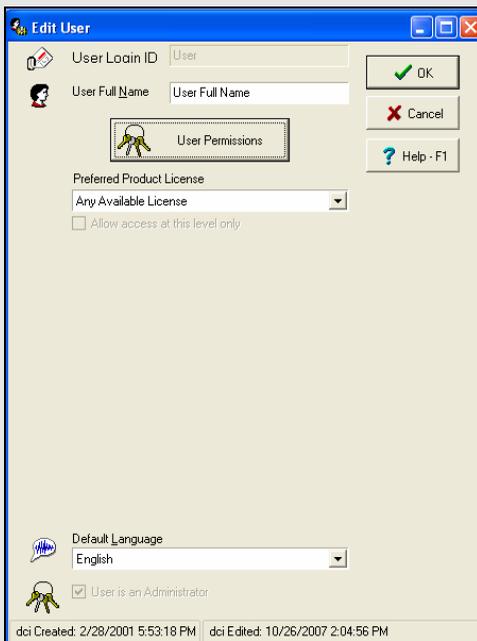
When you click **Save**, the program verifies that all users are assigned to at least one user group. You will see the dialog below for *each* user that is not assigned to a user group:



Click **OK**. The User Group/Administration window remains open. You must assign the user to a group, to complete the record.

Notes for Pigment Database Configuration

When you have made changes and close the User Group/Administration window, the Edit User window displays:



Click **OK** to close the window.

When you create multiple users and close the User Group/Administration window, the Edit User window will display once *for each user created*.

10. **Preferred product license.** Use the default selection.

Edit User

This option is used to change the *User Name*, the *Password*, or both entries for an existing user. To make these changes:

1. On the Users tab, highlight the user to be edited, and click **Properties**. The dialog below displays:



The image shows a 'User Settings' dialog box with a blue title bar. It contains four input fields: 'Existing User Name' (text: 'New Administrator'), 'New User Name' (text: 'New Administrator'), 'Password' (masked with 'xxxxxxx'), and 'Confirm Password' (masked with 'xxxxxxx'). At the bottom are 'OK' and 'Cancel' buttons.

2. **Existing User Name.** This field displays the existing user name, and is for display purposes only. No information can be entered.
3. **New User Name.** Enter a new user name of 3-25 alpha-numeric characters.
4. **Password.** The current password is displayed. Enter a new password containing 3-25 alpha-numeric characters.
5. **Confirm Password.** Re-enter the new password.
6. Enter the changes to these fields as needed, and click **OK**. The program confirms that the user name does not currently exist, and that the entries in *Password* and *Confirm Password* fields match and do not contain prohibited characters.

NOTES

If the password entries do not match, you will receive an message. You must re-enter the information and click **Save**.

Click **Cancel** to close the window without saving any changes.

7. On the User Group/Administration window, click **Save**.

NOTE

To enable these changes, restart the program.

Delete User

If a user is no longer active, you can delete it from the system at any time.

NOTE

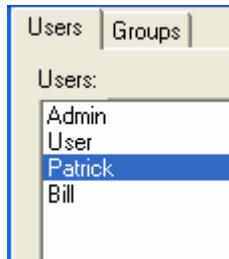
When you delete a user, it is no longer available as a program login. However, it is not deleted from the database, because the user may have created data objects (targets, trials, formulas, etc) that remain active in the database.

The deleted user will no longer appear in the *Admin* users list.

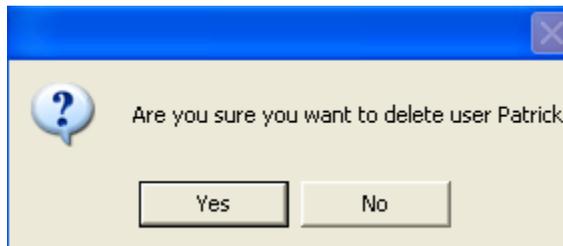
Any objects created by the user will display the user name in the *Created By* field.

To delete a user:

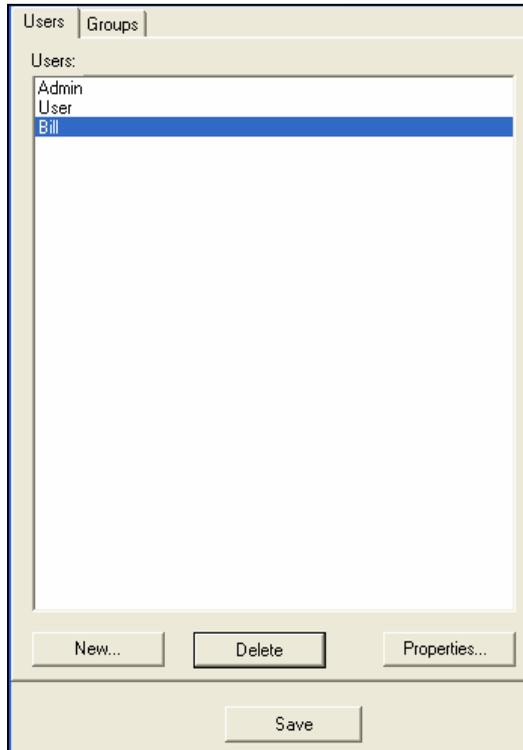
1. From the User/Group Administration window, *Users* tab, highlight the user to be deleted:



2. Click the **Delete** button at the bottom of the window. The program will ask you to confirm the delete command:



3. Click **Yes** to continue, or **No** to cancel the function.
4. On the User/Group administration window, you must click the **Save** button at the bottom of the window to make this change permanent.



In this example, the user *Patrick* will not longer appear in the Users List. However, you may continue to see the user *Patrick* in a Navigator list in the *Created By* or *Modified By* fields.

User Group Configuration

Once you have created the necessary users, you must assign them to a user group. When you install the program, two user groups, *Admin* and *General Users*, are provided.

- **Admin.** The permissions to access data types and data folders for this user group are not restricted. This user group should be restricted to a limited number of users to protect your data.
 - In the case of upgrades for systems using the pigment configuration, all existing users with Admin status are automatically assigned to this group.

- In the case of upgrades for systems using the textile configuration, the *dci* user is automatically assigned to this group.
- *Users* included in this group can be reassigned at any time to other user groups, having restricted data management permissions.
- The program will not allow you to create another administrator group.
- This *user group* cannot be deleted.
- **General Users.** The default configuration of this user provides full permissions to access data types and data folders. In contrast to the Administrator group, permissions to access all data types and all data folders can be restricted.
 - In the case of upgrades, for systems using the pigment configuration, all existing users that do ***not*** have Admin status are automatically assigned to this group.
 - In the case of upgrades for systems using the textile configuration, users other than *dci* are automatically assigned to this group.
 - This user group can be deleted.

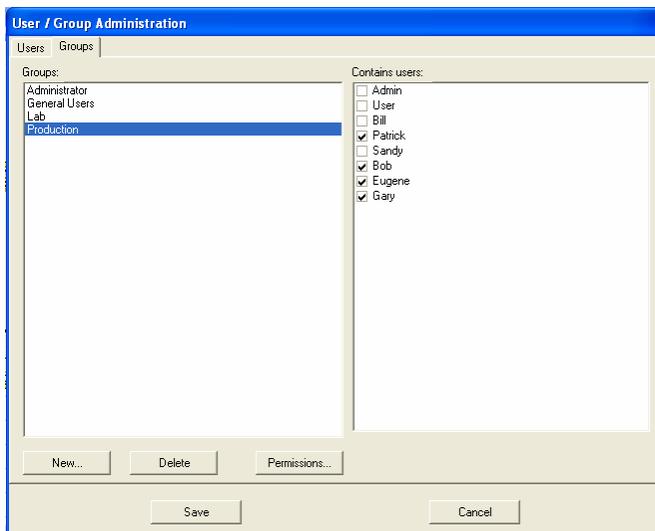
User group configuration includes the following steps:

- Create a user group
- Assign users to the group
- Assign data permissions to the group

User Group Configuration Window

1. On the User/Group Administration window, click on the *Groups* tab.
2. The existing Groups are displayed in the *Groups* pane.

3. A list of all users in the system are displayed in the *Contains users* pane.

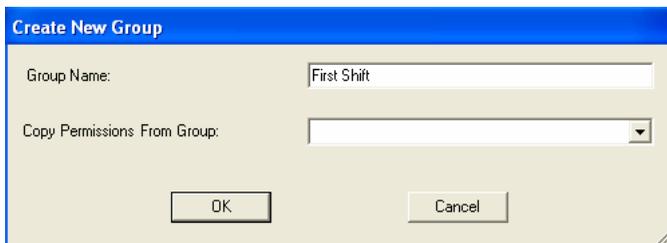


A **check** in the *Contains users* pane indicates the users that are assigned to the highlighted user group.

Create a User Group

Below are instructions to create a new user group.

1. From the User/Group Administration window, *Users* tab, click the **New** button. The window below displays:



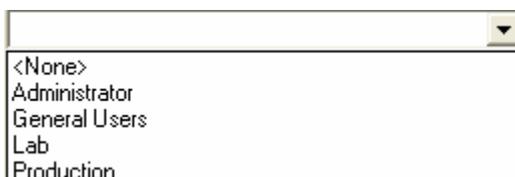
2. **Group Name.** Enter a name for the new user group.

3. **Copy Permissions From Group.** You can duplicate data permissions from another user group. This option speeds the user creation process, and will minimize mistakes made when trying to recreate a set of permissions manually.

NOTE

If this field is left blank, complete permissions are assigned to the new user.

- Click on the down arrow and view the choices:



- Highlight a group having the permission configuration you want applied to the group.

None. When this is selected, the new user group will have the default permission settings, giving the user complete access to data types and data folders.

All other choices. Copies the folder permissions and data type permissions for the group selected. *See also User Group Permissions for a complete explanation of the data type and folder permissions that can be assigned.*

4. Make the appropriate selection and click **OK**.

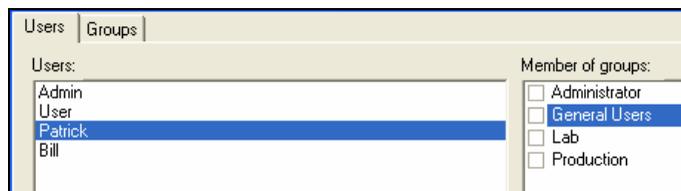
NOTE

You must close Datacolor TOOLS and restart the program to enable these changes.

Assign Users

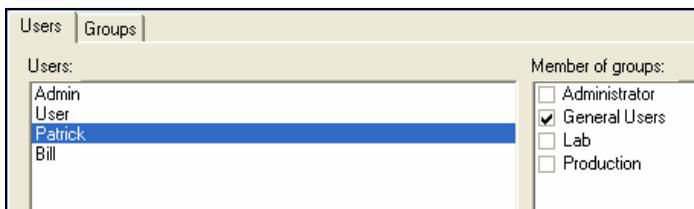
Once you have created a *user group*, you must assign *users* to it. Below are instructions to assign users to a users group.

1. From the User/Group Administration window, *Users* tab, click to highlight a user to be assigned to a group:



The *Member of Groups* pane lists all of the existing groups.

2. Place a **check** in the group to which the user will be added.



3. On the User/Group administration window, you must click the **Save** button at the bottom of the window to make this change permanent.

NOTES

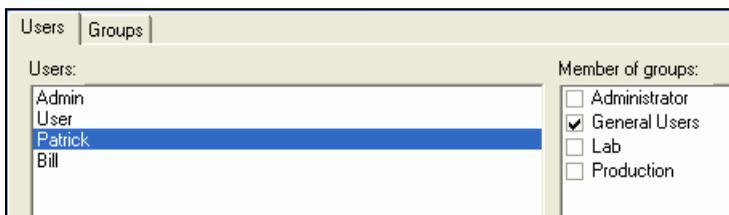
A user can be a member of multiple groups. For users with membership in multiple groups, the user is granted all of the permissions assigned to each user group.

A *User Group* can exist without having any users assigned to it.

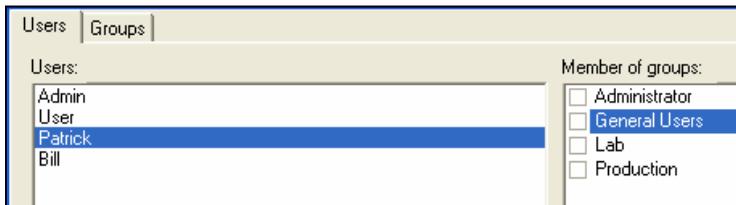
Delete Users from a Group

You can delete a user from a group at any time. To delete a user from a group:

1. From the User/Group Administration window, *Users* tab, click to highlight a user to be deleted from a group. The right window pane will display the user's membership status for each users group:



2. Click in the box to remove the user from a group:



The user is removed from the group, but is still active in the system and can be assigned to a different group.

3. Click **Save** to save the change. The User/Group Administration window closes.

NOTE

A user must be a member of at least one group. If it is not assigned to any user group, when you click **Save** the message below displays:



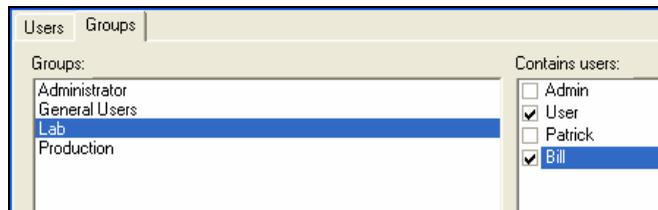
Click **OK** to close the dialog box, and assign the user to one user group.

Delete User Group

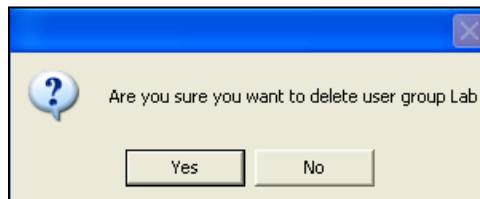
You can delete a *Users Group* at any time. However, you must remove all users from the group before you can delete it. *See also Delete Users from Groups for instructions.*

To delete a User Group:

1. On the User/Group Administration, click on the **Groups** tab to view the choices:



2. Highlight the group to be deleted, and click the **Delete** button at the bottom of the window. A confirmation message is displayed:



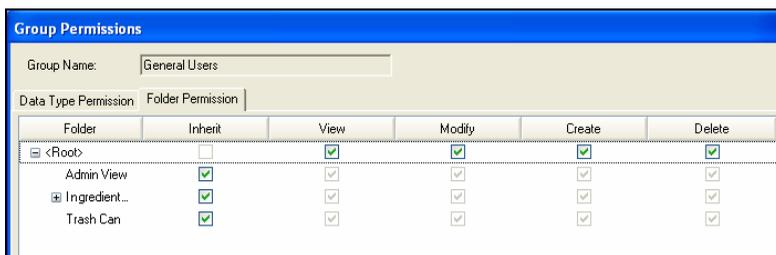
3. Click **Yes** to delete the selected user group, or **No** to cancel the delete command.
4. On the User/Group administration window, you must click the **Save** button at the bottom of the window to make this change permanent.

Permissions

Permissions to access data are applied to two data categories:

- **Data Type.** These are specific data objects created and used by Datacolor programs such as standards, batches and substrate data. You can selectively expand or restrict access to *individual data objects*.
- **Folder.** Permissions are selectively assigned with regard to viewing and editing contents of specified *folders* used by the program.

All selections made regarding data access permissions are made from the Group Permissions window:



See also *Getting Started* for instructions to access this program window from the textile and pigment program configurations.

NOTE

The default folder configuration and object icons vary depending on the program configuration. When this occurs, screens for both the textile and pigment configurations are provided.

Permissions Window

Permissions to access data are assigned to user groups, and are applied to two data categories:

- **Data Type.** These are specific data objects created and used by Datacolor TOOLS such as standards, batches and substrate data. You can selectively expand or restrict access of a user group to individual data objects. Using these permissions, you can limit access to specific data objects, without restricting user access to a particular folder. For example, you can restrict user group access to all standards generated by Datacolor TOOLS.
- **Folder.** Permissions are selectively assigned to a *user group* with regard to viewing and editing contents of specified folders used by the program. Click on the *Folder Permission* tab to access the selections.

You may configure both *data type* permissions and *folder* permissions for each user group.

NOTE

The *Group Name* field at the top of this window identifies the user group assigned the permissions that are currently displayed.

See also *Getting Started, Launching Data Security for Textile Configurations for instructions to access this window from a TOOLS textile configuration.*

See also *Getting Started, Launching Data Security for Pigment Configurations for instructions to access this window from a TOOLS pigment configuration.*

Determining Proper Permissions

Below are some guidelines to determine the permissions assigned to user groups:

- Permissions are assigned to data types and to the folder tree. To selectively assign permissions to a group, the group must have permission to access both the data type AND the folder in question.
- Users can be members of multiple groups. For users with membership in multiple groups, the user is granted all of the permissions assigned to each user group. This can be thought of as an OR permission.
- The permissions applied affect the folder structure that can be viewed in the Navigator module. The Datacolor MATCH^{PIGMENT} application will only display those folders and data objects that are permitted for the active user.
- When a folder permission is denied, the subfolders of the restricted folder will not display in the Navigator module.

Folder Permissions

The Folder Permissions option limits access to an *entire folder*. This folder may include all object types generated by Datacolor programs.

Group Name: <input type="text" value="General Users"/>					
Data Type Permission		Folder Permission			
Folder	Inherit	View	Modify	Create	Delete
<Root>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Fields on the Folder Permissions Tab

- **Inherit.** The folder inherits all of its rights from its parent folder.
- **View.** The folder and objects within the folder can be viewed (subject to other rights). Denying folder view rights to a parent folder implies denied rights for all sub-branches of that folder.
- **Modify.** Data within the folder can be modified.
- **Create.** The user may create objects / subfolders within / move objects to the folder (subject to other rights).
- **Delete.** The user may delete objects within the folder or move objects from the folder (subject to other rights).

NOTES

Modify and *Delete* rights refer to the contents of the folder, not to the folder itself. To have rights to modify or delete a folder, the rights must be set on the parent folder, and on the data object type.

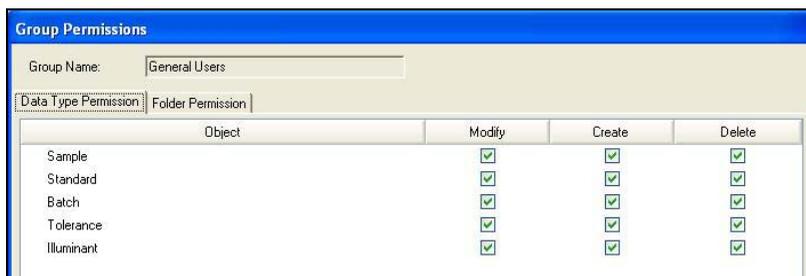
In order to be able to copy and paste an item, *View* rights must exist on the source folder, and *Create* rights must exist on the destination folder.

In order to be able to cut, paste or move an item, *Delete* rights must exist on the source folder, and *Create* rights must exist on the destination folder.

The root folder cannot be set to *Inherit*.

Data Type Permissions

This pane is used to selectively assign access rights to *data types*. These are specific data objects created or used by Datacolor TOOLS, including standards, batches and samples. Using these permissions, you can limit access to specific data objects, without restricting user access to a particular folder. For example, you can restrict user group access to all standards.



Object	Modify	Create	Delete
Sample	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Batch	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tolerance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Illuminant	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Fields on the Data Type Permission Tab

The textile and pigment program configurations assign the same permissions to the data objects. The security settings that can be assigned to data types are:

- **Modify.** The data type can be modified, subject to other rights.
- **Create.** New items of this data type can be created by the user, subject to other rights.

NOTE

Create rights are required for an object in order for copy, paste and move functions to work. *See also User Configuration for details on these options.*

- **Delete.** The user may delete items of this data type, subject to other rights.

Assigning Permissions

Assigning Permissions for a Pigment Database Configuration

Below are *partial lists* of the Data Type and Folder Permission privileges available for the *pigment* database configuration:

Data Type		Folder	
Group Name: <input type="text" value="New Group"/>		Group Name: <input type="text" value="New Group"/>	
Data Type Permission Folder Permission		Data Type Permission Folder Permission	
Object	Modify	Folder	Inherit
Folder	<input checked="" type="checkbox"/>	<Root>	<input type="checkbox"/>
Sample	<input checked="" type="checkbox"/>	Admin View	<input type="checkbox"/>
Standard	<input checked="" type="checkbox"/>	Ingredient System	<input checked="" type="checkbox"/>
Batch	<input checked="" type="checkbox"/>	Demo Folder	<input checked="" type="checkbox"/>
Substrate	<input checked="" type="checkbox"/>	STD DEMO WHITE	<input checked="" type="checkbox"/>
Formula	<input checked="" type="checkbox"/>	STD GOLD PL	<input checked="" type="checkbox"/>
Recycle	<input checked="" type="checkbox"/>	STD GREEN PL	<input checked="" type="checkbox"/>
Job	<input checked="" type="checkbox"/>	STD ORANGE PL	<input checked="" type="checkbox"/>
Tolerance	<input checked="" type="checkbox"/>	Translucent Data	<input checked="" type="checkbox"/>
Illuminant	<input checked="" type="checkbox"/>	Trash Can	<input checked="" type="checkbox"/>
Job Template	<input checked="" type="checkbox"/>		

To assign *Permissions* in a *Pigment* configuration:

1. Navigate to the User/Group Administration window. See also *Accessing Data Security* for instructions to access this window, for the database configuration you are using.

The screenshot shows a window titled 'Users Groups' with two tabs: 'Users' and 'Groups'. The 'Groups' tab is active. On the left, a list of groups includes 'Administrator', 'General Users' (highlighted), 'Lab', and 'Production'. On the right, under 'Contains users:', there is a list of users with checkboxes: 'Admin' (unchecked), 'User' (checked), 'Patrick' (checked), and 'Bill' (checked). At the bottom, there are three buttons: 'New...', 'Delete', and 'Permissions...'.

- From the *Groups* tab, select the user group whose permissions you want to edit, and click the **Permissions** button. The Permissions window will display:

Object	Modify
Folder	<input checked="" type="checkbox"/>
Sample	<input checked="" type="checkbox"/>
Standard	<input checked="" type="checkbox"/>
Batch	<input checked="" type="checkbox"/>
Substrate	<input checked="" type="checkbox"/>
Formula	<input checked="" type="checkbox"/>
Recycle	<input checked="" type="checkbox"/>
Job	<input checked="" type="checkbox"/>
Tolerance	<input checked="" type="checkbox"/>
Illuminant	<input checked="" type="checkbox"/>
Job Template	<input checked="" type="checkbox"/>

- Verify the correct *User Group* is selected.
- Click on the **Data Type Permission** tab, and highlight the object you want to configure. *See also Data Type Permissions for an explanation of the available permissions.*
- Place/remove a check in the box representing the permission you want to assign to the user group.
- When you have assigned all of the *Data Type* permissions, click on the **Folder Permissions** tab, and repeat the procedure. *See also Folder Permissions for an explanation of the available permissions.*
- When you have made all selections, click **OK**. The Group Permission window closes.
- On the User/Admin window, click on the **Save** button to make the changes to the database.

Assigning Permissions for a Textile Database Configuration

Below are partial lists of the of the *Data Type* and *Folder Permission* tabs available for the *textile* configuration:

Data Type Permission

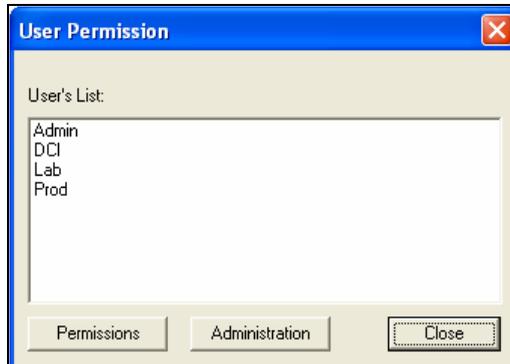
Group Permissions				
Group Name: <input type="text" value="General Users"/>				
<input checked="" type="checkbox"/> Data Type Permission <input type="checkbox"/> Folder Permission				
Object	Modify	Create	De	
Sample	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Standard	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Batch	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Tolerance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Illuminant	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

Folder Permission

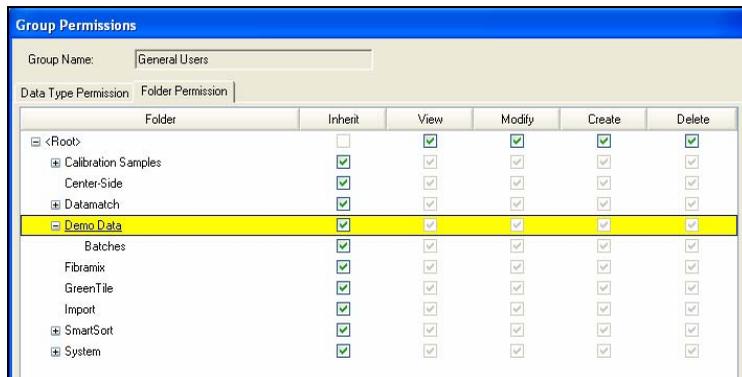
Group Permissions				
Group Name: <input type="text" value="General Users"/>				
<input type="checkbox"/> Data Type Permission <input checked="" type="checkbox"/> Folder Permission				
Folder	Inherit	View	Modify	
<input type="checkbox"/> <Root>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/> Calibration Samples	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Center-Side	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/> Datamatch	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Demo Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Batches	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Fibramix	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
GreenTile	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Import	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/> SmartSort	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/> System	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

To assign/edit *Permissions* for a textile configuration:

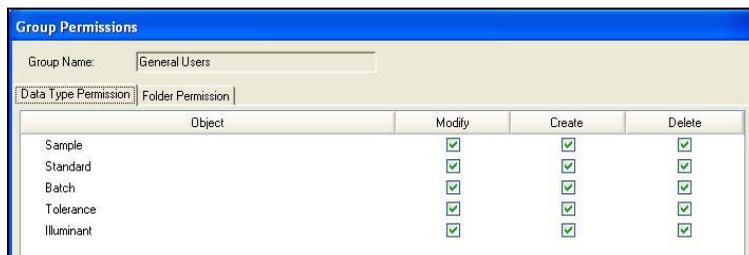
1. Click on System menu, User Configuration Utility.



2. Highlight one of the users, and click **Administration**. The Group Permissions window is displayed:

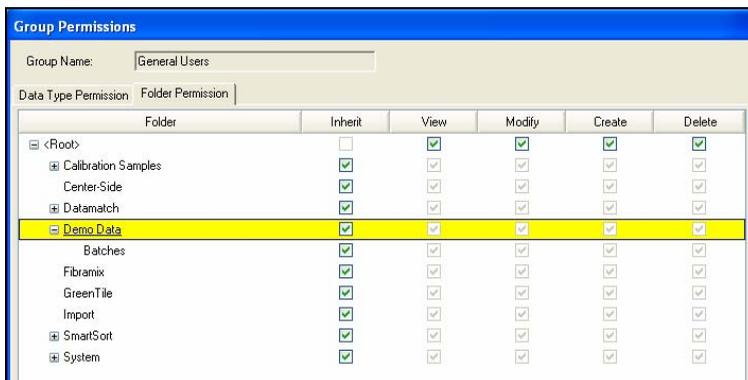


3. Verify the correct *User Group* is selected.
4. Click on the **Data Type Permission** tab, and highlight the object you want to configure. *See also Data Type Permissions for an explanation of the available permissions.*



5. Place/remove a check in the box representing the permission you want to assign to the user group.

- When you have assigned all of the *Data Type* permissions, click on the **Folder Permissions** tab, and repeat the procedure. *See also Folder Permissions for an explanation of the available permissions.*



- When you have made all selections, click **OK**. The Group Permission window closes.

Data Management

Datacolor TOOLS includes a powerful data management system that allows the user to selectively access individual data objects including standards, batches and substrates. It includes sorting and filter functions to allow quick retrieval of records from large databases.

The options available to the pigment and textile program structure are essentially the same. However, the user interfaces, and folder structures are slightly different. Throughout this section, those differences will be noted where appropriate.

Data Management: Pigment Database

Data Objects

The data objects used by Datacolor TOOLS include:

-  **Sample.** A sample record includes a name and a set of measurement data that describes the color quantitatively.
-  **Standard.** A sample record that is specifically identified as a standard.
-  **Batch.** A sample record that is specifically identified as a batch.

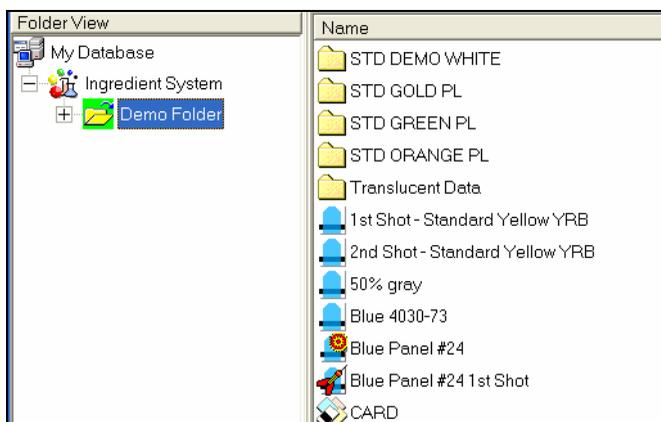
NOTE

When working with Datacolor TOOLS, the program requires the record containing sample information to be labeled as either a *standard* or *batch*. It does not recognize a data record labeled *sample*. The data management options include an option to convert the data object to a type recognized by Datacolor TOOLS. See also *Editing Data Objects for instructions to convert the data objects*.

-  **Substrate.** A sample record that contains measurement data for a substrate sample. This object is used by Datacolor MATCH^{PIGMENT} when matching translucent colors.

Default Folders

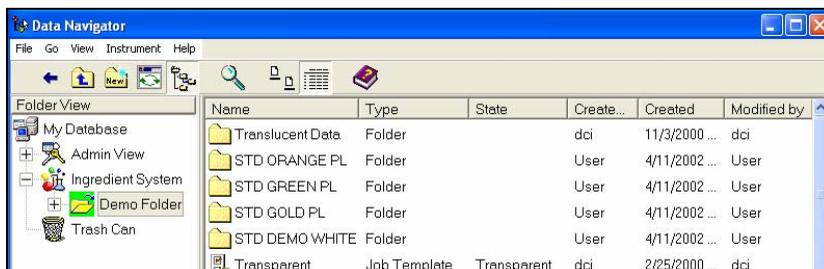
Default data is provided with the program to allow you to begin using it immediately. This data is stored in the Demo folder:



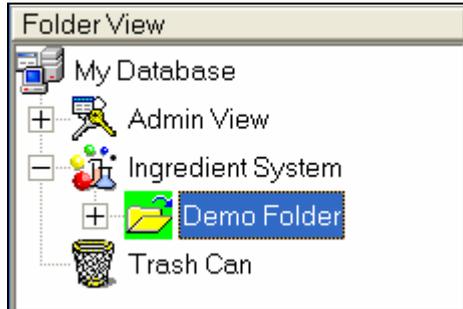
This data is provided simply to enable you to run the software features.

Browsing the Database

The Navigator Window is divided into two sections or panes:



- Folder View.** The left pane is referred to as the Folder view, and displays the structure used for data storage. The data is organized into a series of folders and subfolders similar to the design of Windows Explorer. This is also referred to as a *Tree* view. A "+" next to a folder indicates there are subfolders inside the folder. Click on the "+" to see the names of the subfolders.



Click on the folder names to display contents of the folder in the right pane of the of the Navigator window. Double-click on a folder name to expand the folder listing in *Tree* view.

- List View.** Click on a folder in the *Folder* view. The contents of the selected folder are displayed in the right pane. This pane is referred to as the *List* view. From this view, you can sort the data, and perform standard maintenance functions.

Name	Type	Creation User	ModificationDate
100%_16	Sample	dci	1/3/2002 8:46:23 AM
100%_22	Sample	dci	1/3/2002 8:46:23 AM
100%_31	Standard	dci	1/3/2002 8:46:23 AM
100%_43	Standard	dci	1/3/2002 8:46:23 AM

A display field at the bottom right of the screen displays the total number of objects in the current folder.

YELOX 64	Sample	ROL/ROD	dci	10/9/2001 3:58:11 PM	dci	8/31/2002 9:2
YELOX 8	Sample	ROL/ROD	dci	10/9/2001 3:58:11 PM	dci	8/31/2002 9:2
YELOX 98	Sample	ROL/ROD	dci	10/9/2001 3:58:12 PM	dci	8/31/2002 9:2

filter By: 80 Object(s)

If you move the mouse pointer over this field, a text box displays how many of each object type are in the folder.

Object Selection

You can select a single data object or multiple objects to work with, using Data Navigator.

Once the object is selected, there are several options available for manipulating the data. To access these options:

1. From the List View (right window pane), place the cursor over an individual entry and click the right mouse key. A menu is displayed:



This menu includes all functions for viewing, editing and exporting data created and used by Datacolor TOOLS.

View Options

Two view options, *Open* and *Open With* are used to view the contents of a data object:

- **Open.** When this option is selected, the program automatically selects the correct Datacolor program option needed to open the record. When this is selected, the correct program will open, and the data selected will be displayed.

- **Open With.** When this option is selected, a submenu is displayed.



- Click to highlight the program module to be used to open the record.

NOTE

When you double-click on the record, the appropriate program module will automatically open and the data will be displayed.

Editing Data Objects

There are several editing options available, that are used to cut, copy, paste, move and export the data objects.

Edit Options

- **New Folder.** Creates a new folder inside the active folder.
- **Cut.** Move data from one folder location to another. This option removes the record from the current folder. It has to be *pasted* into another folder. *See also Cut/Copy and Paste procedure below for complete instructions.*
- **Copy.** Store the same data in multiple folder locations, using the *copy* and *paste* procedures. *See also Cut/Copy and Paste procedure below for complete instructions.*
- **Paste.** Stores the record previously selected into a different folder. It is used with both the *cut* and *copy* options. *See also Cut/Copy and Paste procedure below for complete instructions.*

NOTE

An item cannot be deleted if it is included as part of another data item. For example, a sample cannot be deleted if it is also stored with a formula used by Datacolor MATCH^{PIGMENT}. You must delete the sample from the formula before you can delete the sample from the system.

- **Send to.** Exports the data to an XML file. *See Other Options, Send To in this section for more information on this feature.*
- **Delete.** Deletes the sample currently highlighted. Click **Delete** to execute. This moves the object to the trash can, but it is not yet permanently deleted. *See also Trash Can Option for instructions to permanently delete an object.*

WARNING

The system automatically deletes the record without any further warning or confirmation.

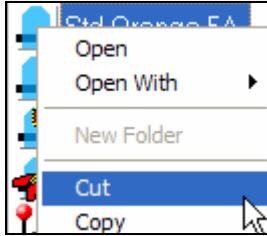
- **Rename.** Renames the sample currently highlighted.

NOTE

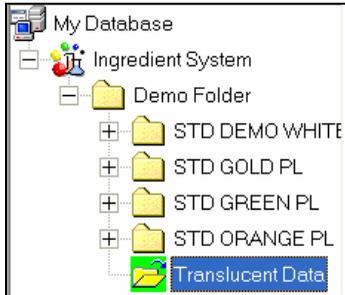
Rename is not available when a range of items is selected.

Cut/Copy and Paste Procedure

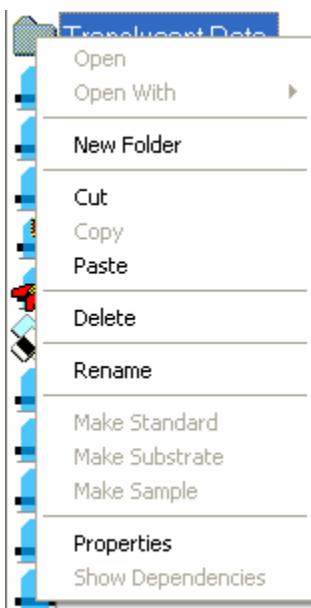
1. Highlight the record to be cut or copied, and right-click on the record to display the editing menu.



2. Click on the option to be executed, *cut* or *copy*. See also *Other Options, New Folder* in this section for instructions to create a new folder for the data.
3. For the copy function, highlight the folder to receive the data record.



- Right-click to display the editing menu.



- Click **Paste** to execute. The right pane will refresh and the data record will be displayed in the list of folder contents.

Folder View	Name	Type	State	Created by
My Database	REDOX 4	Sample	ROL/ROD	dci
Ingredient System	REDOX 8	Sample	ROL/ROD	dci
Demo Folder	REDOX 98	Sample	ROL/ROD	dci
STD DEMO WHITE	Std Orange 5A 1st Shot	Sample	REGULAR	User
STD GOLD PL	WHITE 30.0000%	Sample	ROL/ROD	dci
STD GREEN PL	YELLOW 16	Sample	ROL/ROD	dci
STD ORANGE PL	YELLOW 32	Sample	ROL/ROD	dci
Translucent Data	YELLOW 64	Sample	ROL/ROD	dci

NOTE

When copy is selected, the record displays in both folders.

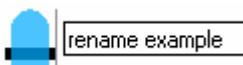
Rename Procedure

- Click on *Rename*. The current name of the sample will be highlighted:



- Place the cursor in the highlighted area.
- Use the *Backspace* key on the keyboard to remove the current letters.

4. From the keyboard enter a new name.



5. When you are finished, click anywhere in the window. The sample name will be updated immediately.

Delete Data

Navigator uses the same conventions used by Windows Explorer to delete data. You can delete individual data objects or complete folders from the database. It includes a trash can option that is similar to the Recycle Bin offered by Windows Explorer.

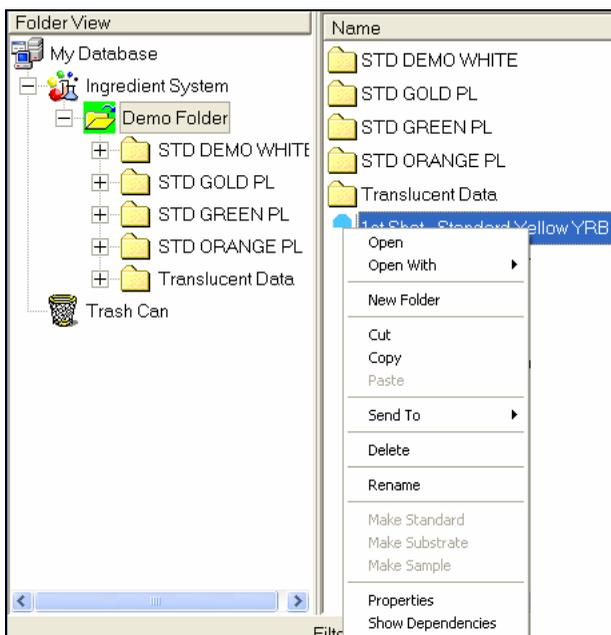
NOTE

These instructions assume that you have permission(s) to delete data objects and/or folders. Permissions to delete data are assigned to user groups.

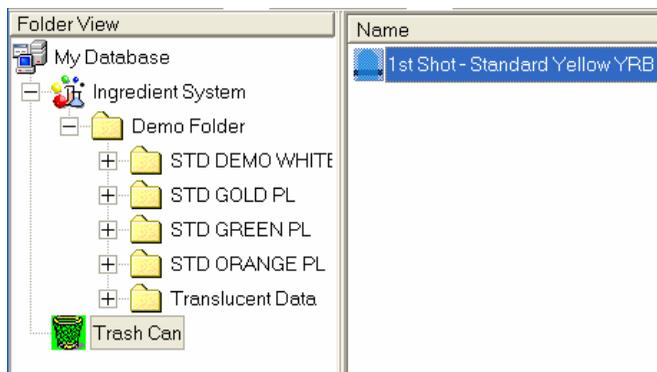
If you are logged in as a user that does not have rights to delete data objects or folders, you must exit the program and login as a different user with the correct permissions to delete the data. *See also Applications Technology, Data Security Option for a complete discussion of the data security capabilities.*

To delete an object from the database:

1. Highlight the object to be deleted, and right-click to display the Navigator menu:



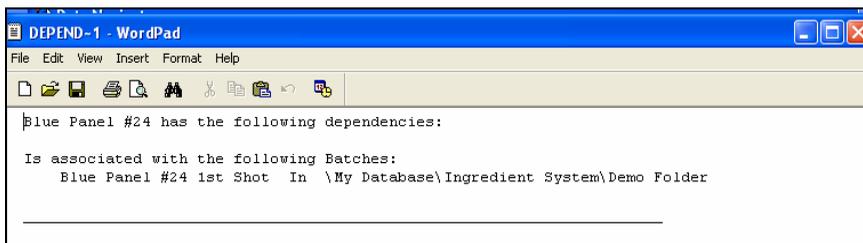
- From the menu, click **Delete**. The object is moved to the Trash Can:



The folder has been moved from the folder to the trash can, and is still in the database. See also *Trash Can Option* for instructions to restore the deleted folder, or to permanently delete it from the database. See also *Folder Dependencies* for information about exceptions to the Delete Folder command.

Data Dependencies

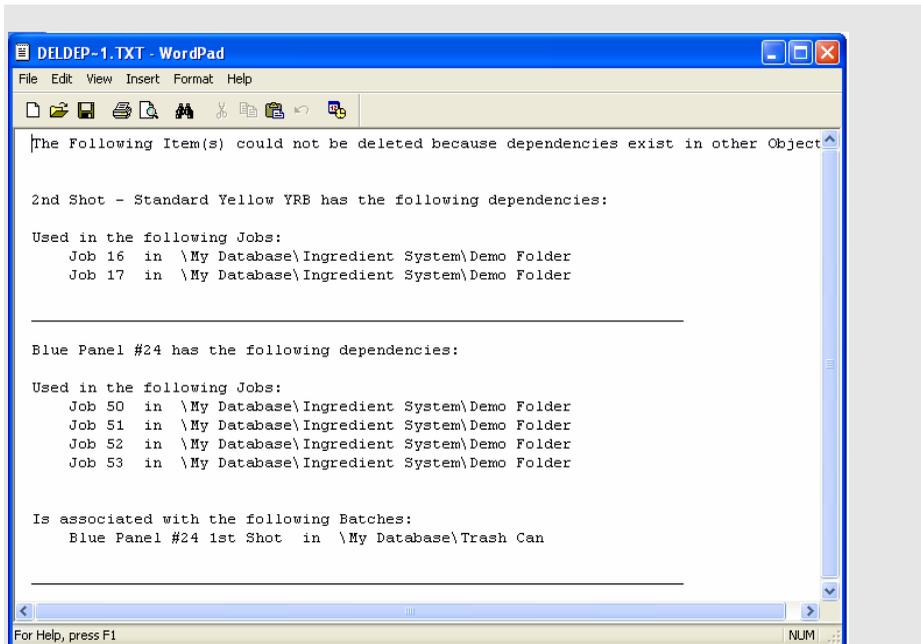
You cannot delete data objects that are active in other data objects. For example, a target or trial sample may be part of a job record, or a formula record, etc. created in Datacolor MATCH^{PIGMENT}. This is referred to as a *dependency*. When you select an item to delete that has dependencies, a message similar to the one below is displayed:



You cannot delete the data record *Blue Panel #24* until the dependencies are removed.

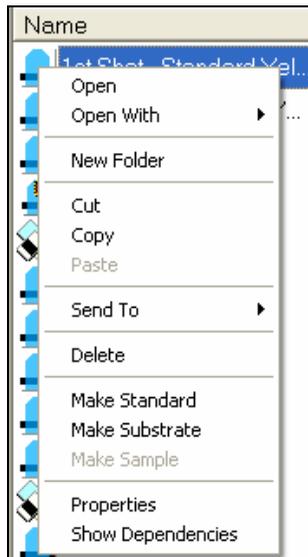
NOTE

You can select multiple objects to be deleted. Dependencies for each of the objects selected will be included in the message. Below is an example:

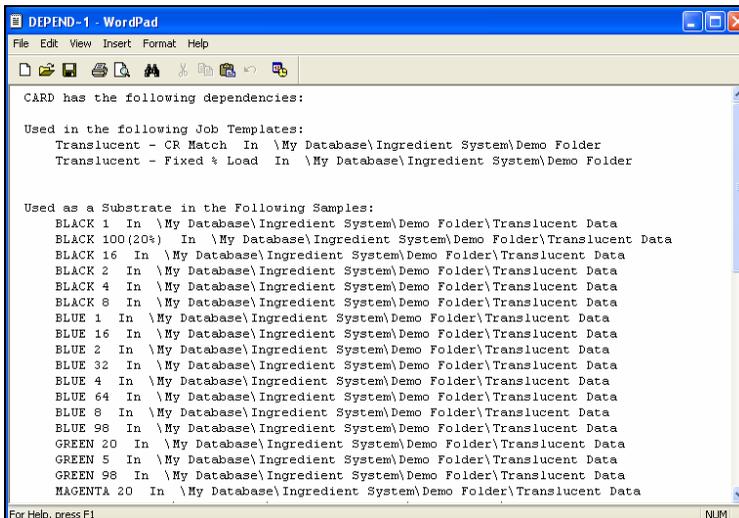


You can view the dependencies for any data object at any time. To do this:

1. Highlight a data object, and right-click. The data management menu is displayed:



2. Click **Show Dependencies**. A dialog that itemizes every dependency for the object is displayed:

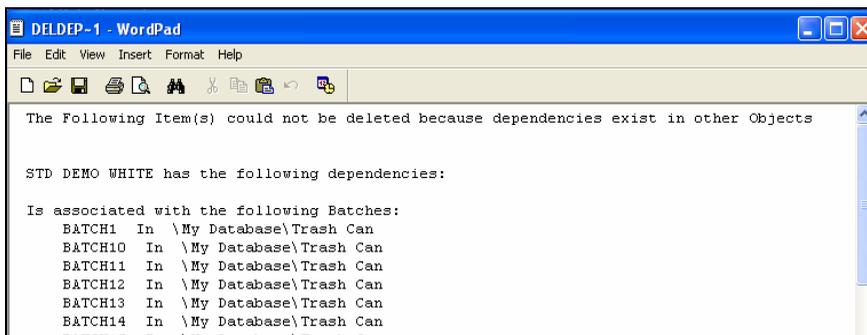


The data object CARD has numerous dependencies. The program will not let you delete this data object.

Folder Dependencies

When you delete a folder, the program checks the contents of the folder for data dependencies. For example, a standard or batch sample in the folder may be part of a job record or a formula record, in Datacolor MATCH^{PIGMENT}. This is referred to as a dependency.

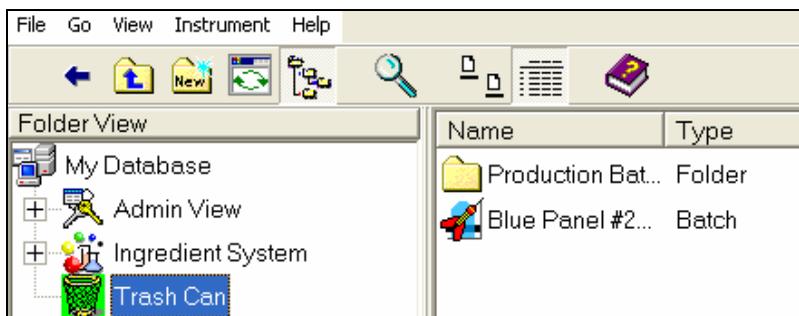
When you attempt to delete a folder that contains data active in other objects, the message below is displayed:



The program will delete all of the folder contents that do not have any dependencies. However, the folder itself will not be moved to the trash can for permanent deletion. To delete the entire folder, you must first remove all of the data objects in the folder that have dependencies.

Trash Can Option

When data objects or folders are deleted from the Navigator, they are placed in the trash can folder. This data remains in the trash can until it is permanently deleted.

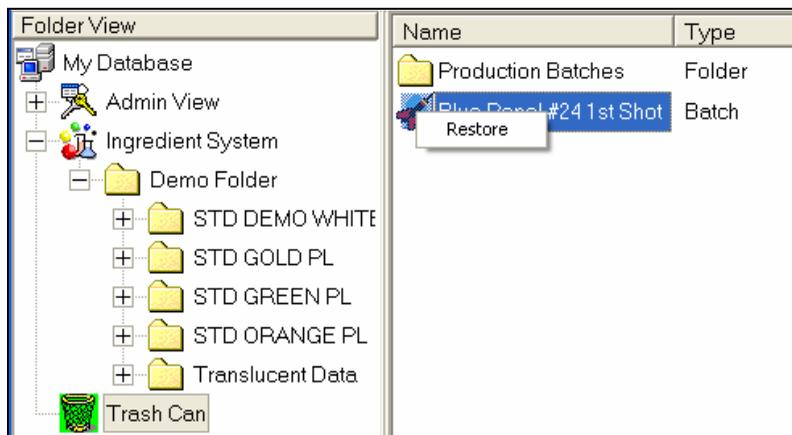


Any item in the trash can folder can be restored to its previous location or permanently deleted.

Restore Data from the Trash Can

To restore a single object:

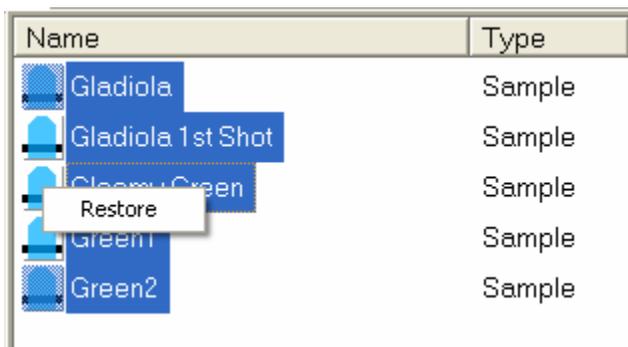
1. Highlight an object in the trash can, and right-click to display the option:



2. Click **Restore**. The object will be restored to the folder that previously held it.

To restore multiple objects:

1. Highlight the objects from the menu, and right-click to display the option:



2. Click **Restore**. Each object will be restored to the folder that previously held it.

Empty the Trash Can

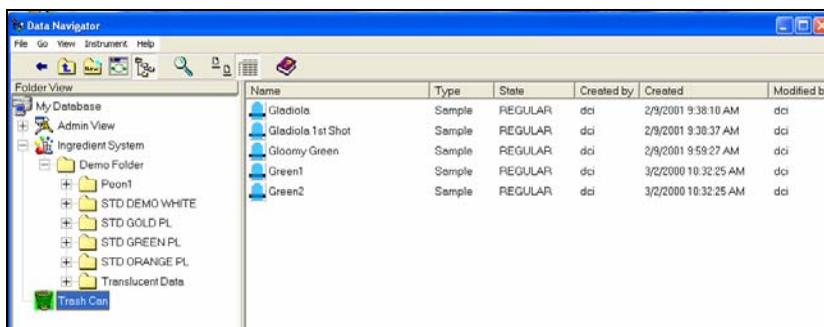
Emptying the trash can removes the data objects and folders permanently from the Datacolor TOOLS database.

NOTE

You must have Administrator rights to empty the trash can.

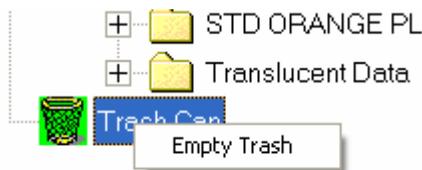
When you empty the trash can, all contents are deleted. You cannot selectively delete items in the trash can.

The trash can folder below contains 5 samples that were deleted:



To empty the trash can:

1. Right-click on the **Trash Can** icon in the Folder View. A menu is displayed:



2. Click **Empty Trash**. All of the folder contents are deleted.

If the data object is active in other folders or other data objects, the program will not let you delete the item. See also *Data Object Dependencies and Folder Dependencies for a discussion of dependencies*.

Disabling Trash Can Option

The Trash Can option can be disabled for all users (including Admin) through a setting in the CC_Global.Ini file.

WARNING

Making changes to the CC_Global.Ini file can significantly impact the program functions. This should be done under the supervision of Datacolor support personnel.

To disable the trash can option:

- In a [DataNavigator] section add the line "UseTrashFolder= 0". This setting bypasses the trash can, and all deleted data is deleted permanently.

Editing Data Object Types

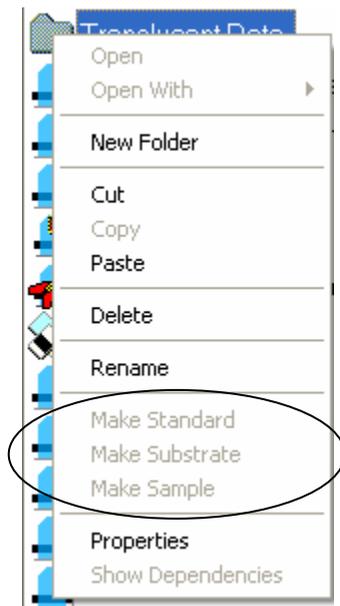
The data management tools include options to change the object type assigned to the record. This is useful when you are working with data in both Datacolor TOOLS and Datacolor MATCH^{PIGMENT}. In Datacolor TOOLS, the program does not recognize data called *samples*. All sample data retrieved to the TOOLS desktop must be labeled as either a *standard* or a *batch*. Datacolor MATCH^{PIGMENT} recognizes and uses sample data interchangeably as targets, trials and substrates. This group of editing options provides the flexibility to change data types to make them available to either program.

NOTE

Administrator rights are required to use the **Make Sample**, **Make Standard**, and **Make Substrate** options.

To access the options for modifying the data type:

1. Highlight a record to be edited in the List view (right pane). Right-click on the highlighted record to display the data management menu options:

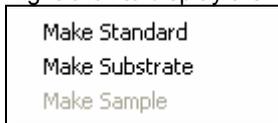


- **Make Standard.** Use this option to convert a *sample*, *batch* or *substrate* record for use as a *standard* in Datacolor TOOLS. A sample measured as a *Target* in Formula Central is saved as *Sample*, not as a *Standard*. This option allows you to change a sample into a standard without having to retrieve and restore it with Datacolor TOOLS.

1. Highlight a sample record to be converted:



2. Right-click to display the menu options:



3. Click **Make Standard**. The record will automatically update and the Type will be updated to reflect the change.

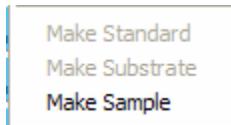


- **Make Sample.** Use this option to convert a standard or batch record to a sample. This makes it available for use in both Datacolor TOOLS and Datacolor MATCH^{PIGMENT}.

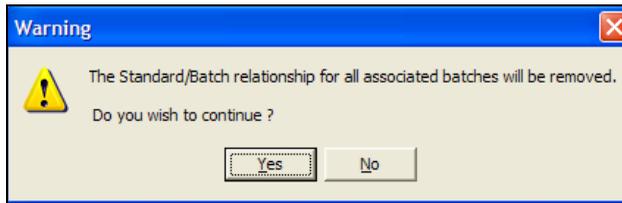
1. Highlight the record to be converted:



2. Right-click to display the menu options:



3. Click **Make Sample**. If the record is a Standard, there may be batch records associated with it for use in Datacolor TOOLS. This connection is lost when you change the type to *Sample*. The program alerts you to this change, and you must confirm that you want to continue.



4. Click **Yes**. The list will update, and the data type will reflect the change.



- **Make Substrate.** Use this option to convert a sample or batch record to a substrate record for use in Datacolor MATCH^{PIGMENT}.

1. Highlight the record to be converted.



2. Right-click on the record to display the Navigator menu options:



3. Click on **Make Substrate**. The list will update, and the data type will reflect the change.

Find and Filter Options

Data Navigator provides both *Find* and *Filter* options to select and display data objects. The *Find* options are used to search *across the entire Datacolor TOOLS database* to locate a particular data object(s) or folder(s). The *Filter* options are applied to the selection and display of data objects *within a single folder*. Each of these features uses pattern matching to select data, and each use the same operators to define the character strings for a search.

Operators Summary

Several operators are available, which enable you to find specific character strings anywhere in a name. These are used for both the *Filter* and *Find* options.

NOTE

The word *string* represents the characters that you will input into the name field of the dialog.

Symbols	Meaning
String(%)	Matches “string” and any number of characters following. NOTE: The % character is automatically appended to the string in the query.
String with Exact Match Option	Matches “string” only.
%string	Matches any number of characters preceding “string”.
%string%	Matches any number of characters before and after “string”.
_ Bl_e	Underscore “_” matches any one character. This example finds names starting with “Bl”, have any character in the 3rd position, and end with “e”.
[specifier]	The specifier in the brackets may take the following forms: Range. A range is of the form rangespec1-rangespec2 where rangespec1 indicates the start of a range of characters, the hyphen indicates a range, and rangespec2 indicates the end of a range of characters. Set. A set can be comprised of any discrete set of values, in any order. For example, [a2bR].  NOTE: The range [a-f], and the sets [abcdef] and [fcbaed] return the same set of values.

Symbols	Meaning
[^specifier]	The caret symbol (^) preceding a specifier indicates non-inclusion. [^a-f] means not in the range a-f; [^a2bR] means not a, 2, b, or R.

Find Option

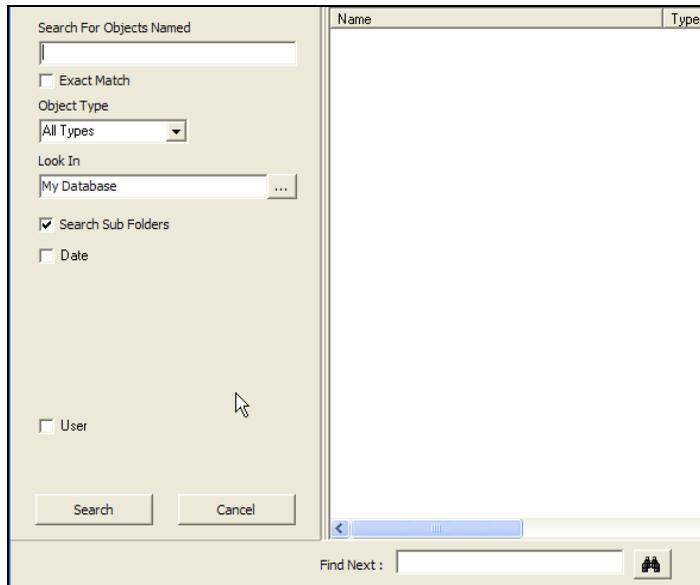
The Find option is used to search across the entire Datacolor TOOLS database for a particular data object(s) or folder(s).

NOTE

The Filter option restricts the search of data objects to a single folder.

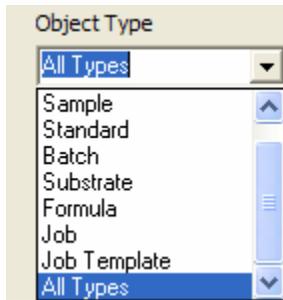
To use the Find option:

1. On the toolbar, click on the *Find* icon to open the Find dialog box. The window below displays:



2. **Search for Objects Named.** Enter a text string for the program to use for the search. You can limit your entry to a single character, or provide a more detailed text string.
3. **Exact Match.** Click the box to instruct the program to find an object with the exact name entered.
4. **Object Type.** You can limit the type of objects included in the search. Limiting the type of objects will speed the search.

- Click on the down arrow to view the object choices.



- Click to highlight the object type to be found.

5. **Look In.** Select to the folder to be searched. To open the browse dialog box, click on the **Browse** button:



6. **Search Sub-Folders.** Expands the search to include sub-folders in the folder selected. To enable this option, click to place a check in the box.
7. **Date.** This option will limit the search to objects with a specific date or date range. When selected, the dialog box below displays:

- To specify a date of creation or modification, click on the down arrow in the *Date* field, and highlight a selection.
- To search a date range, enter a starting (from) and ending (to) date. Click on the drop down arrow to view a calendar and make the appropriate selections.

You can narrow the search to a time range within a particular date range. Click on the arrows next to the *Time* fields, and further narrow the search range.

8. **User.** This option limits the search to objects created or modified by a particular user. When selected, the dialog box below displays:

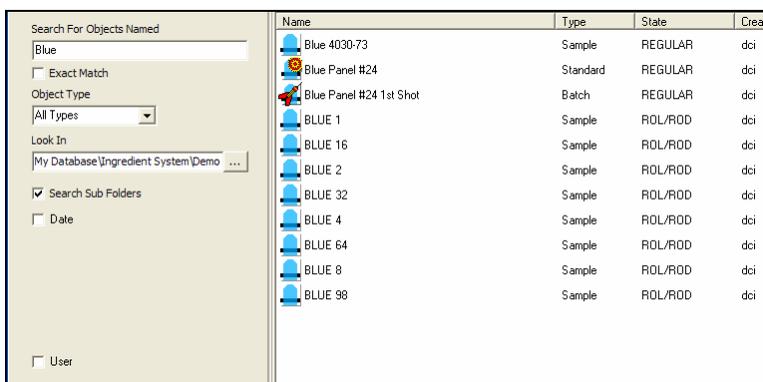


The image shows a search dialog box with a 'User' checkbox checked. Below it are two dropdown menus. The first dropdown menu is set to 'Modified' and the second is set to 'User'.

You must indicate if you are looking for files that were created or modified. Click on the down arrow in this field and make the appropriate selection.

You must identify the user. Click the down arrow to view all of the users on the system, and highlight the user to be the object of the search.

9. When you have made all selections, Click **Search**. The program displays the objects it found that satisfied your specifications:



The image shows a search results window with a table of objects. The table has columns for Name, Type, State, and Create. The search criteria on the left include 'Search For Objects Named' (Blue), 'Object Type' (All Types), 'Look In' (My Database \Ingredient System Demo), and 'Search Sub Folders' checked.

Name	Type	State	Create
Blue 4030-73	Sample	REGULAR	dci
Blue Panel #24	Standard	REGULAR	dci
Blue Panel #24 1st Shot	Batch	REGULAR	dci
BLUE 1	Sample	ROL/ROD	dci
BLUE 16	Sample	ROL/ROD	dci
BLUE 2	Sample	ROL/ROD	dci
BLUE 32	Sample	ROL/ROD	dci
BLUE 4	Sample	ROL/ROD	dci
BLUE 64	Sample	ROL/ROD	dci
BLUE 8	Sample	ROL/ROD	dci
BLUE 98	Sample	ROL/ROD	dci

Advanced Find Queries

Below are examples of operators you can use in the query to refine the search.

Query by Name Ending

Use the % character to find a specific string at the end of a name.

Syntax: %string

In this example, the user input the string %Blue Panel #24.

Search For Objects Named

Exact Match

Object Type

Look In

Search Sub Folders

The % indicates any characters preceding the input string are acceptable for the query. The query says find all objects that end with the string “Blue Panel #24”.

Below are the results of this query. Notice that the results cover several locations:

Name	Type	State	Location
Test Blue Panel #24	Sample	REGULAR	My Database\Ingredient System\Demo Folder
Blue Panel #24	Standard	REGULAR	My Database\Ingredient System\Demo Folder\Production\Location 1\Lab A\Standards
New Blue Panel #24	Standard	REGULAR	My Database\Ingredient System\Demo Folder\Production\Location 1\Lab A\Standards

Query by Name, Mid String

Use the “%” character to find a specific string anywhere in a name.

Syntax: %string%

In this example, the user input the string *%Blue Panel #24%*.

Search For Objects Named

Exact Match

Object Type

Look In

Search Sub Folders

The % character indicates any characters preceding or following the input string are acceptable for the query. This query says find all objects that have the string “Blue Panel #24” anywhere in the name.

Below are the results of this query:

Name	Type	State	Location
 Test Blue Panel #24	Sample	REGULAR	My Database\Ingredient System\Demo Folder
 Test Blue Panel #24 test	Sample	REGULAR	My Database\Ingredient System\Demo Folder
 Blue Panel #24 1st Shot	Batch	REGULAR	My Database\Ingredient System\Demo Folder\Production\Location 1\Lab A\Batches
 Blue Panel #24	Standard	REGULAR	My Database\Ingredient System\Demo Folder\Production\Location 1\Lab A\Standards
 New Blue Panel #24	Standard	REGULAR	My Database\Ingredient System\Demo Folder\Production\Location 1\Lab A\Standards
 New Blue Panel #24 VCN	Standard	REGULAR	My Database\Ingredient System\Demo Folder\Production\Location 1\Lab A\Standards

Filter Options

The filter input is located at the bottom of the Open Dialog window:

 YELOX 64	Sample	ROL/ROD	dci	10/9/2001 3:58:11 PM	dci
 YELOX 8	Sample	ROL/ROD	dci	10/9/2001 3:58:11 PM	dci
 YELOX 98	Sample	ROL/ROD	dci	10/9/2001 3:58:12 PM	dci

filter By:

The filter function uses the same operators used by Find. However, a filter limits the search to the active folder.

NOTE

The *Filter By* entry can be combined with the *Name* option. The filter option will set the items available in the folder list view. When a name is input in the selection field, the program will only search the filtered list and not the entire folder. You can enter a partial or complete name, and move immediately to the first occurrence of that name in the folder list. This creates a very powerful tool for filtering and searching records in large databases.

Sorting Options

There are sorting options available to perform a summary review of the contents of a folder.

In the *List* view, column headings are displayed. The data can be sorted alpha-numerically based on any of these headings.

- **Name.** Sorts the data alphabetically by name. This sort is limited to the first letter of the first name of the record.
- **Type.** Sorts the data by type.
- **State.** Sorts the data by object state.
- **Created by.** Sorts the data by user that created the record.

- **Created.** Sorts data by date created.
- **Modified By.** Sorts data by user who made the last change to the record.
- **Modified.** Sorts the data by date of last modification.
- **Location.** Sorts the data by folder location.
- **GUID.** This is an alpha-numeric code assigned to a record by Datacolor TOOLS. The data can be sorted by this code.

NOTE

This code is only assigned to records created from Datacolor TOOLS.

Other Options

This section includes options on the data management menu not previously discussed. To access this menu:

1. Highlight an item in the right pane.
2. Right-click on the highlighted item. The menu below is displayed:



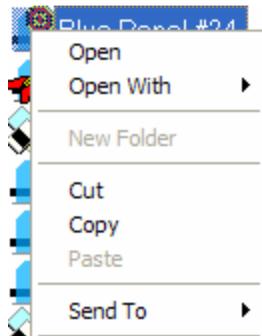
Send To

This option allows you to export individual data objects to another location. You can choose either a QTX or XML file format. These file formats enable the sharing of this data with other Datacolor users, and other 3rd party applications.

NOTE

The data included in the XML record can be viewed by examining the properties of the data record. *See also Other Options, Properties for information to display the object properties.*

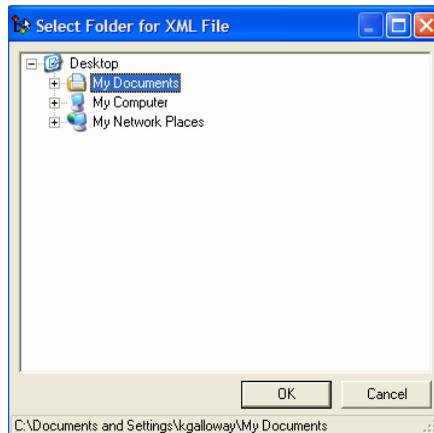
1. Highlight the record to be sent, and right-click to display the data management menu:



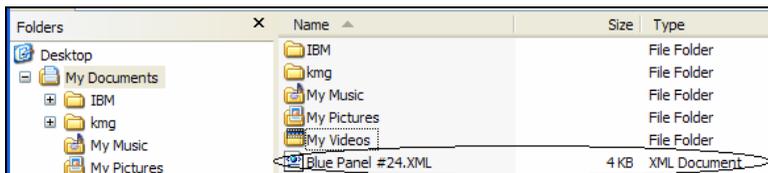
2. Click **Send To**. A submenu is displayed:



3. Select the file type to be exported. The program will open a dialog box to select the folder to receive the XML file:



4. Highlight the folder to receive the XML file, and click **OK**. The window closes.
5. Browse to the folder selected to receive the file. The record will be displayed as and XML document:



6. Right-click on the highlighted folder to display the menu options:

Properties

This option is used to examine the properties of a particular data object.

1. Highlight the object to be examined:



2. Right-click on the data object to display, and click *Properties*.

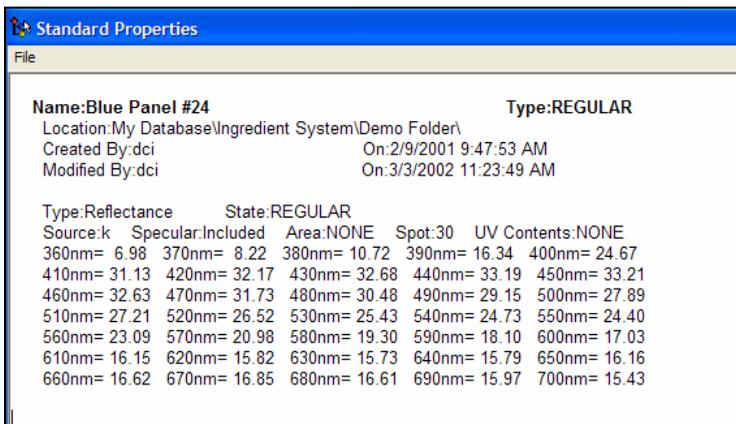


A window will open, displaying information for the object selected.

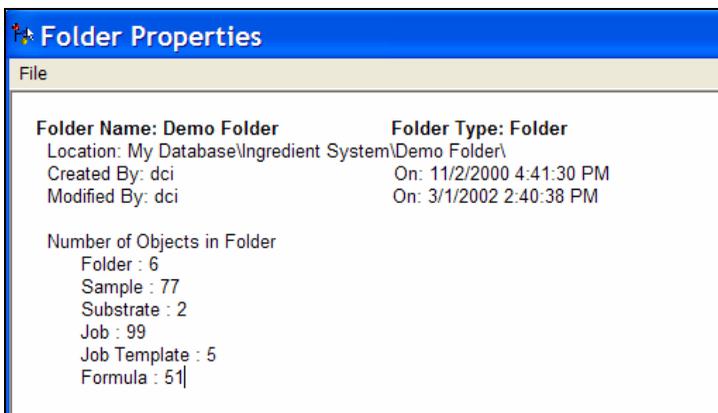
NOTE

The property information displayed is the information exported to an XML file when the *Send To* option is selected. The contents will vary depending on the type of object selected.

Below is an example of the properties displayed for a standard:



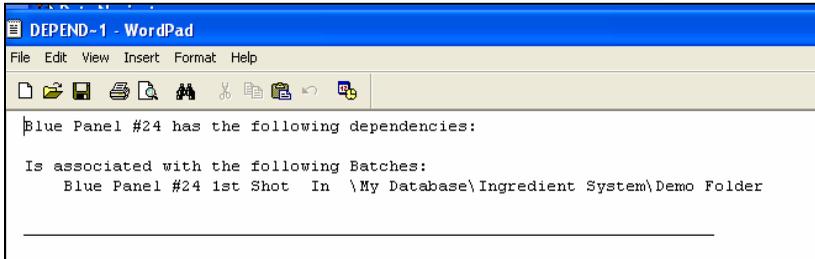
Below is an example of the properties displayed for a folder:



The property display for a folder will include a list of the number of each object type contained in the folder.

Show Dependencies

When using Datacolor TOOLS, it is common for data objects to become part of multiple data records. When you are using Datacolor MATCH^{PIGMENT}, a standard may be included in one or several job records, a formula record, etc. This is referred to as a data *dependency*. This option displays the data dependencies for the selected data object. When you select this option, a message similar to the one below is displayed:



The program will not allow you to delete any data objects that have dependencies. In this example, you cannot delete the sample Blue Panel #24 until the dependencies are removed. See also *Trash Can Option for instructions to permanently delete objects*.

Toolbar

The Toolbar on the browser window contains buttons providing quick access to functions frequently needed for data management.



Below is a description of all icons on the browser toolbar:



Back. Returns to previous folder.



Up. Moves *up* one level in the folder structure.



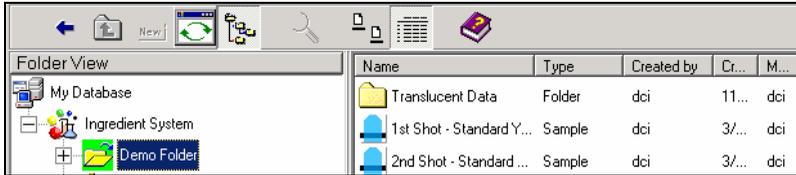
New. Creates a new folder. *Not currently enabled.*



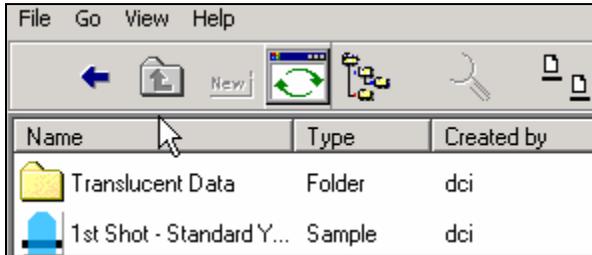
Refresh List. Updates the data listed in the window.



Show/Hide Folder Tree. Changes the Navigator window view. The default view displays two panes, including both the *Folder* and *List* views.



- Click on the *Show/Hide Folder Tree* icon to change the view to single pane. Below is an example of the List view:



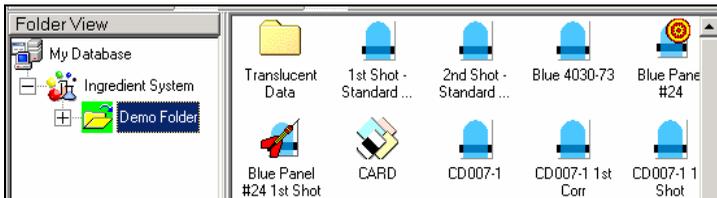
- Click on the icon again to restore the Folder View.



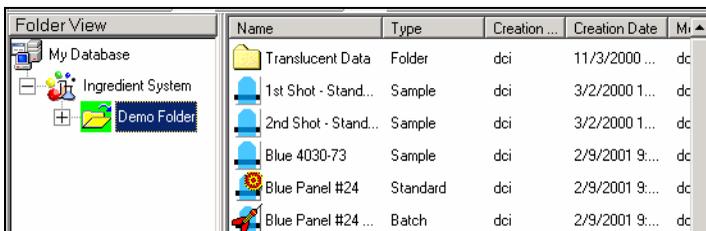
Find. See *Find Option* for details.



View Icons. The *List* view displays icons representing the folder contents:



View Details. The *List* view displays details of the folder contents:





Help. Opens the Datacolor TOOLS help system.

Data Management: Textile Database

This section provides detailed instructions for the data management features available for the textile database configuration.

Accessing the Database

The database is accessed from the Datacolor TOOLS desktop. You must execute a *store* or *retrieve* function. Two methods are available to do this:

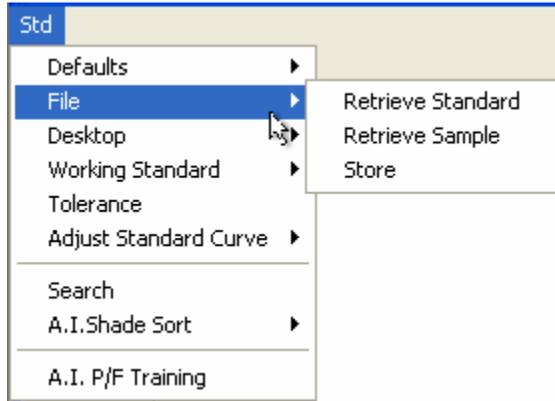
Access from the desktop. You can access the database browser by selecting either a **Store** or **Retrieve** button from the Datacolor TOOLS desktop.

- From the desktop, click on the **Retrieve Std** or **Retrieve Bat** button:

Standard Name		0 of 1	
↑	<input type="text"/>	↓	
New Std	Retrieve Std	List Std	Store Std
Batch Name		of	
↑	<input type="text"/>	↓	
Date:		Time:	
Retrieve Bat	List Bat	Store Bat	Store All Bats

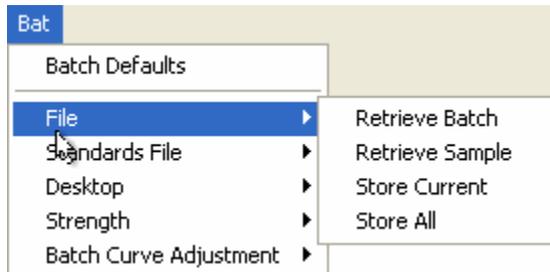
You can also access the database browser when any one of several menu options are selected.

- Click on **Std** menu, **File**, and select one of the *Retrieve* options to open the Browser dialog.



~OR~

- Click on **Bat Menu, File**, and select one of the *Retrieve* options to access the Browser.



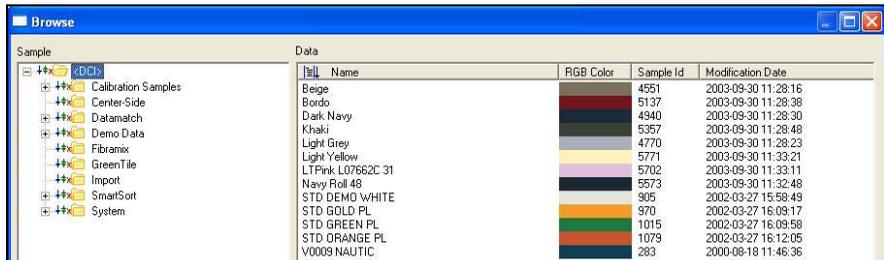
NOTE

The data objects displayed in the browser window depend on the option you select. For example:

- If you retrieve a standard, only the data objects identified as *standards* are displayed.
- If you retrieve a batch, only the data objects identified as *batches* are displayed.
- If you retrieve a sample, *standards* and *batches* are included in the display.

Browsing the Database

The screen below displays the folder tree in Datacolor TOOLS for the default (demo) *textile* database configuration:



The *folder permissions* for the active user are identified by icons to the left of the folder icon:

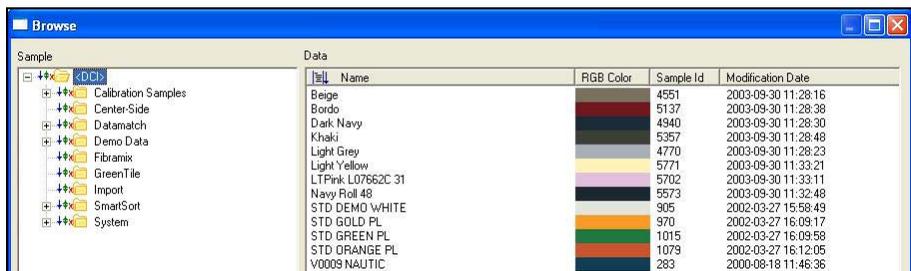


- ↓ User has **Create** rights for the folder
- ↑ User has **Modify** rights for the folder
- × User has **Delete** rights for the folder.

See also *Data Security, Folder Permissions* for instructions to assign or change folder permissions.

Flat Data View

This option controls the display of data in the folder tree. The screen below displays the folder view for the default (demonstration) data base for a textile configuration:



Changes to Folder Organization

In previous versions of Datacolor TOOLS, when the root folder *{All Data}* was selected for browsing purposes, all data (data objects and subfolders) in the root folder would be displayed automatically:

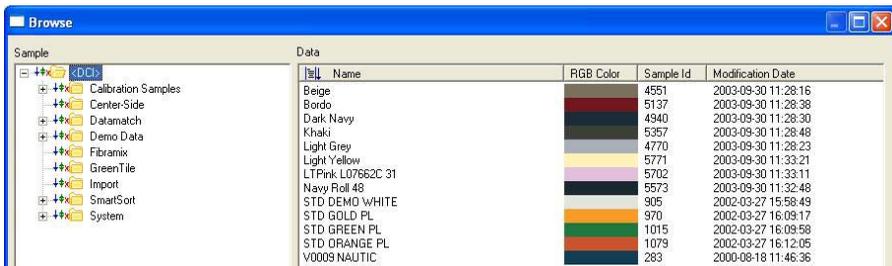


NOTES

The display of data objects are subject to user rights. *See also Data Security, Permissions for a discussion of viewing restrictions.*

The data objects displayed depend on the program function used to open this window. For example, if **Retrieve Standard** was used, only those data objects that are *standards* are displayed. In the example above, *Retrieve Standard* was used, and the browser is only displaying *standard* data objects.

In the current version of TOOLS, the *All Data* folder no longer exists. It has been replaced by the *<Root>* folder, which carries the name of the login user. Below is an example of the *root* folder display for the default user, *DCI*:

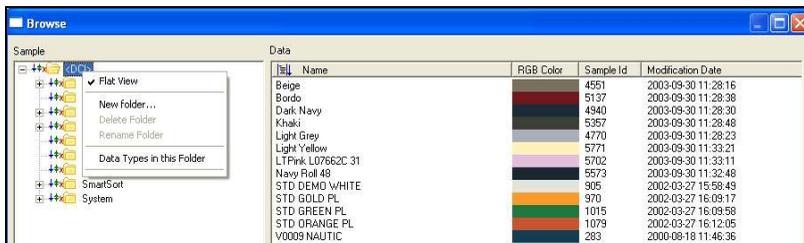


This display is similar to the previous one, in that all of the data records and subfolders in the root directory are displayed. However, the root folder displayed is based on the user, in this case, *DCI*.

Beginning with Datacolor TOOLS v. 1.2, you have an option to expand or restrict the display of individual data records for your *root* folder. This is done through the use of the *Flat Data View option*. When it is enabled, this feature preserves the complete record display available in previous versions of Datacolor TOOLS, when the folder <All Data> was selected.

Flat Data View Examples

Example 1 below is an example of the display when Flat Data View is enabled. It displays an *unrestricted* view of the data for the root folder, <DCI>:



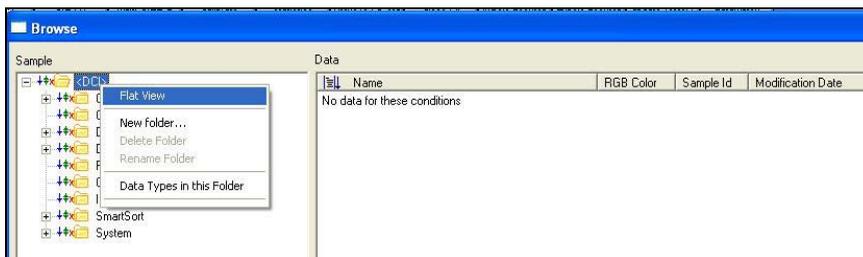
Example 1

The right pane of this window displays *all* of the individual records from all of the subfolders in the root folder, <DCI>. The user sees all of the folders and data object types included in its root directory, which the user has *permission* to see. See also *Applications Technology, Data Management, Permissions for a discussion of folder and data object permissions*.

NOTE

The data objects displayed depend on the program function used to access this window. For example, if **Retrieve Standard** was used, only those data objects that are *standards* are displayed. In the example above, *Retrieve Standard* was used, and the browser is only displaying *standard* data objects.

Example 2 below is a restricted view of the same root folder:



Example 2

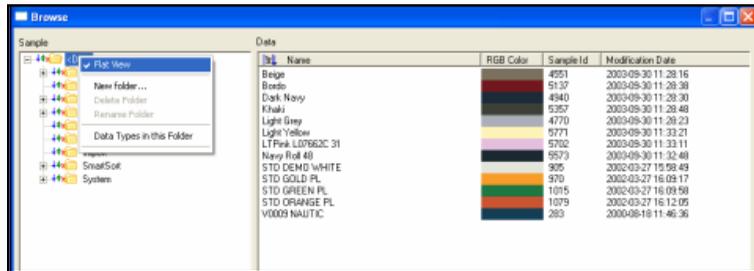
The individual data records are not displayed in this view. This happens for two reasons:

- There are no individual data records the root folder <DCI>, which the user has permission to see.
- The *Flat Data View* option is disabled. Access to individual data records in the subfolders included in <DCI> has been restricted for this user.

Configuring the Flat Data View

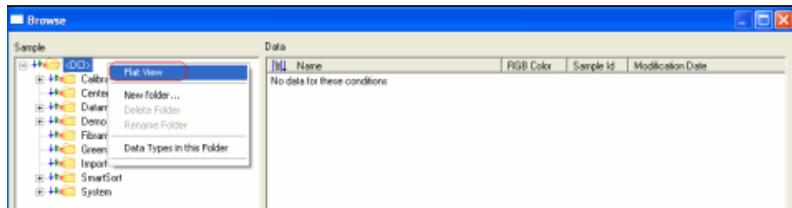
To display all of the records for the root folder, you must enable the *Flat Data View* option. This is accessed directly from the Data Management window:

1. Right-click on the root folder in the left window pane. A menu displays:



A check next to *Flat View* enables the option. In the example above, the option is enabled, and all of the data records are displayed.

2. Click on **Flat View** to remove the check and disable the option:



In this example, *Flat View* is disabled. It does not display any records in any of the subfolders. The only individual data records it displays are records in the folder *DCI*. In this example, no individual data records are included in the folder *DCI*.

NOTES

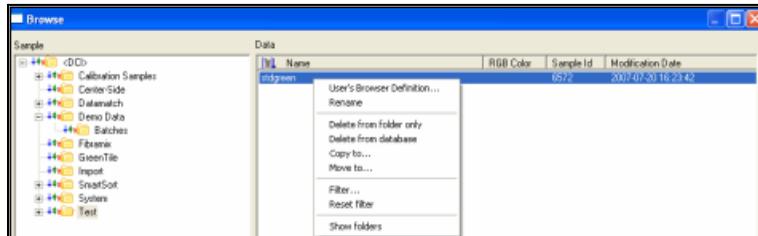
The Flat Data View cannot be disabled for the user *Admin*. The *Admin* user has complete viewing rights that cannot be restricted.

The Flat Data View option can also be enabled/disabled from the System Menu. See also *System Menu, Setup for instructions*.

Managing Data Records

In the textile database configuration, there are several options available to the user for data management, subject to other rights. *See also Data Security, Permissions for a discussion of user permissions.* These options are included on a menu accessed from the Browse window.

- To access the data management menu, **right-click** on a data object:



Edit Options

- **Rename.** Allows the user to change the name of the data record selected.
- **Copy to.** Makes a duplicate of the data record selected in another folder. When the copy is completed there are two identical records. You must specify the destination folder.
- **Move to.** Moves the data record selected to another folder. When the move is completed, there is only one data record. You must specify the destination folder.

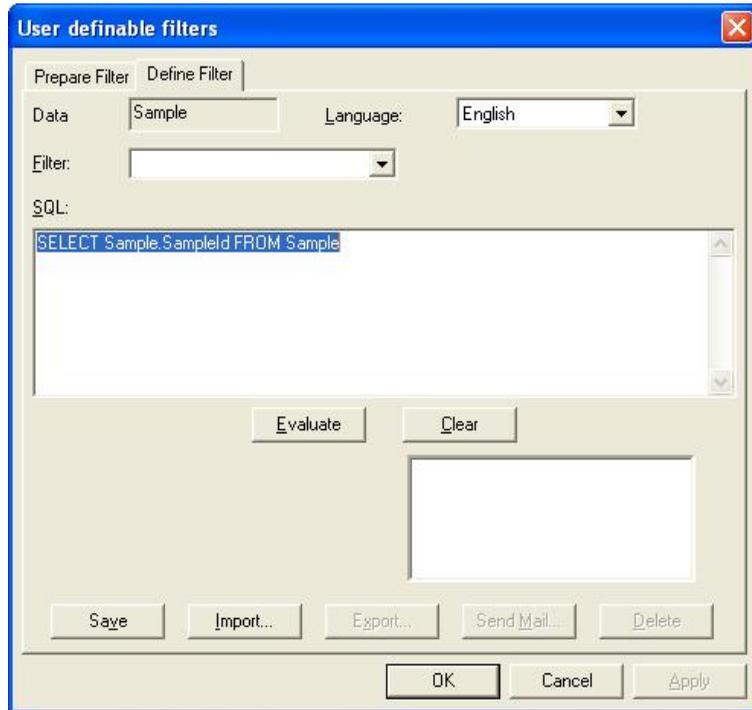
Delete Options

The textile database configuration includes two delete functions.

- **Delete from folder only.** The data object is deleted from the active folder only. If duplicates of this record are stored in other folders, they will remain intact.
- **Delete from database.** The data object is deleted from the database. When there are duplicates of the record, all instances of the record are deleted.

Filter Options

- **Filter.** Displays a window that allows you to define/select a custom filter to be applied to the data display.



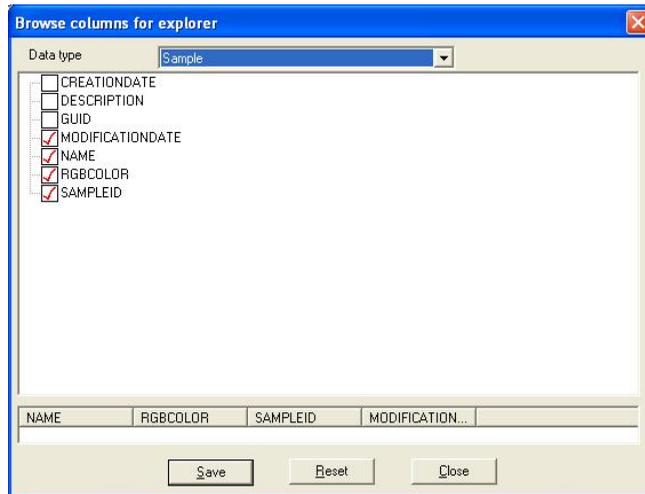
NOTE

You can create an SQL query to filter the display of records in the browser. This procedure is beyond the scope of this document. *Contact your Datacolor Applications Specialist for information to write custom filters.*

- **Reset Filter.** Removes the filter currently applied. The list will refresh and all data objects and folders available will be displayed.

Other Options

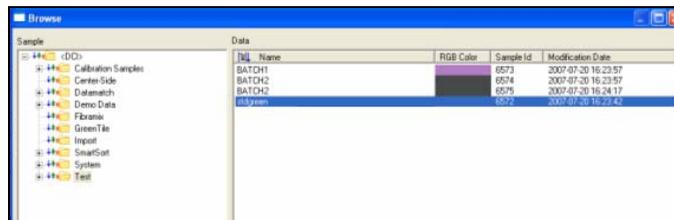
- **User's Browser Definition.** This option identifies the data object properties that are displayed:



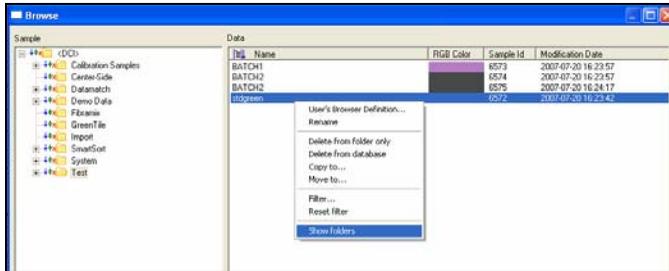
- **Data type.** There are several different types of data, such as standards, batches, samples, etc. The properties displayed in this window are available for the data type selected.
 - **Check boxes.** These boxes correspond to each header in the *Browse* window. A check indicates that the information is displayed. To change the properties displayed:
 - Click to place a check in the box to display the property.
 - Click again to remove the check.
 - When you have completed the selections, click **Save**.
 - Click **Close**, to close the Browse window.
3. **Show Folders.** When you are viewing individual data records in the user folder, there is no identification regarding the folder location of each object. This option is used to identify the folder(s) that hold the record.

To identify the folder holding the record:

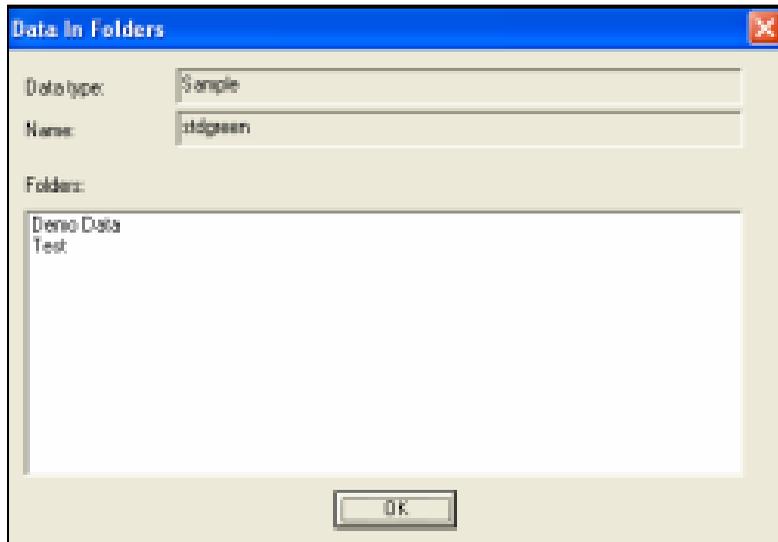
- Highlight the record, and right-click.



The *Browse* menu displays:

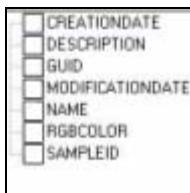


4. Click on **Show folders**. A window will display information regarding the data object, including the folder(s) that hold this record:



Sorting Options

You can resort the data list based on any of the data object properties displayed. Below is a summary of the possible data object properties that may be displayed for your user:



- **Creation Date.** Sorts data by date created
- **Description.** An alpha-numeric search based on the first word in the object description.
- **GUID.** This is an alpha-numeric code assigned to a record by Datacolor TOOLS. The data can be sorted by this code.
- **Modification Date.** Sorts the data by date of last modification.
- **Name.** Sorts the data alphabetically by name. This sort is limited to the first letter of the first name of the record.
- **RGB Color.** Sorts the records based on the numeric values of the RGB that identifies the color.
- **Sample ID.** This is an alpha-numeric code assigned to a record by Datacolor TOOLS. The data can be sorted by this code.

Interpreting Color Differences

All color difference equations include a calculation of the differences between the batch and standard for each three dimensions, or axes. Many equations report differences between the standard and batch along a 'red-green axis', a 'yellow-blue' axis and a 'lightness-darkness' axis.

Some equations report color differences using an alternate system that expresses the 3 dimensions of color space as hue (differences in color shade), chroma (differences in color intensity or saturation) and lightness. Every color difference equation calculates a DE value, which represents the overall color difference between the samples.

Understanding the Numbers

Regardless of the color difference equation you use, color difference components are expressed as negative or positive distances from the batch to the standard. However DE, the total color difference, is always a positive number.

Below is a table containing all of the color difference equations included in the Datacolor TOOLS software. It includes the name of the equation, and details of the color difference calculation it displays.

CIELab

Color Space Model	Based on CIELAB color space model
Red-Green Difference	Da (+Da*) batch is redder than std. (-Da*) batch is greener than std.
Yellow-Blue Difference	Db (+Db*) batch is yellower than std. (-Db*) batch is bluer than std.
Lightness-Darkness Difference	DL (+DL*) batch is lighter than std. (-DL*) batch is darker than std.
Other Differences Displayed	DC = Chroma <ul style="list-style-type: none">• (+DC*) batch is more saturated than std.• (-DC*) batch is less saturated than standard. DH. This represents the hue component of the color difference. Its sign (\pm) indicates the direction of the hue shift, which is dependent upon the color of the standard. Generally, the magnitude of the hue difference (rather than the direction) is typically a key indicator of the quality of the color match. Small DH values generally correspond to acceptable visual matches.
Overall Color Difference	DE*

CIE L*C*H*

Color Space Model	CIELAB color space model
Red-Green Difference	N/A
Yellow-Blue Difference	N/A
Lightness-Darkness Difference	DL (+DL*) batch is lighter than std. (-DL*) batch is darker than std.
Other Differences Displayed	C (chroma) and H (hue) differences described under CIELab.
Overall Color Difference	DE

CMC

ColorSpace Model	CIE LAB color space model
Red-Green Difference	N/A
Lightness-Darkness Difference	DL (+DL) batch is lighter than std. (-DL) batch is darker than std.
Other Differences Displayed	C (chroma) and H (hue) differences described under CIELab.
Overall Color Difference	DE

CIE2000

Color Space Model	CIELAB color space model
Red-Green Difference	N/A
Yellow-Blue Difference	N/A
Lightness-Darkness Difference	DL (+DL) batch is lighter than std. (-DL) batch is darker than std.
Other Differences Displayed	C (chroma) and H (hue) differences described under CIELab.
Overall Color Difference	DE

Hunter

ColorSpace Equation	Based on transformation of CIE tristimulus space, using Hunter Lab equation.
Red-Green Difference	Da (+Da) batch is redder than std. (-Da) batch is greener than std.
Yellow-Blue Difference	Db (+Db) batch is yellower than std. (-Db) batch is bluer than std.
Lightness-Darkness Difference	DL (+DL) batch is lighter than std. (-DL) batch is darker than std.
Other Differences Displayed	No
Overall Color Difference	DE

Comparing the Results from Different Equations

Below is an example of a CIEL*a*b* color difference report:

Display LAB PF				
Standard Name	CIE L*a*b* Color Difference			
STD ORANGE PL	D65 10 Deg			
Batch Name	DL*	Da*	Db*	DE*
BAT1	0.14	1.48	3.64	3.93

- The DL is positive (no sign), making the batch LIGHTER than the standard (0.14)
- The Da* is positive (no sign), making the batch REDDER (or less GREEN) than the standard (1.48)
- The Db* is positive (no sign), making the batch yellower (or LESS BLUE) than the standard (3.64)
- The overall color difference is 3.93 CIELab units.

Below is an evaluation of the same sample data, applying the Hunter Lab, rather than CIEL*a*b* equation:

HunterLAB Pass/Fail			
	Standard	Batch	Deltas
L	43.95	44.09	0.14
a	42.38	43.97	1.60
b	20.96	22.15	1.18
DE			1.99

- The batch is lighter than the standard (+L)
- The batch is redder than the standard (+a)
- The batch is yellower than the standard (+b)
- The overall color difference is 1.99 Hunter Lab units.

As you can see, the equation uses similar labels for the three axes (L, a, b), and the results are similar, but not identical to the CIEL*a*b* evaluation

NOTE

If you are communicating Lab values, be sure to verify which equation you are using. For example, Hunter Lab and CIEL*a*b* use the same notations, but the numerical values are NOT the same.

Acceptability Tolerances

Tolerancing tools may be the most fundamental feature offered by instrumental color evaluation systems. In a fast paced production environment, instantaneous pass/fail evaluations are an essential step in the process, and the introduction of instrumental tolerancing systems to the QC environment makes fast, consistent color evaluations possible.

A pass/fail tolerance sets an acceptability limit on specific parameters. The color differences between the standard and the batch are compared to the acceptability tolerances for that standard, and the program displays a Pass/Fail report. Datacolor TOOLS provides you the ability to establish tolerancing systems using traditional approaches, largely based on numeric descriptions of the color. You typically begin by identifying the color difference equation (e.g., CMC, CIEL*a*b*, etc.) to be used, and a single tolerance value, DE, to define the acceptability of the color match. When additional parameters, such as DL*, Da*, Db*, DC*, and DH, are added to the tolerance, the tolerance becomes more refined, and will yield instrumental pass/fail evaluations that more closely agree with your visual evaluation of the color.

Datacolor TOOLS offers you the ability to set up traditional tolerancing systems for any color difference equation included in the program. It provides a wide variety of choices regarding color difference equations, the ability to assign tolerances to individual standards, to apply the same tolerance to multiple standards, and to combine different equations in a single tolerance. The choice of equations is often based on the color specification your customer uses to evaluate the product. If your customer is **not** using instrumental color evaluations to perform quality control inspections on the products you supply, you can select a color difference equation to be used as your (internal) company standard.

Included in the tolerance choices is the Datacolor Formula. Similar to A.I. Pass/Fail, it incorporates visual assessments of the samples into the generation of an acceptability tolerance, improving the agreement between the instrumental and visual assessments of the samples. However, it differs from A.I. Pass/Fail in that it does not limit the data used to a single standard. It can incorporate multiple standards in single 'tolerance block', and the standards included can cover a wide range of hues allowing you to create a tolerance that can be applied universally.

NOTE

Some of the tolerancing options are not enabled for Datacolor TOOLS^{QCX}.

Tolerance Types

Datacolor TOOLS offers three types of tolerances:

- **Local Tolerance.** This is a unique tolerance created for an individual standard. It cannot be assigned to more than one standard. Local tolerances are created through *Standard Menu/Tolerances*, and they never appear in any tolerance lists. The parameters defined for a local tolerance

can only be created, viewed or edited by moving the standard to the desktop, and selecting Standard Menu/Tolerance/Local.

- **System Tolerance.** This is a single tolerance that serves as a system-wide default tolerance. It is selected from the Shared Tolerances defined for your system. If you use the same acceptability tolerance for every product you make, you can assign this tolerance as the system tolerance, and it will be applied to every standard in the program. The System Tolerances is accessed from System Menu/Tolerances.
- **Shared (Global) Tolerance.** This is a tolerance that can be applied to more than one standard. Shared Global Tolerances are accessed from System Menu/Tolerances.

Using *Shared Tolerances*, you can create multiple tolerances for the same equation. For example, you may have 2 CIEL*a*b* tolerances defined, each having a different set of acceptability limits, and each having a different name (i.e. CIEL*a*b* 1 and CIEL*a*b* 2). Shared tolerances can be assigned to individual standards, and can be created, edited or deleted at any time. The default System Tolerance is chosen from the list of Shared (Global) Tolerances.

Local Tolerances, *Shared Tolerances* and *System Tolerances* may include more than one color difference equation. When you create a tolerance you are not limited to working with one color difference equation. You can string together several discrete color difference equations in a single tolerance. For example, you can set acceptability limits on both CMC and CIEL*a*b* parameters in a single evaluation, and name it 'CMC & CIELAB'. When you assign this tolerance to a standard, and select a pass/fail evaluation form for the CMC equation, the evaluation is based on the values stored in this tolerance for the CMC parameters. When you select a CIEL*a*b* pass/fail form for the same standard, the evaluation is based on the CIEL*a*b* values in the tolerance.

Creating a tolerance that contains multiple color difference equations can be useful for those standards (products) that are supplied to multiple customers, each having their own acceptability tolerance. A shared tolerance can be created that includes all of the pass/fail equations that are applied to this standard. When this tolerance is assigned to the standard, you can display any of the pass/fail evaluations you need to review, without reselecting either the standard or the tolerance.

Each time you assign/reassign a tolerance to a standard, the program requires that you store the standard and the tolerance information into a folder in the database. It also requires that any updates made to the tolerance information are stored. Whenever you make any changes to an existing Shared (Global) Tolerance, those changes will be applied to every standard using the tolerance, regardless of the tolerance values originally stored with the standard.

Example: You assigned the shared CMC tolerance to Std 1 last year. The original DE value for the tolerance was 1.0. Today, you edited the CMC DE limit for the (shared) CMC tolerance to 0.9, and then recalled Std 1. The pass/fail evaluation for Std 1 would be based on the current tolerance for CMC, not the original value of 1.0.

Shared (Global) tolerances cannot be deleted if they are assigned to a standard. To delete one of these tolerances, you must first recall all standards in the database that are using the tolerance, and change the tolerance assignment. Once the tolerance is disassociated from all of the standards, you can delete the tolerance.

Tolerance Hierarchy

When you select a printer or screen form that contains a pass/fail evaluation, you will **always** receive a Pass/Fail evaluation, **regardless of whether you have declared a tolerance for the color difference equation used in the form.** The program first looks at the tolerance assigned to the standard. If no tolerance exists for the color difference equation being used, the program defaults to the embedded tolerance for the color difference equation, built into the program code. For example, if you select FMC-2 pass/fail, you will receive a report of the color difference (FMC-2 units) between the standard and batch, AND a pass/fail evaluation, even if there is not an FMC-2 tolerance associated with the standard, or included in the default system tolerance

NOTE

Tolerances are set in the program code for every color difference equation offered, and they cannot be viewed, edited or deleted. *See also Appendix, Embedded Tolerances for details regarding the tolerance defaults stored in the program code.*

Pass/Fail Determination

Once you have established your tolerances, you can run a pass/fail evaluation. When the batch color difference is less than the acceptability limit *for each of the parameters defined*, the batch "Passes." If the batch color difference is greater than the limit *for any single parameter defined*, the batch "Fails." When the batch color difference is greater than 75% of the tolerance limits defined for any of the parameters, a 'Warning' is displayed.

In order for the Pass/Fail evaluation to be valid, the screen or printer form that you are using must have the appropriate color difference equation to display the correct text and values. You should make sure that the form you are using includes the correct pass/fail field.

For example, the screen form "QC INPUT-A.I. P/F" contains the A.I. P/F pass/fail determination while the form "QC INPUT-CMC P/F" contains the CMC pass/fail determination. The Pass/Fail evaluation included on the screen is based on the tolerances created for the color difference equations it offers.

If the color difference equation reported by the form is not included in the tolerance you have assigned, regardless of whether it is a system tolerance or local tolerance the program will use the default tolerances embedded in the program code to complete the form you have selected.

NOTES

If the Illuminant/Observer condition on the form is set to 'current,' it uses the first Illuminant/Observer condition defined in the *Illuminant/Observer menu* for the evaluation. See also *Illuminant Menu, Select for the current Illuminant/Observer conditions*.

If an Illuminant/Observer condition is specified on the form, the evaluation is made using the Illuminant/Observer condition that is specified.

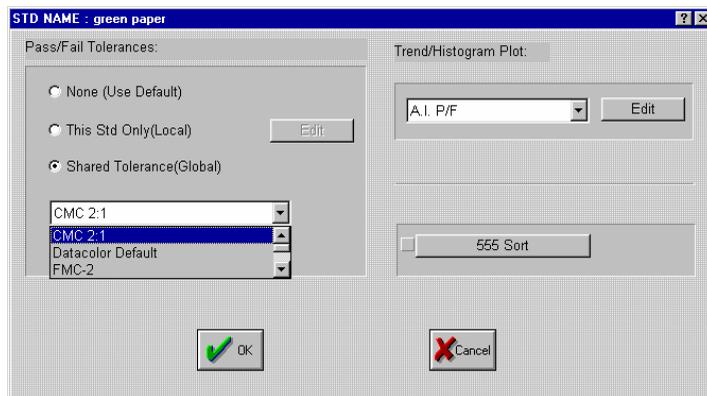
If you don't agree with the pass/fail evaluation, you should verify that you are working with the correct form, the appropriate tolerance values (*Standard Menu or System Menu, Tolerance, Edit Evaluation*), and Illuminant/Observer condition (*Illuminant Menu*).

Two menu options offer you access to the tolerancing options. The Standard Menu gives you the ability to assign a tolerance to an individual standard, and offers you the options to create, edit, and delete *local tolerances* only. The System Menu provides options to create, edit and delete Shared (Global) Tolerances, and to select one of the Shared (Global) Tolerances as the default System Tolerance.

Creating Standard Tolerances

To assign a tolerance to an individual standard, do the following:

- From the menu bar, select **Standard, Tolerances**. The STD NAME : [name] dialog box displays.



None (Use Default)

If no tolerance exists for the individual standard, the default used is the System Tolerance defined in the menu option, *System, Tolerance*. This is the default setting for all standards.

NOTE

Only one tolerance can be selected as a system tolerance. However, a system tolerance can include more than one color difference calculation.

If you are running a pass/fail evaluation for a color equation that is not included in the system tolerance, the program will default to a tolerance built into the program code. *See also Appendix, Embedded Tolerances for a summary of all the tolerance limits embedded in the program.*

This Std Only (Local)

Select this tolerance option to define a unique tolerance for the current standard. This option names the tolerance *Local*, and limits its use to the current standard. It is defined for the current standard, and cannot be reused with any other standard.

See also Standard Menu, Local Tolerance for details regarding the fields on this screen.

Shared Tolerance (Global)

This feature allows you to assign an existing pass/fail tolerance to more than one standard. New global tolerances can be added at any time. Global tolerances are defined in *System, Tolerance*. *See also Standard Menu, Shared Tolerance for instructions to assign Shared Tolerances to a standard.*

NOTE

Shared tolerances are only those tolerances created as 'global' tolerances. Local tolerances created for any individual standard will never appear in the global/shared tolerance list.

Creating System Tolerances

The default system tolerance is the tolerance used for pass/fail evaluations when a tolerance is not assigned to the desktop standard. The tolerance that displays in the *System Tolerance/Pass/Fail Tolerances* field is the default system tolerance.

See also System Menu, Creating Tolerances for instructions to create and edit System Tolerances.

Datacolor Tolerance

Included in the color difference equation choices available for Local, Standard and System Tolerances is a proprietary equation, the Datacolor Tolerance formula. This tolerancing option is similar to A.I. tolerancing, in that you can create a custom tolerance, based on the batches on your desktop. You will generate a *tolerance block* based on physical samples that have been previously accepted, offering a better correlation between the visual and instrumental pass/fail evaluations of the samples.

NOTE

The Datacolor Tolerance option is not enabled for Datacolor TOOLS^{QCX}. The 'tolerance' defined using other color difference equations is referred to as a 'tolerance block' in the Datacolor Formula.

The major difference between A.I. Tolerancing and the Datacolor Tolerance Formula is that the custom 'tolerance blocks' generated with the Datacolor Tolerance can be based on multiple standards and their associated batches. A.I. Tolerancing is based on batch data for a single standard. Because of this, the Datacolor Formula allows you to generate a single tolerance block based on a wide variety of colors and is useful when, for example, you have gathered a large collection of samples for the same substrate (i.e. fabric), or if you supply the same customer with a variety of colors.

A default Datacolor tolerance block is provided with the program, which is based on the visual evaluation of thousands of samples. It offers a reasonable starting point for those users that have no previous experience with this tolerancing feature.

To create a custom tolerance block, the standard and batches to be used must be available on the desktop. You must also evaluate each batch visually, to determine if each is an acceptable match to the standard.

Procedure

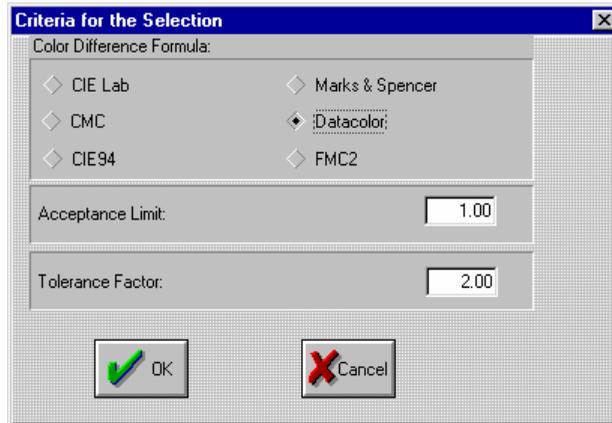
This procedure is a two-step process. First you must define the "Criteria for Selection." You select a color difference equation and a pass/fail tolerance that is used to pre-select the batches on the desktop. These batches are used to calculate the DCI tolerance.

NOTE

You should always visually evaluate the batches pre-selected by the program before calculating a tolerance block. Once this is completed, you can generate the Datacolor Tolerance Block.

Criteria for Selection

1. From the **System Menu**, select **DCI Tolerance Block Defaults**. The Criteria for the Selection dialog box displays.



2. Under the *Color Difference Formula* section, click the radio button to select the equation to be applied.
3. In the *Acceptance Limit* field, enter an acceptance limit. This is used by the Datacolor tolerance maintenance to identify the batches on the desktop that are included in the calculation of the DCI Tolerance Block.

NOTE

The criteria in the DCI Tolerance Block option is used simply to preselect the batches from which the tolerance block is calculated. You should evaluate each batch visually before proceeding to calculate the tolerance block.

The Tolerance Factor defines the size of the tolerance area, once the tolerance block is created. Changing this value allows you to expand or restrict the size of the tolerance area, and is the value that should be modified to reflect changes in the acceptability tolerance for a standard.

Calculating the Tolerance Block

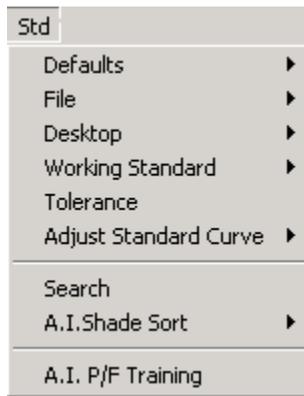
After you have set the *Criteria for Selection* you can generate the Datacolor Tolerance Block.

NOTE

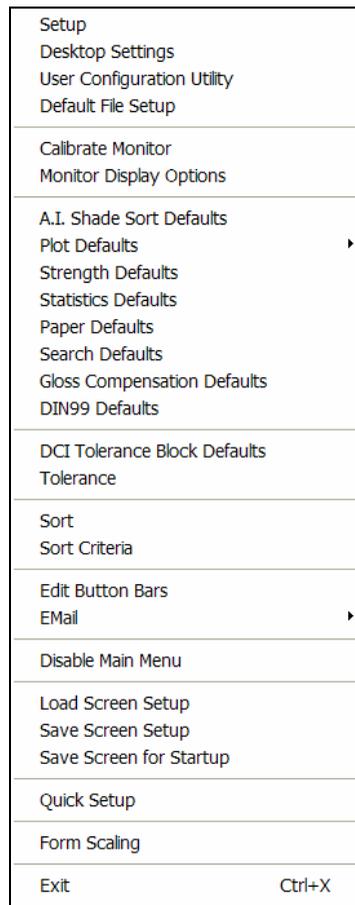
You can create the tolerance as either a Standard Tolerance or a Global/System Tolerance.

- To create a Datacolor tolerance block, from either the **Std** or **System** menus, select **Tolerance, Datacolor Tolerance, Edit**.

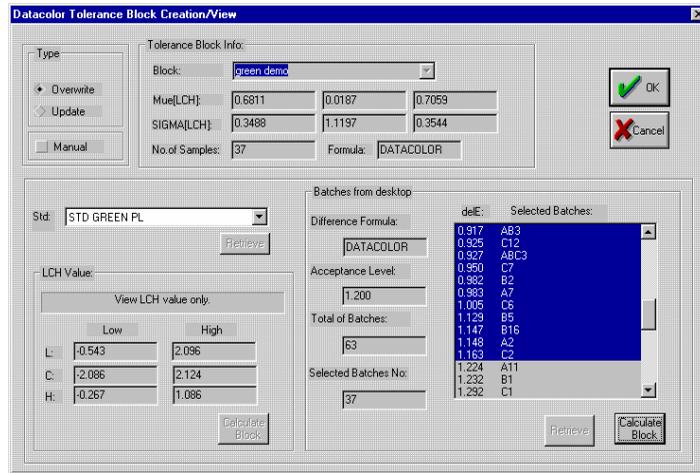
Std Menu



System Menu



The Datacolor Tolerance Block Creation/View window displays:



NOTE

If you select the existing Datacolor Default block and make edits, you may generate different Pass/Fail results for those standards already using a Datacolor Tolerance Block. It is recommended that you create a new Datacolor Tolerance Block rather than editing the default block.

Fields on the Datacolor Tolerance Window

FIELD	DESCRIPTION
Type	<p>Overwrite. The tolerance block is redefined using <i>the current samples selected</i>.</p> <p>Update. The tolerance block is updated, and the latest samples are added to the tolerance block.</p> <p>Manual. Allows you to input the low and high tolerance limits for each parameter.</p>
Tolerance Block Info	<p>Block. The name of the tolerance block. This matches the entry under Tolerance Name on <i>System Tolerance Maintenance</i> screen.</p> <p>Mue (LCH). The mean value of the mean difference for each of the three coordinates, based on a group of batches. This is stored in the tolerance block, and recalculated when a new batch is included.</p> <p>SIGMA (LCH). The variance for each of three coordinates, based on a group of batches. This is stored in the tolerance block, and recalculated when a new batch is included</p> <p>No. of Samples. If the tolerance block is calculated from batches on the desktop, this indicates the number of samples used to calculate the Mue and Sigma values currently displayed.</p>

FIELD	DESCRIPTION
	<p>Formula. Color difference formula used to calculate the values in the tolerance block. This will always be the Datacolor formula.</p>
Std	<p>The color standard associated with the tolerance block. Click Retrieve to retrieve all batches from the desktop associated with the current standard. NOTE: If you have included more than one standard in the tolerance block, this field is used to change the standard selection.</p>
LCH Value	<p>Range of the L, C, and H values for the current tolerance block. If you selected Manual, above, you input a minimum and maximum value for each of the parameters.</p> <p>Calculate Block. After L, C, H values are entered, you select this option to calculate the values for fields included in the tolerance block.</p>
Batches from desktop	<p>DelE. This value is the Delta E of each batch on the desktop compared to the standard.</p> <p>Selected Batches. The highlighted batches fall within the DE tolerance/color difference equation defined in <i>System Menu, Tolerance Block Defaults</i>. They are used to calculate the Datacolor tolerance block.</p> <p>Difference Formula. This is the color difference formula associated with the Acceptability Limit used to sort the desktop batches. It is defined in <i>System Menu, Tolerance Block Defaults</i>.</p> <p>Acceptance Level. The Delta E tolerance used to select the batches as the basis for calculating the tolerance block.</p> <p>Total of Batches. Total number of batches on the desktop associated with the current standard.</p> <p>Selected Batches No. Number of batches selected to create this tolerance block.</p> <p>Retrieve. Retrieves all batches from the desktop associated with the current standard.</p> <p>Calculate Block. Click this option to have the program calculate the tolerance block based on the batches selected. When it is finished, values appear in the tolerance block above, and the L, C, and H fields on the left.</p>

NOTE

In order to use this tolerance block, you must select a Screen or Print form that includes Datacolor tolerances. One screen form included is called, "QC Input DCI Tolerancing". If none of the forms suit your needs, change the screen or print forms using the Datacolor TOOLS Form Editor program.

Procedure for Calculating DCI Tolerance Block

The highlighted samples in *Selected Batches* are the batches on the desktop that have been selected to calculate the tolerance block. This selection is based on the criteria you have defined for the DCI Tolerance Block Defaults. You can add/delete individual batches from this list of batches to further refine the tolerance block.

1. Add or remove batches appearing in the list of pre-selected batches that do/do not satisfy your visual pass/fail evaluation. Once you are satisfied with the batches selected, you are ready to have the program calculate a DCI tolerance.
2. Select **Calculate Block**. The screen refreshes and displays the information for the new Datacolor Tolerance Block. Included are the following:
 - The statistical values for the new block.
 - The current L C H limits for the Standard displayed.
 - If the tolerance block included multiple standards from the desktop, you can select a different standard and view the L C H limits. These values will change from standard to standard within a single tolerance block.

The screenshot shows the 'Datacolor Tolerance Block Creation/View' dialog box. It is divided into several sections:

- Type:** Includes buttons for 'Overwrite', 'Update', and 'Manual'.
- Tolerance Block Info:** Contains a 'Block' dropdown menu (set to 'green demo'), and input fields for 'Mue(LCH):' (0.6811, 0.0187, 0.7059), 'SIGMA(LCH):' (0.3488, 1.1197, 0.3544), 'No. of Samples:' (37), and 'Formula:' (DATACOLOR). There are 'OK' and 'Cancel' buttons on the right.
- Standard Selection:** A 'Std:' dropdown menu (set to 'STD GREEN PL') with a 'Retrieve' button. Below it is an 'LCH Value:' section with a 'View LCH value only.' button and a table for 'Low' and 'High' values for L, C, and H.
- Batches from desktop:** A list of batches with columns for 'Difference Formula:', 'Acceptance Level:', 'Total of Batches:', and 'Selected Batches No.'. A 'Selected Batches:' list on the right shows a list of batches (AB3, C12, ABC3, C7, B2, A7, C5, B5, B16, A2, C2, A11, B1, C1) with some highlighted in blue. There are 'Retrieve' and 'Calculate Block' buttons at the bottom right.

3. The tolerance block is calculated and stored with the tolerance, and can be used to evaluate future batches.

The **Update** option is used to add new standards and/or batches to be included in the tolerance block calculation. Periodically updating the tolerance block will improve the correlation between the instrumental evaluation performed using the Datacolor formula and your visual evaluation of the samples. Adding new standards (and associated batches) may help to expand the accuracy of the tolerance block to a wider range of colors.

NOTE

In contrast to other tolerance formulas, the Datacolor tolerance block values do not have to be derived from a single set of batches specific to one standard color. You can work with a wide variety of colors within one common block, rather than generating tolerances for each individual standard. Use the Update function to add more Std/Batch collections to a block previously created.

Once the tolerance is created you can assign it as a shared tolerance or a system tolerance. *See Applications Technology, Acceptability Tolerances for instructions to assign local, global and system tolerances.*

A.I. Tolerancing

NOTE

This tolerancing option is not enabled for Datacolor TOOLS^{QCX}

Traditional tolerancing approaches are based solely on numeric descriptions of the color. You typically begin by identifying a single number, DE, which can be used universally to define the acceptability of the color match. When additional parameters, such as DL*, Da*, Db* DC* and DH, are added to the tolerance, you create an acceptability ellipsoid around the standard in color space. Batches are evaluated based on whether they fall relative to the acceptability ellipsoid.

We have learned through working with instrumental tolerancing systems that, although the numbers are consistent, they do not always tell the complete story about the acceptability of a color match. Regardless of the color space model and color difference formula chosen, you have probably generated instrumental color evaluations that that did not agree with your visual evaluation of the samples. Often when there is a conflict between the visual and instrumental evaluation of the sample, you either physically adjust a batch that doesn't need adjustment in order to satisfy the numerical tolerances, or 'pass' a batch that has 'failed' instrumentally. In either case, the approval process is delayed.

The Artificial Intelligence Pass/Fail (A.I. P/F) feature was developed to address these limitations with instrumental tolerancing. Unlike traditional methods that work exclusively with instrumental evaluations, A.I. P/F incorporates your visual assessments of the samples into the creation of the tolerances. This results in instrumental evaluations that more closely correlate with your visual evaluation of the samples.

Unlike traditional instrumental tolerances, you will notice that A.I. P/F tolerances are not always symmetrical around the standard. This is because A.I. tolerances are based on visual evaluations. In many cases, we do not visually *tolerate* symmetrical differences. For example, we may be able accept a sample that is lighter than the standard, but not one that is darker. A.I. P/F also indicates its *certainty* regarding each individual evaluation. This is an indication of the confidence it has in the evaluation. Some batches may fall in a region of the ellipsoid where the program does not have enough information to make a definite judgment. It will offer a pass or fail evaluation based on the available data, but it will also indicate that you should check the sample visually.

Finally, the A.I. P/F tolerancing option is designed to allow the system to continually update the tolerances, based on batches made after the initial tolerances have been developed. The program can continue to refine the A.I. tolerances based on the latest batch data.

A.I. Tolerancing Method

A.I. P/F uses the CIELab coordinates (DC*, DH*, and DL*) of the standard and the batches to determine an ellipsoidal acceptability volume in CIELab color space. This ellipsoid can be non-symmetrical around the standard or even skewed away from the standard depending on the data used in training.

A.I. P/F Value or DE

After the DC*, DH*, and DL* tolerances are determined through A.I. P/F training, the program performs the following calculation to make a pass/fail determination:

$$\text{A.I. P/F Value} = \sqrt{\frac{DC^2}{DC_{tol}^2} + \frac{DH^2}{DH_{tol}^2} + \frac{DL^2}{DL_{tol}^2}}$$

In the above equation, the DC, DH, and DL represent the CIELAB DC*, DH*, and DL* of a measured batch. The DC_{tol}, DH_{tol}, and the DL_{tol} represent the A.I. pass/fail tolerances for the standard.

If the A.I. P/F value is greater than 1, it indicates the batch falls outside of the ellipsoidal acceptability volume and the batch will fail. If the A.I. P/F value is less than 1, it indicates that the batch falls inside the ellipsoidal acceptability volume and the batch will pass. If the A.I. P/F value equals 1, it indicates that the batch falls on the surface of the ellipsoidal acceptability volume. The number "1" will always determine pass or fail for the A.I. P/F value even though the shape of the ellipsoid may be very different for different standards.

A.I. P/F Procedure

Below is the procedure for implementing the A.I. P/F feature:

1. Visually evaluate all of your batches.
2. Measure or recall the standard.
3. Measure all of the batches.
4. Choose **Std, Screen Form, A.I. P/F Training**.
5. Mark samples.
6. *Train* the system.
7. Evaluate the data.
8. Store the A.I. tolerances.
9. Run A.I. P/F on new batches.

Training the Standard

Physical samples representing batches must be available for someone to make visual pass or fail judgments. You will measure the batches and use the 'training' option (*Forms Menu, Screen Forms, Visual Tolerancing Form*) to produce ellipsoidal A.I. P/F tolerances.

Measuring Samples

1. On the desktop, measure or recall the standard.
2. Measure each batch than has been evaluated visually. It is important to include batches that you have failed visually in this group of samples.

Marking Samples

Next, the samples are marked as having either passed or failed. This is done using the *Visual Tolerance Training* form.

To display this form, do the following:

- Select the form from the screen form list (*Forms, Screen, Visual Tolerance Training*).

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	0.75	-0.05	-0.09	0.09	-0.05	0.75
A 10 Deg	0.73	-0.07	-0.11	0.13	-0.04	0.75
F2 10 Deg	0.74	-0.03	-0.08	0.08	-0.03	0.75

In this example, 50 batches are measured against the standard *DJV01 Blue reference*. The current batch, *DJO50 Blue 50* is set as *Exclude*, indicating it is not used to calculate the training data. All batches are initially set to *Exclude* until they are assigned a pass or fail judgment.

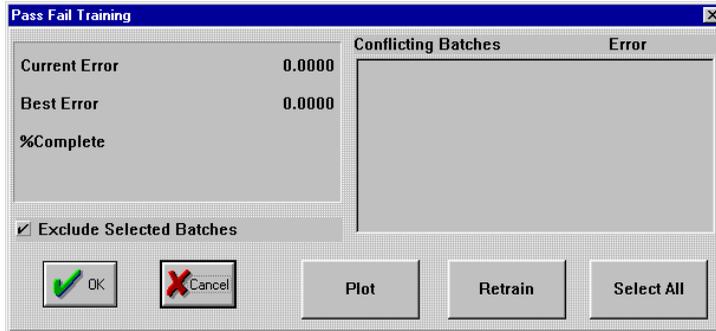
- To give the current batch a *Pass* judgment, click the **Accept Batch** button.
- To give the current batch a *Fail* judgment, click on **Reject Batch** button.
- To exclude the current batch from the training data, click on the **Exclude Batch** button.
- Move to the next batch and mark as *accept* or *reject* based on your visual evaluation. The program attempts to include the samples that you indicated

as a *pass* into an ellipsoidal shape, and to exclude those samples that you indicated as *fail*.

Starting the A.I. Training

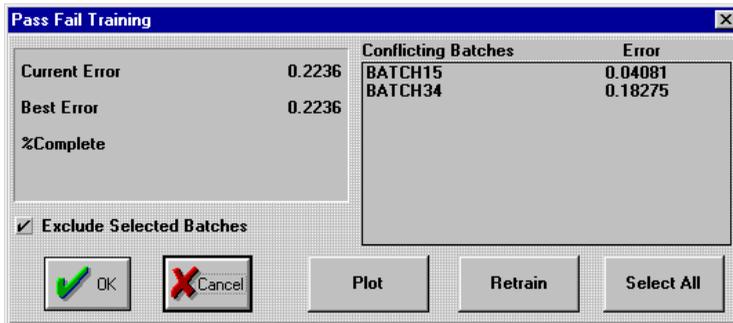
Once you have marked all of the batches, you can begin the A.I. training for the standard.

- To start the A.I. Training, click the **Std P/F Train** button on the screen form. If it is not on the form, move to the menu, and select **Std, A.I. P/F Training**. When the training is complete, the Pass/Fail Training dialog box displays:



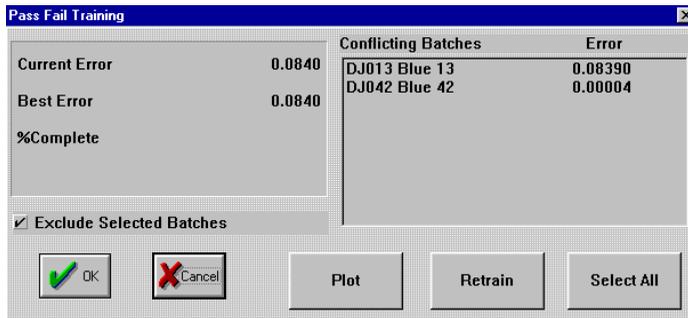
Analyzing the Training Data

Below is an example of the results from an A.I. P/F Training session:



Errors and Conflicts

Statistical errors and conflicting batches are generated during a P/F training session:



- **Errors.** Errors reflect the presence of conflicting batches. An error of 0.00 indicates that there weren't any conflicting batches.
- **Conflicts.** A conflict can occur if you pass a sample that is located in the same area of color space as one that you failed. In this case, the software cannot exclude the failing sample while including the passing sample. This can occur because of a mistake in input or it may be a visual judgment error.

In this example, there are 2 batches in conflict. The error number displayed for each batch indicates the degree of error. The magnitude of the error indicates the degree of conflict associated with the batch. A higher number indicates that the batch is a greater problem.

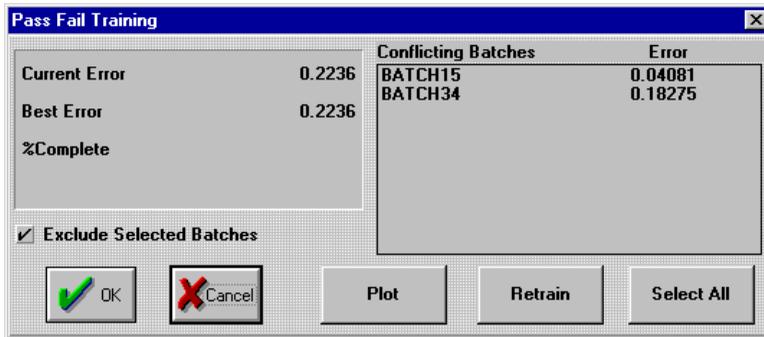
Eliminating Conflicts. There are 2 ways to handle conflicting batches.

- The recommended approach is to re-evaluate the visual pass/fail judgment made regarding the conflicting batch. Start with the batches having the highest error. If you decide that the visual evaluation is not correct, you change the judgment and *retrain* the standard. In many cases, if you change the evaluation of the samples with the greatest error first, the other conflicts may be resolved.
- The fastest way to eliminate the conflict is to *exclude* the conflicting batches from the training.
 - To exclude a single batch, click on the batch name to highlight it.
 - To exclude a group of batches, hold down the **Ctrl** key and click on the batches.

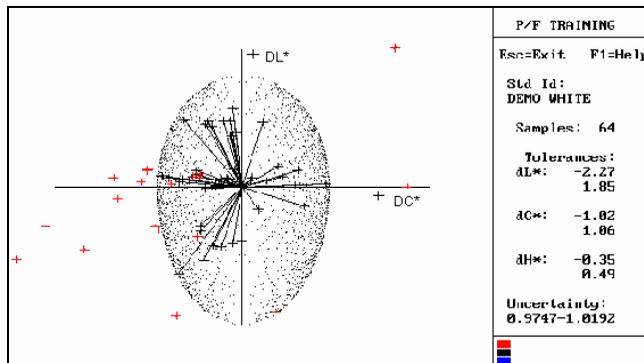
To exclude all the conflicting batches:

1. Click the **Select All** button.
2. After you have excluded the batches, click on the **Retrain** button to start the training again. The conflicting batches will be excluded.

A.I. P/F Tolerance Plots



- In the Pass Fail Training dialog box, click the **Plot** button to obtain a 3D plot of the ellipsoidal acceptability volume, such as the one pictured below.



- 3D Plot.** The 3D plot graphically represents the results of a Pass/Fail Training session. The standard is at the origin of the axes and it will be surrounded by the ellipsoid of acceptability that is generated by the A.I. P/F training. The samples that were marked as *Pass* are displayed in green and the samples that were marked as *Fail* are displayed in red. The example above is a plot of DL* vs. DC*. The program also offers the option to plot DL* vs. DH*. See *3D Plot Rotation Controls* below for instructions to select a different plot.
- Tolerances.** These are the L*, C*, H* difference tolerances calculated from the samples used in the training.

Uncertainty

The *Uncertainty* range defines the area where the pass/fail judgment is uncertain because of a lack of data in that area. In these areas, the program will make a pass or fail decision but the word *Check* will be added after a pass or fail decision. This indicates that the sample should be re-evaluated visually. The standard should then be retrained substituting the new visual evaluation. The range of uncertainty should decrease.

- The numeric value of the uncertainty relates to the A.I. P/F value of 1.
- A value of 1 indicates that the batch is on the surface of the acceptability ellipsoid.
- The uncertainty in the previous example is 0.9747 - 1.0192.
- Samples with an A.I. P/F value of less than .9747 are certain *Passes*.
- From .9747 to 1.0, the samples will *Pass*, with a *Check* comment added.
- Samples with a P/F value greater than 1.0192 are certain *Fails*.
- From 1.0 to 1.0192, the samples will *Fail*, but with a *Check* comment added.

The uncertainty value in the above example is very good. This indicates uncertainty near the surface of the ellipsoid.

If you trained a group of samples and marked them all *Pass*, you would generate a very large uncertainty value. The ellipsoid would be defined solely on *passing* samples. Since there are no samples that fail, the uncertainty would be great outside the ellipsoid.

To reduce the uncertainty regarding the tolerances, you should visually re-evaluate all of the samples that were marked *Check*. You should mark them again, based on your new evaluation, and 'retrain' the standard. The acceptability ellipsoid will be redefined, based on changes you've made to the visual evaluation of the batches, and there should be less 'uncertainty'.

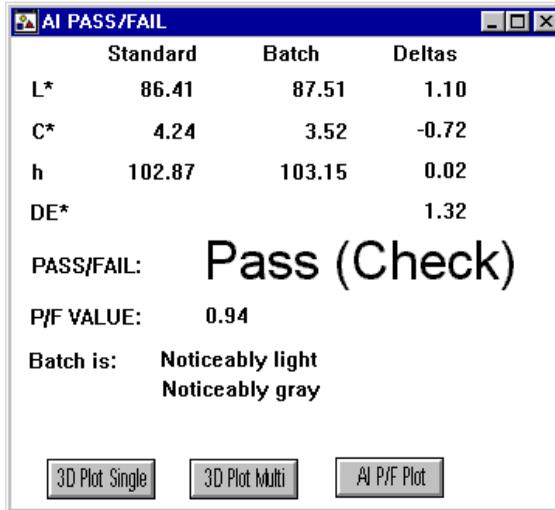
Storing A.I. P/F Tolerances

After you are satisfied with the training session, you can store the new A.I. P/F tolerances with the standard by clicking the **OK** button.

Performing A.I. P/F Evaluation

After A.I. tolerances are created, you can perform a pass/fail evaluation on a new batch. This is done as follows:

1. Retrieve the standard to be used in the evaluation.
2. Measure or retrieve the current batches to be evaluated.
3. From the menu, select **Forms, Screen Form**. Select any form with 'A.I. P/F' as part of the name. (In the example below, the form 'A.I. PASS/FAIL' was selected.)



ITEM	DESCRIPTION
L*, C*, h* values	These are the color space coordinates for the standard and batch.
Deltas	This is the color difference between the standard and batch along each of the three axes, and the overall color difference (DE).
P/F Value	This is the A.I. P/F value for the batch, indicating if the sample falls within the acceptability limits. Anything less than 1.0 is usually a Pass. Anything greater than 1.0 is usually a Fail. In this example the evaluation is marked 'Pass (check)', indicating that the batch falls into the area of uncertainty. This batch should be inspected visually.
Descriptors	This translates the numerical color differences into a qualitative evaluation.

Shade Sorting

NOTE

Shade Sorting is not enabled for Datacolor TOOLS^{QCX}.

Shade sorting is a feature that is useful to applications whose finished product is assembled from various batches of the same color. It helps to insure color consistency across a finished product, and is commonly used in textile applications for example, to assemble finished pieces of wearing apparel. A shirt may be assembled from different lots of fabric that match that standard. The collar may be cut from one lot and the sleeves from another. The challenge during assembly is to maintain the consistency of the color across the finished shirt.

In this situation, all of the batches available for use are acceptable matches to the standard. However, the lots may vary significantly from one to another. One lot may be yellower than the standard, while another may be bluer. When these two lots of material are laid side-by-side, they may appear to be a mismatch.

Shade sorting allows you to sort all of the acceptable batches into boxes. You can then select all of the batches you need to complete a finished product from the same box, or from adjacent boxes. This reduces any lot-to-lot variation with the finished product.

5-5-5 Shade Sort

The traditional 5-5-5 shade sorting option is based strictly on an instrumental evaluation of the batches. You define the standard using three colorimetric coordinates; for example, L*, a*, and b*. You then determine the minimum and maximum value for each coordinate, based on the batches that are acceptable. From the measurement of these batches, you can manually identify the lowest and highest values for each of the three coordinates, and these values define the acceptability range around the standard. The range along each parameter is subdivided equally into 9 symmetrical boxes, with the standard located in the center box. The standard is typically assigned a sort code of 5 for each coordinate, resulting in the code 5-5-5.

Below is a table that represents a traditional 5-5-5 sort. It is actually three dimensional, representing a volume of the L*a*b* color solid, and offers you 729 boxes for sorting. Batches are measured and assigned a 5-5-5 code based on their individual L*, a*, b* values.

L*	a*	b*
Min L*	Min a*	Min b*
(1)	(1)	(1)
(2)	(2)	(2)
(3)	(3)	(3)
(4)	(4)	(4)
Standard	Standard	Standard
(5)	(5)	(5)
(6)	(6)	(6)

(7)	(7)	(7)
(8)	(8)	(8)
Max L*	Max a*	Max b*
(9)	(9)	(9)

A batch can have a sort code that consists of any combination of the bins included in the table; for example, 1-6-3, 7-2-8, 3-3-3, etc. You would try to combine batches from the same boxes or from adjacent boxes, to assemble the finished product.

TOC Sorting

Truncated Octahedron Method for shade sorting is available as a button to be added to a form (*System Menu, Edit Button Bars*). This method of sorting allows for close packing of samples, which has the maximum volume for a given diameter. It has six square and eight hexagonal faces, each side being of the same length.

The TOC method is based on the default 5-5-5 sort tolerances. Its use of uniform microspaces eliminates many of the problems associated with the 5-5-5 method. Its volume is 68.3% of that of a sphere.

The TOC rating can be added to a form for display using the form editor. The feature is found in the file QC.FLD. Below are the details:

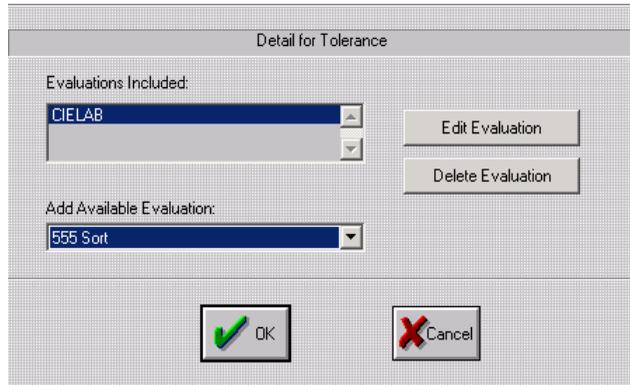
```
[TOC_Rating]
Type=STRING
Length=11
Description=TOC Sort Code
```

Sort Tolerances

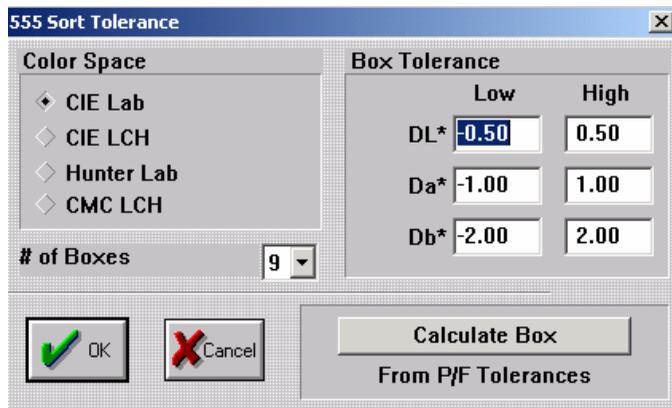
Sort tolerances are used to organize all of the batches into groups having similar colorimetric properties (e.g., lighter than the std., redder than the std., etc.). They are not used to evaluate whether a batch passes or fails. *See also Applications Technology, Acceptability Tolerances for a discussion of pass/fail tolerances.*

The Sort Tolerances are accessed through the tolerance options. *See also Std Menu, Local Tolerance, Std Menu Shared Tolerance, or Std Menu System Tolerance for detailed instructions to create and edit sort tolerances.*

1. To access from the Std Menu, select **Std Menu, Tolerances, This Std Only (Local), Edit**.
2. To access from the System Menu, select **System Menu, Tolerance, Pass/Fail Tolerance, Edit**. The Tolerance Information is displayed.



- In the *Add Available Evaluation* field, select **555 Sort**. Then click **Edit Evaluation** to view/edit the sort tolerances.

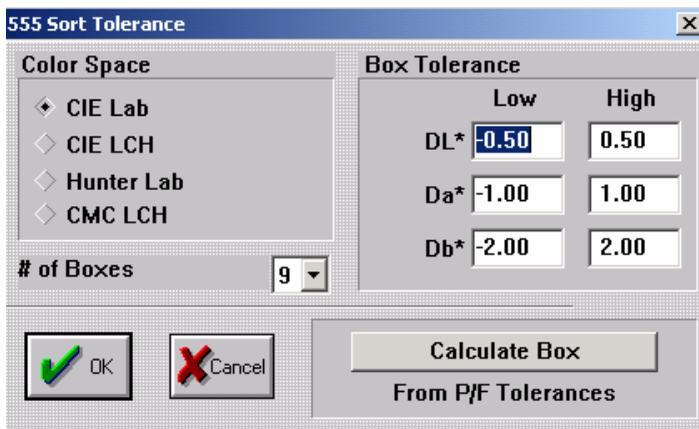


- The sort tolerance creates a rectangle around the standard, using 3 color difference parameters.
 - **CIE L*a*b***. Boxes are set up based on DL*, Da*, and Db*.
 - **CIE L*C*H***. Boxes are set up based on DL*, DC*, and DH*.
 - **Hunter Lab**. Boxes are set up based on Hunter DL, Da, and Db.
 - **CMC LCH**. The CMC 5-5-5 sort uses the CMC parameters DL*/SL, DC*/SC, and DH*/SH to define the 5-5-5 boxes. SL, SC, and SH represent the acceptability tolerance (semi-axis) of the CMC ellipsoid. The factor "l" is included in SL and the factor "c" is included in SC.

NOTE
 CMC sorting always uses the batch DL*/SL, DC*/SC, and DH*/SH values to perform the 5-5-5 sort.

- **# of Boxes.** This defines the number of boxes available for each sort parameter. If 9 is entered, 9 boxes would be available for each parameter. The standard is always located in the middle box (box #5 out of 9) for each parameter, and the batches would be sorted into boxes 1-9 based on each their values. The 5-5-5 sort code could range from 1-1-1 to 9-9-9. See *Box Tolerances* for details on the fields in this portion of the window.

The low and high tolerance value for each parameter defines the box size and also the placement of box 5-5-5. The difference between the low and high value defines the size of a box.



If the lower limit is negative and the upper limit is positive and they are symmetrical, the box 5-5-5 is placed around the standard. For example:

- A DL* of -.5 and a +DL* of +.5 produces a box with the DL* dimension of 1.0.
- A Da* of -1.0 and a Da* of +1.0 produces a box with the Da* dimension of 2.0.
- A Db* of -2.0 and a Db* of +2.0 produces a box with the Da* dimension of 4.0.
- The actual 5-5-5 box is 1x2x4. The box 5-5-5 contains the standard.
- If the input box tolerance values are not symmetrical, box 5-5-5 can be placed at any position, and does not necessarily include the standard. For example:
- If the -DL* is +.25 and the +DL* is +.75, the box size is .5 and box 5-5-5 is +.25/+.75.

Calculate Box Tolerances

This option automatically calculates the box tolerances using the default pass/fail tolerances used for the standard, and the number of boxes provided in this window. See also *Standard Menu, Tolerances or System Menu, Tolerances* for instructions to view and edit pass/fail tolerances.

For example:

- A +DL* P/F tolerance is +1.0 and the -DL* P/F tolerance is -1.0, the total DL* acceptability distance is 2.0.
- The number of boxes is 9.
- The box size is 2.0/9 or .22.

The table below shows how the sort code is applied for this example. This example only shows the DL* dimension.

DL* Pass/Fail	-1.0 to 1.0
Number of Boxes	9
Box Size	.22

Below are the boundaries for each box:

DL* Range	Sort Code
> +.99	+
+.77 to +.99	9
+.55 to +.77	8
+.33 to +.55	7
+.11 to +.33	6
-.11 to +.11	5
-.33 to -.11	4
-.55 to -.33	3
-.77 to -.55	2
-.99 to -.77	1
< -.99	-

- The range for each sort category for DL is +.11 and -DL* as -.11.
- The range of DL* from -.11 to +.11 defines "5" for DL*.
- Notice that the code for a sample that is outside of the defined box area will either be a "+" sign or a "-" sign. It will be "+" if the sample falls outside the tolerance on the positive side, and "-" if outside on the negative side.

A.I. Shade Sorting

NOTE

AI Shade Sorting is not enabled for Datacolor TOOLS^{QCX}.

A.I. Shade Sorting is based on the CIE L*C*H* coordinates of the batches. It calculates the sort tolerances based on the A.I. P/F tolerance, and tries to include all of the batches you have provided within the L*C*H* color solid it generates. Unlike traditional shade sorting, the boxes, or bins are not typically symmetrical in shape. This results in tolerances that better correlate with your visual evaluation of the sample, and identify batches that are anomalies based on their colorimetric properties.

A.I. Shade Sort also offers the option of a tapered sort. The batches in each bin are sorted from best to worst in terms of their proximity to the standard.

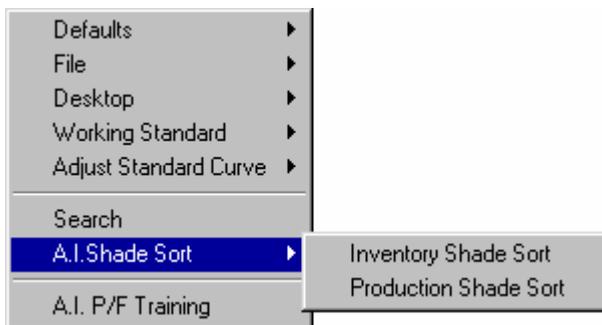
NOTES

The default desktop screen does not include the two command buttons required to run the production shade sorting option, *Prod Sort Current* and *End Prod Sort*. To add these buttons to the button bar, see also *System, Edit Button Bars*.

The results of both A.I. Shade Sorting options are based on the A.I. Tolerance assigned to the standard. The A.I. Shade Sorting Defaults (System Menu, A.I. Shade Sort) are only used to define the tolerances that separate the bins. If a batch fails the A.I. Tolerance, it is rejected.

A.I. Shade Sorting Options

Shade Sorting results are displayed through the **Std, A.I. Shade Sort** menu option.



A.I. Shade Sort offers two sorting options.

- The *Inventory Shade Sort* sorts all of the batches on the desktop associated with the standard.
- The *Production Shade Sort* only works with the current desktop batch.

Before You Begin

Before you can successfully run the A.I. shade sort, you must do the following:

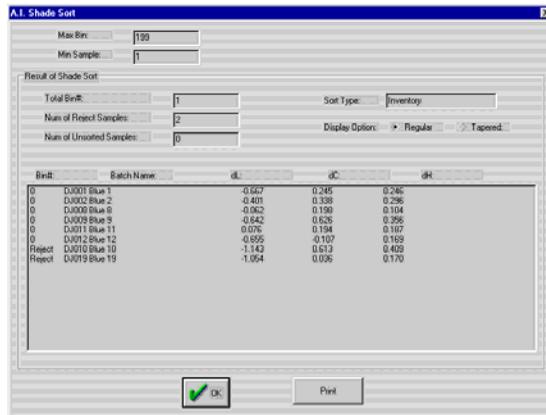
1. Identify the standard to be used.
2. Verify what type of tolerance will be applied to the standard. *See also **Applications Technology, Acceptability Tolerances, Tolerance Types** for details on tolerance types.*
3. Create or edit the A.I. Tolerance being used for the standard (either local, shared or system).
4. Add *Production Sort Current* button to the button bar. *See also **System Menu, Edit Button Bars** for instructions to add this button to the bar.*
5. Retrieve the standard to the desktop
6. Measure/Retrieve batch.

Inventory Shade Sort

This sort works with an accumulated inventory of pieces, or samples, and assigns them into sets of bins. The program sorts all of the batches on the desktop associated with the current standard based on the default A.I. Sort tolerances. The bin centers are calculated to cluster the pieces that can be combined together visually into the smallest possible number of bins.

To run the inventory shade sort:

1. Retrieve or measure a standard on the desktop.
2. Retrieve or measure all batches on the desktop.
3. Select the active batch to be sorted.
4. From the menu, select **Std, A.I. Shade Sort**.
5. From the sub-menu of options, select *Inventory Shade Sort*. The shade sort is completed, and the results displayed:



6. A file containing the results, entitled A.I.SORT.OUT, is generated and placed in the Data folder inside the Datacolor TOOLS program folder. This file can be opened as a text file and printed.

See *Std. Menu, A.I. Inventory Shade Sort* for details regarding the fields in this window.

Production Shade Sort

This sort works with individual pieces as they are produced, clustering them "on the fly" into optimal bin assignments.

NOTES

It is important that you verify the A.I. Tolerances that will be applied to the standard. You must check to see if a local tolerance is assigned to the standard, and the tolerance values it is using. If no A.I. Tolerance is assigned to the standard, you must check the default values used for the system A.I. tolerance.

This option can only be run when the command button, *Prod. Sort Current*, is displayed on the desktop. The button is *Prod. Sort Current*. See also *System Menu, Edit Button Bars* for instructions to add this button to the button bar.

1. Retrieve or measure a standard on the desktop.
2. Retrieve or measure all batches on the desktop.
3. Click the **Production Sort Current** button. A production bin number is assigned to the batch.

- To view the result, move to the menu bar, and select **A.I. Shade Sort, Production Shade Sort**. The A.I. Shade Sort dialog box displays.

The screenshot shows the 'Result of Shade Sort' dialog box. At the top, there are input fields for 'Max Bin:' (value 2) and 'Min Sample:' (value 1). Below these, the 'Total Bin:' is 1, 'Num of Reject Samples:' is 1, and 'Num of Unsized Samples:' is 0. The 'Sort Type:' is set to 'Production'. Under 'Display Option:', there are radio buttons for 'Regular' (selected) and 'Tapered'. The main part of the dialog is a table with the following data:

Bin#	Batch Name	dL	dC	dH
0	BAT 12	1.655	1.837	1.713
0	BAT 13	0.139	1.280	0.475
0	BAT 14	0.565	1.231	0.852
0	BAT 7	1.642	3.199	-0.213
0	BAT 8	0.061	2.525	-0.201
0	BAT 9	0.083	1.783	1.406
0	BAT 9	0.083	1.783	1.406
0	BAT 9	0.083	1.783	1.406
Reject	BAT 11	0.620	5.366	0.942

- To run a second batch on the desktop through a Production Sort, select a different batch to be the *current* desktop batch. Select the **Production Sort Current** button on the desktop again. This adds the second batch to the existing sort output. Continue this procedure until you have included all of the batches you want to have sorted.
- To view the results of the Production Shade Sort, from the menu bar select **Std, A.I. Shade Sort, Production Shade Sort**.
- To apply a tapered sort to the production sort, click on the radio button for *Tapered Sort*. The data will be updated based on this selection.

Strength Evaluation

In the manufacture of a colored product, it is important to develop a formula that will reproduce the color accurately and efficiently each time. A production formula is reliable only if the raw materials used in the formula are consistent from lot to lot. A strength evaluation compares the current lot of raw material to the master standard for both tinting strength and color. It determines if the current batch of colorant is stronger or weaker than the material used in the original formula, and projects the color difference between the two lots of colorant, when they are at equal strength. This information helps you to determine if the concentration of colorant(s) in a formula needs to be adjusted to reflect differences in the raw materials.

Sample Preparation

The strength of a colorant is defined only in reference to another colorant that has identical colorimetric and physical properties. In order for the strength evaluation to be meaningful, you must prepare your samples in a uniform fashion, keeping in mind the following points:

- The samples are usually finished samples of your product, such as a dyed fabric or a coating applied to a substrate.
- Colorant strength should only be evaluated using samples that contain a single colorant.
- The samples prepared for a strength evaluation should contain a fixed percentage of the colorant. For pigments, it is mixed with a standardized white paste. For dyes, the solution used should be standardized.
- All of the ingredients in both the standard and the batch should come from the same lots of materials except for the colorant. When this procedure is used, there can be only one source for the differences between the samples: the different lots of colorant.

Strength Calculation

Below are two examples of the strength calculation:

- A batch containing 80 parts of colorant has the same strength (100%) as the standard containing 100 parts. The strength of the batch colorant is calculated as follows: $100/80 * 100 = 125\%$

In this case, we say that the batch is stronger (i.e. it takes less colorant to achieve the strength of the standard).

- In contrast, if a batch sample containing 120 parts of colorant has the same strength as the standard containing 100 parts, the strength of the batch colorant is calculated as follows: $100/120 * 100 = 83.33\%$

In this case, we say that the batch is weaker; i.e. it takes more colorant to equal the strength of the standard.

When the differences between the batch and the standard relate solely to the strength of the material, the colorant concentration can be adjusted to reflect the change. If the strength evaluation reports an *adjusted* color difference of significant size, this indicates that the current batch of colorant differs from the original material in its spectral character. In this case, adjusting the concentration of the colorant used in the formula may not completely eliminate the color differences between the current batch and original colorant.

The strength evaluation includes a report of strength and color difference between the standard and the current batch. The program can also recommend an addition of raw materials (either colorant or vehicle) to make the strength of the batch equal to the strength of the standard.

NOTE

This “recommended add” option is activated from the **Batch Menu, Batch Strength Defaults**.

Information about *Concentration* and *Cost* of the raw materials can be incorporated onto a screen form to display the formula cost savings or loss when there are strength differences between lots of colorant. *For instructions on adding fields to an existing form, see the Form Editor User Guide. (This is included on the Datacolor TOOLS CD, Form Editor. PDF)*

Types of Strength Evaluations

There are several methods available in the program for evaluating strength. Some of the evaluation options use the spectral data of the samples to perform the calculation while others work from colorimetric data. The program options that control the strength evaluation are accessed through the **Std, Defaults, Strength Defaults** menu options.

Strength Calculations Using Spectrophotometric Data

These calculations are based on the spectral data for each sample at a single wavelength. When you are comparing identical raw materials, you should base the strength evaluation on spectral data.

Pigments. For pigments, the reflectance data is converted to a ratio, K/S, using the following equation:

$$K/S = \frac{(1-R)^2}{2R}$$

K = the coefficient of light absorption.

S = the coefficient of light scattering.

K / S is directly proportional to colorant concentration. The K/S ratios for the standard and batch are calculated and compared to determine the relative strength (%) of the batch when compared to the standard.

$$\frac{K/S \text{ Batch}}{K/S \text{ Std}} \times 100 = \%$$

Dyes. For dyes, transmittance data is used, and the *Absorbance* of the colorant is calculated using the following equation:

$$A = \text{Log} (1/\text{Transmission})$$

A is directly proportional to colorant concentration.

$$A \text{ Batch}/A \text{ Standard} \times 100 = \%$$

Strength Calculations Using Colorimetric Data

This approach is based on the tristimulus values of the samples, and is often used when trying to compare the strength of similar, but not identical, materials. For example, if you must substitute one colorant for another, you can examine the materials available for substitution for both strength and color difference. You can then decide which material can be substituted with acceptable results.

Since the materials in this situation are not identical, you examine the strength of the materials by evaluating their absorption behavior across wavelength bands represented by the tristimulus values X, Y, and Z. Typically, you would use X to evaluate blues and greens, Y to evaluate reds, and Z to evaluate yellows and some oranges. The tristimulus value used should correspond to a wavelength band where the colorant exhibits the greatest absorption.

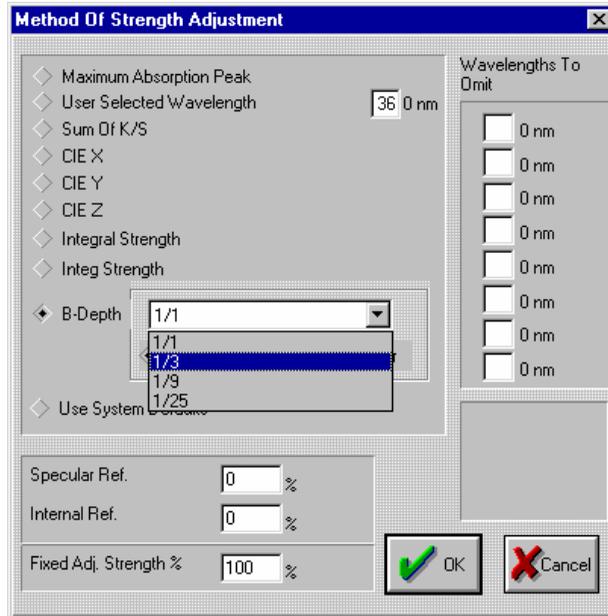
- **Strength Adjustment.** In addition to determining the batch strength, the program can determine the amount of colorant or vehicle needed to adjust the strength of a batch. Using the strength adjustment form (*Forms, Screen, STR ADD*), you can enter the amount of colorant and vehicle in your batch sample. The program can then determine the amount and type of material required to bring the batch to 100% strength.
- **Setting the Strength Defaults in the Program.** You must set defaults for both the standard and the batch.

Strength Defaults

Defaults to be used in the strength determination option are created for both the *Standard* and the *System*. These defaults are applied to all standards.

Standard/System Strength Defaults

- From the menu bar, click on **Std Menu, Standard Defaults or System Menu, Strength Defaults**. The Strength Defaults dialog box displays.



Fields on the Strength Window

You must identify the type of strength evaluation to be used, the specular and internal reflection factors, and the wavelengths to be omitted from the evaluation.

FIELD	DESCRIPTION
Maximum Absorption Peak	The strength evaluation is based on the spectral data for a single wavelength, the wavelength of maximum absorption. It is the wavelength with the lowest %R value (the highest K/S value). This is the area of the spectrum where the colorant absorbs the most light and is a valid indicator of strength. This is one of the most common methods used for strength comparisons. The wavelength selection is made by the program, and is based on the reflectance or transmittance curve of the standard.
User Selected Wavelength	The strength evaluation is based on the spectral data for a single wavelength, the wavelength of maximum absorption. It is typically the wavelength with the lowest %R value (the highest K/S value). This is the area of the spectrum where the colorant absorbs the most light and is a valid indicator of strength. This is a common method used for strength comparisons. This method is similar to the wavelength of maximum absorption, except that the user determines the wavelength to be used for evaluation.

FIELD	DESCRIPTION
Sum K/S	This method calculates strength based on the sum of the K/S values across the visible spectrum.
CIE X, Y, and Z	<p>This method calculates the strength by using a single tristimulus value (X, Y or Z) for the standard and batch. This method is often used when trying to compare the strength of similar, but not identical, materials.</p> <p>Colorimeters can only report tristimulus values, and this method is used when a history of strength evaluations generated from colorimeters has been collected for a colorant.</p> <p>The tristimulus value used in the evaluation should correspond to the band of the spectrum where the colorant has the greatest absorption. Typically, you would use X to evaluate blues and greens, Y to evaluate reds, and Z to evaluate yellows and some oranges. The tristimulus value used should correspond to a wavelength band where the colorant exhibits the greatest absorption.</p> <p>NOTE: Colorimetric data is specific to an Illuminant/Observer condition. You should verify that the Illuminant/Observer condition you are using matches the conditions used to collect comparable data from a colorimeter.</p>
Integral Strength	<p>This strength method uses K/S weighted at each wavelength by the <i>standard observer</i> \bar{x}, \bar{y}, and \bar{z} bar function.</p> <p>Residual Color Difference is the adjusted color difference using the integral strength value and is independent of concentration changes.</p> <p>By weighting the K/S values by the Standard Observer functions, the results may better correlate with your visual evaluation of the sample than does <i>Sum K/S</i>.</p>
Integ Strength	<p>Similar to <i>Integral Strength</i>, this method uses K/S, weighted at each wavelength by the <i>Illuminant/Observer</i> data. Separate Integ values are calculated for the standard and batch.</p> <p>By weighting the K/S values by the Standard Observer functions and the Illuminant, the results may better correlate with your visual evaluation of the sample than does either Sum K/S or Integral Strength methods.</p> <p>Datamaster (ICS). Uses the same Integ Strength calculation used by the Datamaster program offered by ICS. This option is provided to ensure consistency with legacy products.</p>

FIELD	DESCRIPTION
B Depth (DIN Specification 53235/1)	<p>Color depth is a measure of the intensity of a color sensation that increases with increasing saturation, and decreases generally with increasing brightness. This approach assumes that samples made at the same color depth appear to the observer as though they were made with the same concentrations of colorant of the same color intensity. There are two adjustment methods available for this option.</p> <p>The Kubelka-Munk method calculates strength by adjusting concentrations until the individual B values reach 0.</p> <p>The Schmeltzer method calculates strength by adjusting concentrations until the Delta B reaches close to zero.</p> <p>Each of these B-Depth methods has a menu choice for the degree of adjustment.</p>
Use System Strength Defaults	<p><i>Only displayed for Std Menu, Strength Defaults.</i> Rather than inputting a set of strength values to be applied to the standard, system defaults are used. <i>See also System Menu, Strength Defaults to view/edit the system defaults.</i></p>
Specular & Internal Ref	<p>Specular Ref. This is a correction factor used to adjust the spectral data for index of refraction differences. The specular reflectance value represents the amount of light that is refracted at the sample surface and never penetrates the sample.</p> <p>For resin systems most commonly used in paint and plastics applications, and for translucent plastics applications measured in transmission mode, a value of 4.0 may be used. This is true for both opaque systems using reflectance measurements, and for translucent plastics measured using transmittance.</p> <p>For evaluating dyes in solution (transmittance mode), or dyes on a substrate (reflectance mode), a value of 0 is recommended.</p> <p>Internal Ref. A second correction factor is included in the equation that adjusts for index of refraction differences. The internal reflectance value represents the amount of light that is scattered inside the sample and never emerges.</p> <p>For paint and plastics applications using reflectance measurements, a value of 60.0 may be used.</p> <p>For translucent plastics using measurements, a value of 0 is recommended.</p> <p>For dyes in solution or dyes on a substrate, a value of 0 is recommended.</p>

FIELD	DESCRIPTION
Fixed Adj. Strength	<p>This option is used to determine the effect of adjusting the strength of the batch to a value other than 100% strength of the standard. This is useful in cases where it is not physically possible or practical to adjust the strength of the batch to 100% of the standard. Often physical properties of the samples or the processing technique impose this limitation.</p> <p>Enter a number representing the target strength you want to use as the basis for comparison.</p>
Wavelengths to Omit	<p>This option allows you to omit specified wavelengths for use in the strength calculation. For example, in pigment applications in which the samples are mixtures of colorant and white, the maximum absorption wavelength may occur at 400 nm. In this case, the absorption is due to the white pigment, not the colorant. For this situation, the evaluation of the strength of this colorant at 400nm is not valid. Enter the first 2 digits of the wavelength—e.g., for 400 nm you enter 40.</p>
Substrate	<p><i>Only displayed for System Menu, Strength Defaults.</i></p> <p>When measuring translucent samples, the substrate shows through the colored layer, and contributes to the measurement. To get an accurate evaluation of the colorant strength, the measurement should be corrected for the substrate contribution. This option allows you to identify a stored measurement of the substrate being used. This measurement data can be used to correct the strength evaluation so that the evaluation is limited to the influence of the colorant only, and not the substrate.</p> <p>When this option is selected, a dialog box opens requesting the name of the sample to be used as the substrate measurement.</p>

Batch Strength Defaults

The Bat Menu includes a strength default that is applied only to the batch. The program can adjust the batch data to minimize differences between the standard and batch solely due to differences in the strength of the colorant used. When this option is enabled, the measured curve of the batch is adjusted by theoretically adding colorant or clear to the batch sample. A new, theoretical curve is calculated for the batch, which is used for all of the evaluations you perform. If you store the batch to the database, the theoretical adjusted curve is stored for the batch.

NOTE

The data stored for the batch is the *unadjusted* data. If you have turned on the strength adjustment for the batch, you must turn it off to run other evaluations using the *unadjusted* measurement data. It can be disabled from a button on the strength form, or by clicking **Batch Menu, Batch Curve Adjustment, Curve Adjustment Off.**

Performing a Strength Evaluation

Once you have prepared the samples and selected the appropriate program settings you can run a strength evaluation. The procedure consists of the following steps:

- Measure the standard.
- Measure the batch.

Open the screen form *Strength*, or a custom form you have created for this evaluation. The strength results will be displayed.

UV Calibration/Whiteness Options

Whiteness indices are available in Datacolor TOOLS, which are used by the textile, paper and plastics industries to evaluate the following:

- The whiteness of the material
- The presence of optical brighteners
- The effect of optical brighteners on the whiteness of the materials.

These evaluations must be performed using a spectrophotometer fitted with an adjustable UV filter. In addition, the evaluation typically conforms to a procedure defined by standards organization such as ISO, ASTM, CIE, SCAN, TAPPI, etc.

NOTE

The software options required to evaluate optical brighteners are not enabled for Datacolor TOOLS^{QCX}.

Each procedure specifies the following:

- Instrument calibration standard to be used
- UV calibration standard to be used
- UV calibration procedure to be used
- Measurement condition(s) to be used
- Number of measurements to be made for each sample measured
- Illuminant/observer selection to be used
- Whiteness calculation to be used

Some of the whiteness indices included in the program (e.g., CIE Whiteness) are used by multiple industries. However, each industry has selected a standard procedure to be used for the evaluation. When using the whiteness evaluations in the program, you should reference the standard procedure carefully to insure that that you are performing it correctly. If you do not, your results will not be valid.

What are Optical Brighteners?

Optical Brightening Agents (OBA's) also referred to as Fluorescent Whitening Agents (FWA's) are chemicals containing molecules that fluoresce. When they are applied to white materials they give the material the appearance of being "whiter than white". Optical brighteners are commonly used in textile and paper products.

What is Fluorescence?

The energy present in natural daylight is not limited to the wavelengths of the visible spectrum (400 – 700nm). It includes radiation from the entire electromagnetic spectrum. When radiation strikes a fluorescent molecule, it excites the molecule and is absorbed by it. As the molecule returns to its normal state, it emits the absorbed energy as visible light, rather than heat. In the case of OBA's, energy in the ultra-violet region of the visible spectrum is absorbed by the molecule and re-emitted in the blue region of the visible spectrum, around 450nm.

In the case of white materials, any increase in the energy reflected in the blue region results in the white appearing "bluer". A bluer white is perceived as "cleaner", while a white that has aged or become dirty appears to be yellow, and is less acceptable to the eye than a "blue-shade" white. As a result, OBA's are commonly added to white fabrics and other white materials to make them bluer, or cleaner.

What is a UV Enhanced Spectrophotometer?

A spectrophotometer used to evaluate fluorescent samples must include three features:

- A light source that contains ultra-violet energy.
- A filter to control the *amount* of ultra-violet light illuminating the sample.
- A filter calibration procedure to keep the amount of UV energy illuminating the sample constant over time.

UV Light Sources. In order to distinguish fluorescent materials, the wavelengths of ultra-violet light that are absorbed and re-emitted by the fluorescent material must be present in the light source. In spectrophotometers that use a quartz-halogen light source, the amount of ultra-violet light contained in the source is small, making the detection of the fluorescent material difficult. Pulsed xenon light sources emit much more UV energy, and are commonly used in commercial spectrophotometers. These light sources make it possible to evaluate fluorescent samples.

Adjustable UV Filters. In spectrophotometers that utilize a light source containing UV light such as pulsed xenon, the source emits more UV light than is present *in natural daylight*. Because of this, the amount of UV radiation coming from the light source must be controlled. In addition, the amount of fluorescence detected in the sample is directly related to the amount of energy absorbed by the fluorescent molecule. The goal is to simulate the spectral energy distribution of daylight (Illuminant D65 or Illuminant C, depending on the procedure you are using), and to keep it constant. A variable position UV cutoff filter adjusts the amount of UV light present in the source. The filter is placed in front of the beam before it enters the sphere of the instrument. This filter is used to simulate the energy output of natural daylight.

Another variable affecting the UV component of the light is the sphere coating. As the instrument ages, the barium sulphate coating in the sphere absorbs the ultra-violet light emitted from the source, changing the characteristics of the energy illuminating the sample. Because of this, the position of the filter needs to change over time to

keep the amount of UV light constant. To achieve this, the filter position must be adjusted, or calibrated, periodically using a calibration procedure that is distinct from the instrument calibration procedure. The UV filter position is normally calibrated on a weekly basis. See *Instrument Menu, Procedure for UV Calibration* for step-by-step instructions to calibrate the filter position.

What is a UV Filter Calibration?

The UV Calibration option is used to re-adjust the position of the UV filter (referred to as the UV calibrator). Because of the changes to the light source and the sphere coating, you must be able to adjust the filter to control the *amount* of ultra-violet light in the source. This ensures that you consistently simulate the spectral energy distribution of the Illuminant specified by the standard whiteness procedure you are using.

NOTE

The filter calibration is *not* the same as the standard instrument calibration, and requires the use of a fluorescent calibration standard. The UV filter calibration should be performed on a weekly basis. The standard instrument calibration should be performed every 8 hours.

Fluorescent Calibration Standard

The UV filter calibration requires the use of a fluorescent calibration standard that is different from the standard white calibration tile. A fluorescent tile is typically provided with UV-enhanced spectrophotometers for this procedure. However, textile, and paper standards provided by recognized laboratories can also be used for the UV filter calibration.

Regardless of the type of fluorescent standard used, you will need to input a target whiteness value for the calibration standard. These values are normally provided with the calibration standard. If you are using the fluorescent white standard provided by Datacolor, a certificate is provided with the tile. The certificate contains several values for the tile. Below is a table of the values to use for each calibration option:

Software Calibration Option	Target Whiteness Value to Use
UV D65/10 CIE Whiteness	Paprican White Standard D65/10 CIE Whiteness
UV C ISO Brightness	C/2 ISO Brightness
UV D65/10 Ganz-Griesser	D65/10 Ganz-Griesser Whiteness

NOTE

If you are trying to stay consistent with CIE Whiteness values generated using Datacolor legacy products, you must use the D65/10 CIE Whiteness^{*} value. This is found under the Ganz-Griesser section of the instrument *Ultraviolet Calibration* profile certificate. If you do not, any comparison between historical CIE Whiteness values and current values is ***not*** valid.

Whiteness Evaluations Used for Fluorescent Samples

The whiteness evaluations that are most commonly used to evaluate the presence of OBA's include the following:

- **ISO 2470 ISO Brightness.** Measures the diffuse blue reflectance factor of white, near-white pulps, papers and boards. Comparable to Tappi T525, SCAN P3:75 and SCAN P3:93.
- **Ganz Whiteness.** This whiteness equation is based on the measurement of standards having a known Ganz whiteness. Instrument-specific constants are calculated based on these standards, and are used in the calculation of Ganz Whiteness. This allows measurements from different instruments to be compared. It assumes that the standards used for the setup of the instruments are neutral with respect to hue. The standard values can be used as references, and do not have to be measured at the same time as the batch.

This index can also report a tint deviation, either in the red or the green direction. The notation consists of a letter and a number. R1 indicates that the sample has the smallest deviation in the red direction, while G5 indicates the largest deviation in the green direction.

- GG: Indicates the sample is 'off-white' rather than white.
- RR: Indicates the sample is 'off-white' rather than white.

- **CIE Whiteness.** This is a variation of the Ganz Whiteness Index. It uses standard constants rather than instrument specific constants. The difference between the CIE Whiteness and the Ganz Whiteness is the scaling factor. A sample with a Ganz Whiteness value of 210 may have CIE Whiteness of 150. CIE Whiteness can also be used for evaluating non-fluorescent samples. Whiteness options also available for use in Datacolor TOOLS include Hunter Whiteness, Berger Whiteness, and Stensby Whiteness, among others.

Preparing for a Whiteness Evaluation

To perform any whiteness evaluation on a fluorescent material, you must identify the following requirements:

- The **measurement conditions to be used.** This includes the aperture size, position of specular port, and the UV filter to be used. These selections are used for both the UV calibration procedure and for the whiteness evaluation.
- The **instrument calibration procedure** to be used. This specifies the aperture size, the specular port position, etc. to be used to perform the normal instrument calibration.
- The **fluorescent calibration standard** to be used for adjusting the position of the UV filter. Datacolor provides a white calibration tile to be used as a fluorescent standard. However, the procedure you are using may specify the use of a textile, paper or plastic standard. You will need to identify the

standard to use. Target values are provided with the calibration standard and you must input the values into the program.

- The **UV calibration procedure** to be used to adjust the position of the UV filter. This selection is made each time you perform a UV calibration. Three procedures are included in the program:
 - UV D65/10 (Ganz-Griesser)
 - UV D65/10 (CIE Whiteness)
 - UV C (ISO Brightness)

Each UV calibration procedure specifies the technique and calculation used to determine the correct position for the UV filter. In addition, each procedure uses a different target value for the fluorescent standard.

- **Calibration Standard.** Datacolor provides a standard white tile for use in the daily calibration of the instrument.

NOTE

If you are evaluating the whiteness of a non-fluorescent sample, you do not need to make any of these selections. You are only required to perform a standard instrument calibration before you measure the samples.

Program Configuration for Whiteness Options

Datacolor TOOLS offers three menu options that are used to configure the instrument and program to evaluate materials containing Optical Brightening Agents. The options are found on the Instrument Menu:



- **Measurement Conditions Setup.** To perform any whiteness evaluation you must create the appropriate measurement condition(s).
- **UV Calibration Setup.** You must select the calibration procedure to be used to adjust the filter.

- **R457 Brightness.** If you will be running ISO 2470 Brightness or CIE Whiteness you must also select two separate measurement conditions to be used for the evaluations. This option is used to identify the two measurement conditions to be used.

UV Filter Calibration

The position of the UV filter can be adjusted using either the fluorescent transfer standard provided by Datacolor, or through the use of Paprican, STFI, Hohenstein or other standards supplied by accredited laboratories. Instructions for these procedures are provided.

When you are using this option for the first time, you must input the Ganz-Griesser Whiteness Constants, Textile into the program. To do this:

1. Click on **Instrument Setup, UV Calibration Setup, Ganz-Griesser Parameters**. The dialog box below displays:

Whiteness Ganz-Parameters:		
Phi	Bandwidth	D
15	0.0008	1
P	Q	C
0	0	0
m	n	k
0	0	0

2. From the Ultra-Violet Calibration Profile provided by Datacolor, enter the Ganz-Griesser Whiteness Constants in these fields.

NOTE

You can re-generate these constants using a set of Hohenstein reference standards. This option is accessed using *Instrument Menu, Ganz-Griesser Parameters, Re-Calibrate* parameters. See also *UV Filter*.

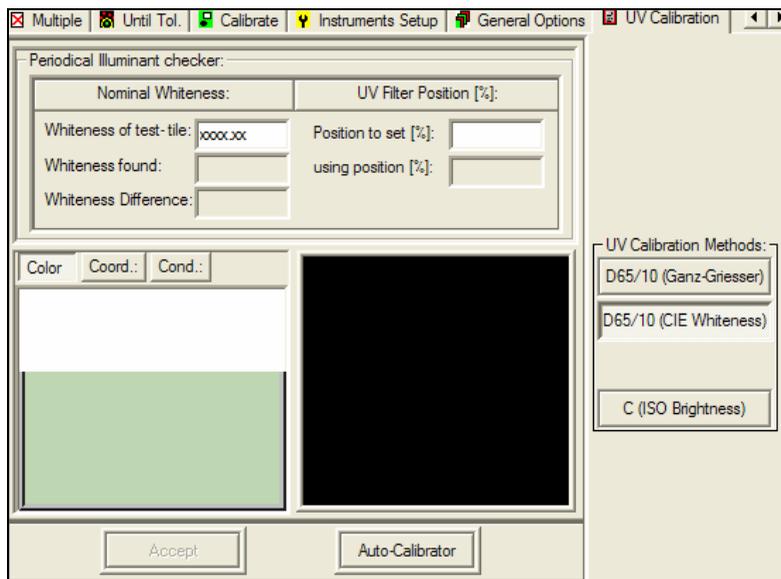
UV Filter Calibration Using Fluorescent Transfer Standard

To perform the UV Filter calibration using the fluorescent white transfer standard provided by Datacolor:

1. Locate the target whiteness values for the UV calibration standard. If you are using the fluorescent white standard provided by Datacolor, a certificate is provided with the tile. The certificate contains several values for the tile. Below is a table of the values to use for each calibration option:

Software Calibration Option	Target Whiteness Value to Use
UV D65/10 CIE Whiteness	Paprican White Standard D65/10 CIE Whiteness
UV C ISO Brightness	C/2 ISO Brightness
UV D65/10 Ganz-Griesser	D65/10 Ganz-Griesser Whiteness

- Input the appropriate value into the *Whiteness of test tile field* in the *UV Calibration* option.



- Click the **Auto-Calibrator** button. The program will adjust the position of the UV filter until the target value is achieved.

NOTE

If you use fluorescent standards not supplied by Datacolor, the procedure is slightly different. See also *UV Filter Calibration Using Other Standards* in this section for instructions to use several different fluorescent standards for the filter calibration.

Whiteness Evaluation Procedures

Below are two step-by-step procedures for performing a whiteness evaluation using Datacolor TOOLS. One procedure guides you through the steps required when the whiteness procedure specifies a single measurement of the sample. The other procedure is to be used when the samples are treated with optical brighteners, and the procedure you are running requires two measurements of the sample. *Please refer to the whiteness standard you are using (e.g. Ganz Whiteness, CIE Whiteness, etc.) to determine the procedure you need to follow.*

Whiteness Evaluation Requiring One Sample Measurement

Gather the specifications for the procedure you will be using.

1. **Measurement Conditions Setup.** Create the measurement condition you need. This identifies the aperture size, specular port configuration, and UV filter position to be used. See also **Instrument Menu, Measurement Conditions Setup** for instructions.

NOTE

Typically, you will only need to create the measurement conditions one time.

2. **Enable the measurement condition** you have created as *Current*. You can only have one active measurement condition (*Instrument Menu, Measurement Conditions Setup*).
3. Calibrate the instrument. We recommend you select the **Calibrate All** option (*Instrument Menu, Calibrate All*).
4. If you are using an instrument equipped with an adjustable UV filter, you must also **calibrate the UV filter** (*Instrument Menu, UV Calibration Setup, Auto Calibrator*).
5. If you have calibrated the UV filter, you must **recalibrate the instrument again** (*Instrument Menu, Calibrate*).
6. **Verify Illuminant/Observer Selection.** For most whiteness evaluations, you must use an Illuminant/Observer condition specified by the procedure (e.g. D65/10 CIE Whiteness). This can be included in the form used to display the whiteness results. If it is not, you must select it as the current condition. See *Ill/Obs Menu, Select option*. The condition to be used should become the active selection (the radio button next to position #1 should be filled).
7. Retrieve the form matching the whiteness evaluation you are using.
8. Measure/retrieve the standard.
9. Measure/retrieve the batch. The screen will refresh and the form will include whiteness data for the current samples.

The screenshot displays the 'QC INPUT - Paper' software interface. It is titled '1 of 4' and shows 'Today's Date: 16-Dec-03'. The interface is divided into sections for 'Standard' and 'Batch'.

Standard Section:

- Standard Name: STD DEMO WHITE
- Buttons: New Std, Retrieve Std, Store Std, List Std
- Measure Standard: Std. Inst (dropdown), Over Stack
- Measure Standard: OP Std. Inst (dropdown), Over Black Trap

Batch Section:

- Batch Name: BATCH1
- Date: 27-Mar-02, Time: 16:00:13
- Buttons: New Bat, Retrieve Bat, Store All Bats, List Bat
- Measure Batch: Bat. Inst (dropdown), Over Stack
- Measure Batch: OP Bat. Inst (dropdown), Over Black Trap

Measurement Results:

- Ill/Obs: D65 10 Deg
- R457 / T519 Opacity
- Std R457 UV Inc = 64.26
- Std R457 UV Exc =
- Std Delta R457 =
- Std T519 Opacity =
- Deltas
- Bat R457 UV Inc = 66.77
- Bat R457 UV Exc = 2.51
- Bat Delta R457 =
- Bat T519 Opacity =

10. Manually record the whiteness results. From the example above, you would record the values for Std R457 UV Inc. and Bat R457 UV Inc.
11. Repeat step 10 for each batch measurement required.
12. Using the values you recorded, manually calculate the average for the evaluation you are running.

Whiteness Evaluation Requiring Two Sample Measurements

Whiteness evaluations commonly used by the paper industry are based on standard procedures issued by international standard organizations such as ISO 2470, ISO 11475 and ISO 11476, among others. These procedures specify that when the samples contain optical brighteners, each sample be measured twice.

Below is a general procedure to be used when running a 2-measurement procedure.

1. Gather the specifications for the procedure you will be using.
2. Add the appropriate buttons from the list to below to the button bars:
 - Enable R457 Measurements
 - Disable R457 Measurements
 - Enable CIE Whiteness Measurements
 - Disable CIE Whiteness Measurements

NOTE

You only need to add these buttons one time.

3. Verify the instrument measurement conditions to be used. If you are running R457 Brightness, click ***Instrument Menu/R457 Brightness***, and view/edit the measurement conditions for the whiteness evaluation you are running. (*See also Instrument Menu, R457 Brightness in this chapter for details on this option.*)
4. In the same window, **enable** the whiteness evaluation(s) you are running.
5. Calibrate the instrument. Since you need multiple measurement conditions to be calibrated for these evaluations, click ***Instrument Menu, Calibrate All, or Measurement Conditions Setup, Calibrate All*** to calibrate all of the conditions you need.

NOTE

You can also add the button **Calibrate All** to the button bar. See ***System Menu, Edit Button Bars*** in this guide for details on adding/deleting buttons on the button bar.

6. **Calibrate the UV filter position.** Click ***Instrument Menu/UV Calibration Setup***. Select the appropriate calibration option for the procedure you are running.
7. Calibrate the instrument a second time. (***Calibrate All***).

8. The standard procedure you are running may specify an Illuminant/Observer selection. This may be selected on the form you are using. If not, click *Ill/Obs Menu*, *Select* option, and select the appropriate condition.

NOTE

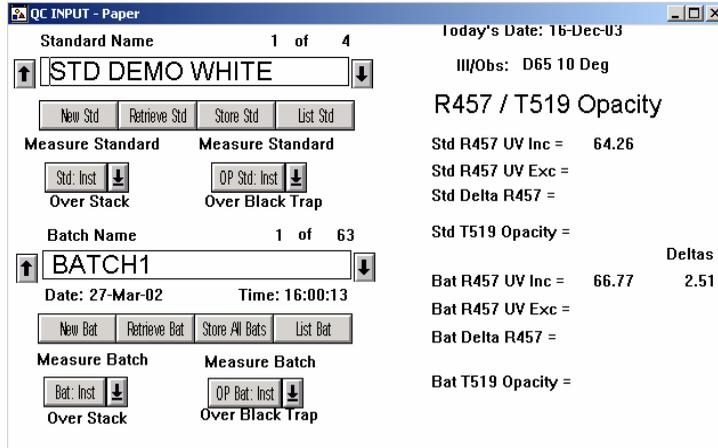
Not all whiteness evaluations require an Illuminant/Observer selection. Refer to the procedure you are using.

9. **Retrieve the form** matching the whiteness evaluation you are using.
10. **Measure/retrieve the standard.** If you are making 2 measurements of each sample, you must record 2 values for the std. In the case of R457 Brightness, one value (*Std R457 UV Inc.*) includes the UV content of the lamp. The other (*Std R457 UVExc.*) excludes the UV content of the lamp.

The screenshot shows the 'QC INPUT - Paper' software window. It displays the following information:

- Standard Name:** 1 of 4, **STD DEMO WHITE**
- Today's Date:** 16-Dec-03
- Ill/Obs:** D65 10 Deg
- Measure Standard:** Buttons for 'New Std', 'Retrieve Std', 'Store Std', 'List Std'. Below are 'Std: Inst' and 'Over Stack' buttons.
- Measure Standard:** Buttons for 'OP Std: Inst' and 'Over Black Trap'.
- Batch Name:** 1 of 63, **BATCH1**
- Date:** 27-Mar-02, **Time:** 16:00:13
- Measure Batch:** Buttons for 'New Bat', 'Retrieve Bat', 'Store All Bats', 'List Bat'. Below are 'Bat: Inst' and 'Over Stack' buttons.
- Measure Batch:** Buttons for 'OP Bat: Inst' and 'Over Black Trap'.
- Results:**
 - R457 / T519 Opacity**
 - Std R457 UV Inc = 64.26
 - Std R457 UV Exc =
 - Std Delta R457 =
 - Std T519 Opacity =
 - Deltas**
 - Bat R457 UV Inc = 66.77 2.51
 - Bat R457 UV Exc =
 - Bat Delta R457 =
 - Bat T519 Opacity =

11. **Measure/retrieve the batch.** The screen will refresh and the form will include whiteness data for the current samples.
12. **Record 2 values for the std.** One value (*Bat R457 UV Inc.*) includes the UV content of the lamp. The other (*Bat R457 UVExc.*) excludes the UV content of the lamp.



13. Repeat steps 11-12 for each batch measurement.
14. Using the values you recorded, **manually calculate the average** for the evaluation you are running. If you are evaluating 2 conditions (see step #12), you must separately calculate the value for the UV excluded and UV included conditions.

UV Filter Calibration Using other Standards

If you have purchased calibration standards separately, you will need to calibrate the instrument using the values for those standards. Below are the procedures for 3 commonly used standards: Paprican Standards, STFI Standards, and Hohenstein Standards.

Calibration Procedure Using Paprican Standards

1. Select **Instrument Menu, UV Calibration**.
2. From the submenu, select the correct calibration method D65/10 (CIE Whiteness) or C (ISO Brightness).
3. In the *Whiteness of test-tile* field, enter the value on the back of the standard. This value should correspond to the calibration method selected in step #1 (D65/10 CIE Whiteness or C ISO Brightness).
4. Click on the **Auto-Calibrator** button. The program will adjust the position of the UV filter until the **target value is achieved**.

Calibration Procedure Using STFI Standards

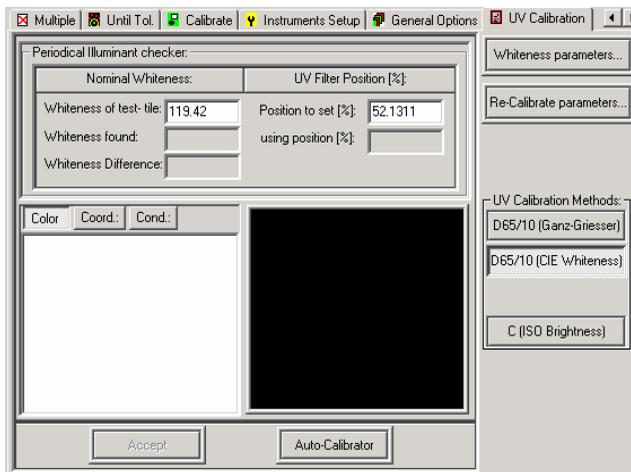
Use the same procedure detailed for the Paprican standards. The target values will be STFI values, and are found on the standard.

Calibration Procedure using Hohenstein Standards

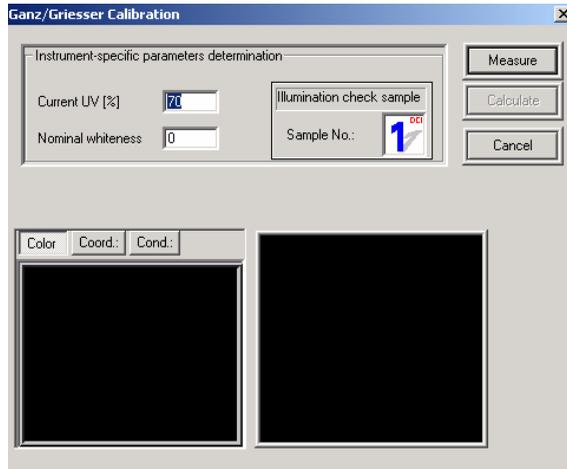
If you are using Hohenstein standards, and the Ganz-Griesser calibration procedure, you need to generate instrument-specific constants. If you have purchased your instrument from Datacolor, these parameters are generated at the factory for the fluorescent transfer standard provided by Datacolor. They are found under *Ganz-Griesser Whiteness Constants, Textile* on the Ultra Violet certification sheet. You must enter these values into the program to perform an accurate Ganz-Griesser UV filter calibration. See *UV Filter Calibration, step #1* in this section for instructions to enter the Ganz-Griesser parameters specific to your instrument.

If Datacolor did not supply your instrument, or if your application requires you to periodically recalculate these constants, you must use the Hohenstein textile standards that are specifically produced for the Ganz-Griesser calibration. Follow the instructions below to generate the parameters.

1. Obtain a set of Hohenstein textile samples.
2. Calibrate the instrument. If this is the first time that you are doing a Ganz-Griesser calibration, calibrate with UV included, using the default UV filter position.
3. From the main window, move to the menu bar, and select **Instrument Menu, Instrument Setup, UV Calibration Tab**. The window below displays:

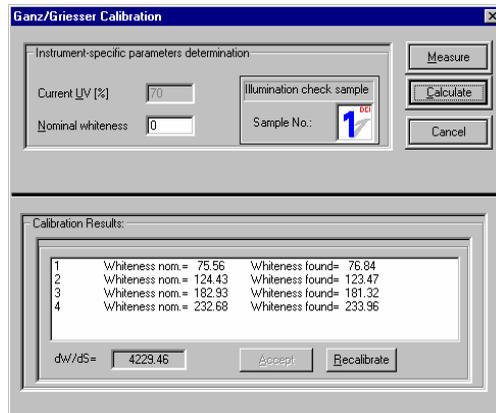


4. Select **Re-calibrate Parameters**. The window below displays:



The whiteness samples must be input in order of lowest to highest target value. Start with the sample having the lowest whiteness value first.

5. Input the Ganz-Griesser Whiteness Value of the first sample into the *Nominal Whiteness* field.
6. Place the first whiteness sample at the instrument port and click on the **Measure** button. The measurement will be taken and the Sample No. will increment to 2.
7. Enter the whiteness value for the next sample, and then measure that sample. Continue this process until you have input at least 4 samples. The maximum number of samples is 12. When you have input the minimum number of samples, the **Calculate** button will become available.
8. After you have input all your samples, click on the **Calculate** button. This calculates the dW/dS and the whiteness values of the samples.



9. The dW/dS value should be 4000 +/- 10. If it is within these limits, the Accept button will be available. Click Accept to save the values for use with

Ganz-Griesser calibration and the calculation of Ganz-Griesser whiteness and tint values.

NOTES

- If the dW/dS value is outside the required limits, click on the **Recalibrate** button. The program selects a new position for the UV filter. Click **Recalibrate** and repeat the measurements.
- Follow the procedure until dW/dS value is within limits - a value of 4000 +/-10. Then click **Accept**. The program will store the Ganz-Griesser parameters that have been calculated.
- If the dW/dS is too low, there is too much UV in the light. The program will adjust the UV filter position to reduce the amount of UV energy striking the sample. If the dW/dS is too high, there is not enough UV in the light. The program adjusts the filter position to increase the amount of UV energy striking the sample.
- When you select **Recalibrate**, the program expects to receive the samples in the reverse order from the last presentation. For example, if sample #4 is the last sample presented, the program will expect #4 to be the first sample presented in the new procedure. If you select **Recalibrate** a third time, the program reverses the order of the samples again, and sample #1 becomes the first sample presented in the sequence.
- When you select **Recalibrate**, the program retains the nominal whiteness value for each of the samples presented. You do not have to enter them again.

10. To view the new Ganz-Griesser parameters, click the **Whiteness Parameters** button on the UV Calibration tab. The dialog box below displays:

Whiteness Ganz-Parameters:		
Phi	Bandwidth	D
15	0.0008	1
P	Q	C
0	0	0
m	n	k
0	0	0

The window displays the current the Ganz-Griesser instrument-specific parameters that have been calculated.

NOTES

If any values need to be changed manually, click the **Manual Change** button, and enter the new values in the appropriate box.

If you have generated Ganz-Griesser parameters, we recommend that you record these values for reference purposes.

Exchanging Data with Other TOOLS Users

Datacolor TOOLS provides the capability to send and receive Datacolor TOOLS desktop data to other users. The data can be sent and received through the email system, or it can be exported to an ASCII file for import by another user or program.

The implementation of these Email features is fully compliant with the MAPI (Messaging Application Program Interface) standard, and will work with any email service that supports this standard. However to use this capability, all computers running Datacolor TOOLS that will be using the email option, must be properly configured. When properly configured, these mail clients will also interface with other email services that comply with the MAPI interface.

Email Options

You can configure TOOLS to work directly with an email system. This feature uses the options *Send* and *Receive Desktop*.

The **Send** option will automatically save the desktop data as an email attachment, and open the email client/program. You then select the recipient, add a message if appropriate, and send the email.

The **Receive** option automatically opens the email inbox. You can then select an email message with a TOOLS attachment to be opened, and the data is transferred to the desktop.

NOTES

The program does not indicate which email messages in the list have attachments. We recommend that the email box you designate for this option be dedicated to sending and receiving TOOLS data to speed the email selection process.

Emailing data to/from Datacolor TRACK requires a different setup. *See also Datacolor TRACK User's Guide for detailed instructions to configure the email options for use with TRACK.*

ASCII Import/Export Options

There are also options to **Import** and **Export Desktop** to an ASCII file. This file can then be opened by another user or another program that recognizes ASCII file formats.

File Extensions

- When you use the email options, the attachment created is an ASCII file that has a *.QTX extension. This is the specific type of file recognized by TOOLS, other Datacolor products and by color control software made by other manufacturers.
- When you use the Import/Export options, you have a choice of creating either a *.QTX or a *.TXT file.

Configuring the Email Option

It is the responsibility of the user to properly setup, configure, and maintain the email services on the systems running Datacolor TOOLS. If do not have experience with email client configuration, you need to contact your network administrator or staff to assist in this task.

- *See System Requirements in this guide for operating system requirements.*
- The mail facility must be fully MAPI compliant.
- The Microsoft email clients supported include Microsoft Exchange, Microsoft Windows Messaging, and Microsoft Outlook 9 Outlook 98 or later).
- There are reported difficulties with the implementation of the MAPI interface in Lotus Notes (Domino Server), Netscape (Netscape Messaging Server) and certain mail servers used by some Independent Service Providers (ISP's). Problems resulting from the use of these mail services are not connected to Datacolor TOOLS.

Editing Setup Files

For the data exchange options to run properly, you may need to edit setup files on both the sending and receiving systems. Adding data fields to *.FLD files is done using Notepad or a standard text editor. Below is a description of the files to be edited:

- **USER.FLD.** Whenever you add custom fields using the Form Editor, the fields are added to this file. The USER.FLD on the receiving system must be updated to include the custom fields being sent.
- **CTMAIL.FLD.** This file defines the database fields sent and received by the program, using any of these options. After custom fields are added to the USER.FLD file, they must also be added to the CTMAIL.FLD in order for the data to be successfully transferred.

See also Datacolor TOOLS Form Editor.PDF for instructions to add custom fields to the database. See also Appendix, Data Locations in this guide for the location of these configuration fields.

For example, you have added the batch field, BRAND_LABEL as a new user field. When the field is created it is added to the USER.FLD file. To include this in the data exported from the desktop, the field name, BRAND_LABEL, must be added to the CTMAIL.FLD file on your system, in the section, [BATCH_DATA].

NOTE

The same changes must be made to both files on the receiving system. If they are not, the information will not be displayed or stored to the database.

To make this edit, do the following:

1. Using a text editor (e.g. Notepad, etc.) and open CTMAIL.FLD.
2. Add the field name, into the appropriate section. Do NOT use the square brackets [].
 - Standard fields are entered under [STANDARD_DATA] section.
 - Batch fields are entered under [BATCH_DATA] section.
 - Delta fields are entered under [DELTA_DATA] section.

Below is a partial listing of CTMAIL.FLD, including the field that was added:

```
[BATCH_DATA]
STD_NAME
BAT_DATETIME
BAT_NAME
BAT_GUID
BAT_PF_JUDGE
BAT_REFLPOINTS
BAT_REFLINTERVAL
BAT_REFLOW
BAT_VIEWING
BAT_R
BAT_GLOSS_VALUE
BAT_GLOSS_ADJ_GEOMETRY
BAT_CORD_ILLUM
BAT_X
BAT_Y
BAT_Z
BAT_TX
BAT_TY
BAT_TZ
BAT_CONTRAST_RATIO
GENTOL_VALUE
BAT_INPUT_METHOD
BAT_R0
BAT_RWBG
BAT_OP_CALMETHOD
BAT_BI_TAPPI525_UVExclude
BAT_WI(CIE)_UVExcluded
```

BAT_WI_CIE_Tint_UVExclude
BAT_MEASDLL_PARAMS
BAT_INST_TYPE
BAT_WHITENESS_UVEXC_VIEWING
BAT_DCC_STATUS
BRAND_LABEL This is the field that was added.

See also *Datacolor TOOLS Form Editor.PDF*, *User Field Maintenance* for an explanation of the *.FLD files, and instructions to add/remove these files.

Adding Command Buttons to the TOOLS Desktop

The program options used to exchange data include *Send Desktop*, *Receive Desktop*, *Import Desktop* and *Export Desktop*. The options can be accessed from command buttons located on forms, or on the button bar. You will need to add them to the button bar or forms you are using.

Below is a description of each command button available for the email options. The button(s) you use depend on the type of file involved in the data exchange (*.QTX or *.TXT), and the amount of information to be sent.

NOTE

Sending/receiving email from Datacolor TRACK is a special case, and uses a different set of command buttons. See also *Datacolor TRACK User's Guide* for instructions to enable the TRACK email options in both Datacolor TRACK and Datacolor TOOLS.

- **Send Desktop.** This option emails the data on the desktop. The Datacolor TOOLS user receiving the data can access the data using the *Receive Desktop* button. The email attachment created has a *.QTX file extension.
- **Receive Desktop.** Opens an email containing desktop data.
- **Export Desktop.** Transfers all standards and batch data to an ASCII file. You specify the file extension (*.QTX or *.TXT) to be assigned. The file is opened in Datacolor TOOLS using the *Import Desktop* option. The file can also be imported into other 3rd party software programs that recognize ASCII file formats. This is not an email option.
- **Export Current Std and Batch.** This button transfers the current standard and all associated batches to an ASCII file. You specify the file extension (*.QTX or *.TXT) to be assigned. The file is opened in Datacolor TOOLS using the *Import Desktop* option. The file can also be imported into other 3rd party software programs that recognize ASCII file formats. This is not an email option.
- **Import Desktop.** Opens an ASCII file sent from another user. A Browse dialog box will open, and you highlight the file to be opened. It can access both *.QTX and *.TXT file sent from another TOOLS Desktop. This is not an email option.

NOTE

The email options, **Send** and **Receive Desktop** can also be accessed from the System Menu (**System Menu, Email Options**). See also **System Menu, Edit Button Bars** in this guide for instructions to add the button to the button bar. See also **Form Editor** for detailed instructions to add buttons to forms.

Sending/Receiving TOOLS Data

Once you have setup the email system, edited the appropriate files and added the command buttons to the button bar or forms, you can begin exchanging data with others. The options can be accessed from either the *System* menu or from buttons on the button bar or forms you are using.

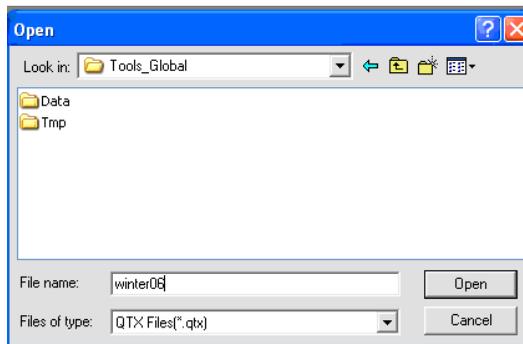
Import/Export Data

To import or export desktop data:

1. Click on a command button on the button bar or form you are using.



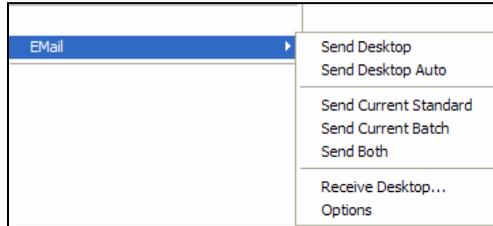
A dialog box displays, asking for a file name and location.



2. To **import** files:
 - Browse to the location of the file and highlight it.
 - Click **Open**. The desktop will refresh and the data in the file will be displayed on the desktop.
3. To **export** files:
 - Browse to the location of the folder.
 - In the *File name* field, enter a name. The data will be exported to that location/file name.

Send Email

- Click on **System Menu, Email Options** and select one of the **Send** options.



...Or...

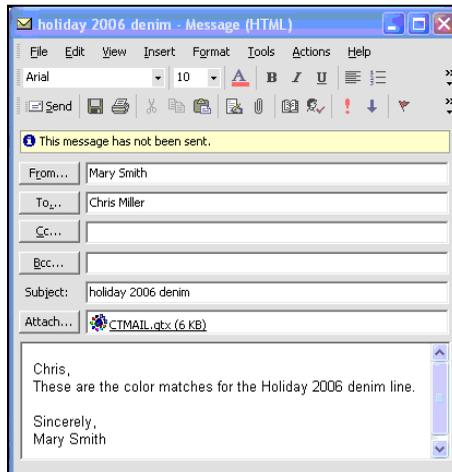
Click on a command button on the button bar or form you are using.



The email system automatically opens, and a QTX file is included as an attachment. The file is always named CTMAIL*.qtx.

NOTE

All of the email Send options create a file containing the Datacolor TOOLS desktop data. This file is called CTMAIL#.QTX (where # is a sequential number; e.g., CTMAIL0.QTX, CTMAIL1.QTX, etc.). The # is incremented with each email sent. These files are saved in the default directory.



- Select the recipients from the email address book.
- Add a message as required.

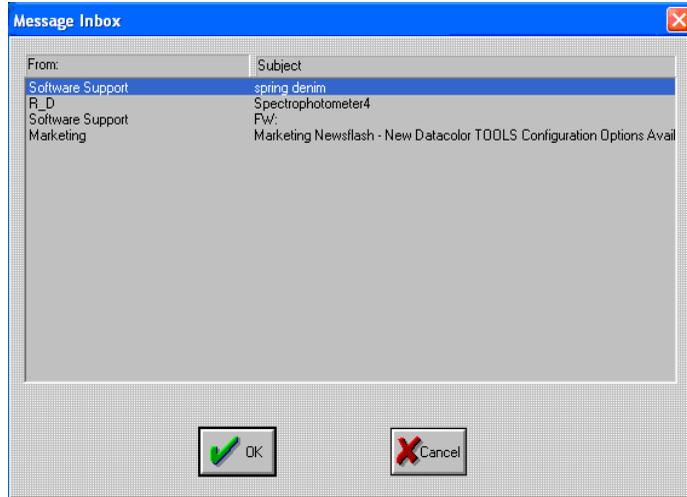
- Click the **Send** button. The email will be sent.

Receiving Data via Email

1. Click on the **Receive** button on the button bar or form.



A window will open that lists all emails in the inbox.



NOTE

The program does not indicate which email messages in the list have attachments. We recommend that the email box you designate for this option be dedicated to sending and receiving TOOLS data to speed the email selection process.

2. Click to highlight the email to be opened. Then click **OK**. The data in the email attachment will be displayed on the TOOLS desktop.

Master/Working Standards

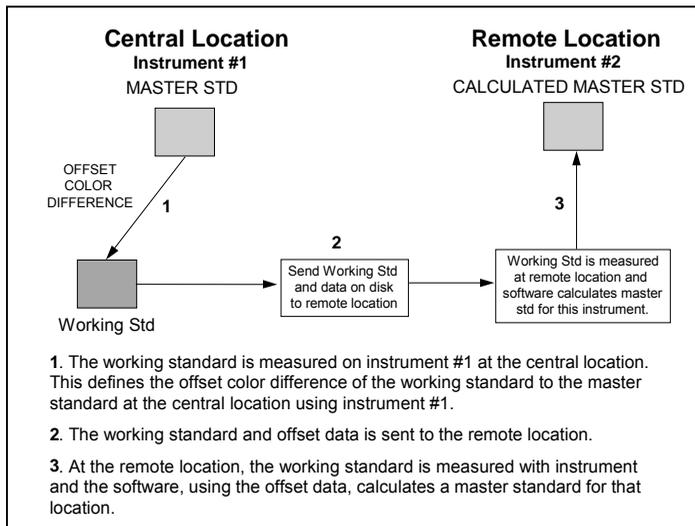
NOTE

The Master/Working Standard option is not enabled for Datacolor TOOLS^{QCX}.

It is often the case that only one sample of the master standard, agreed upon by both vendor and supplier, physically exists. This sample is usually isolated in order to protect it from loss or physical damage. A working standard(s) is usually substituted for the use in day-to-day color evaluations. Multiple working standards may be in use, depending on the number of locations involved in laboratory and production activities.

The working standard(s) are very close in color to the master standard, but in practice, there is usually a color difference between them. There is also a small difference in performance from one instrument to another. The *Working Standard* option compensates for color differences between the standards, and performance differences between instruments. It is used to create a numerical correlation between a working and master or *reference* standard.

This feature creates offset data that captures the differences between the measurements of the master and working standards, made on the central instrument. This offset data is sent to the remote location, along with the working standard, and is applied to measurement of the working standard made on the remote instrument. The resulting measurement of the working standard becomes the (simulated) master standard.



When this feature is properly implemented, color differences between the working and master standard measured on one instrument will be very similar to color differences displayed when the same working and master standards are measured at a different location using a different instrument. The absolute values of the data will be slightly different, but the color differences will agree.

Once the master standard has been simulated at the remote location, this should be the sample used for performing instrumental color evaluations. The working standard should be used in a visual comparison between the standard and batch.

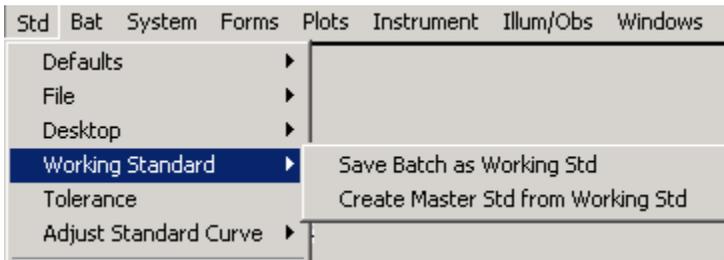
This process consists of two steps:

- Save Batch as Working Standard
- Create Master STD from Working STD

NOTES

- You should make sure that the instrument geometry is the same for all of the instruments involved in this correlation. The most commonly used instrument geometries are sphere (d/0), and 0/45 or 45/0. You should not try to correlate measurements with instruments using different geometries (i.e., sphere instruments (d/0) with 0/45).
- You should also calibrate your instrument before you make measurements for use with this option.

This option is accessed from the *Std* menu. It includes a submenu of options:



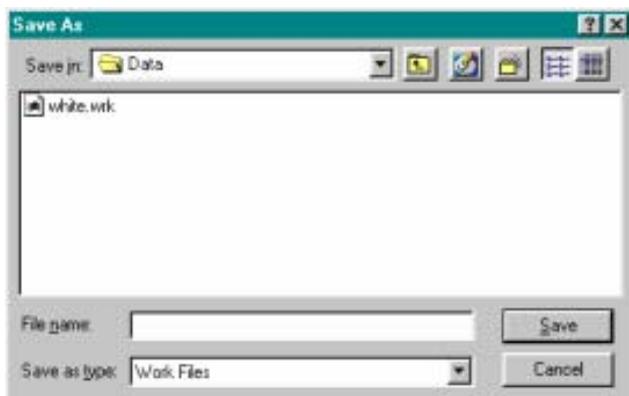
Save Batch as Working Std

This option is used by the central location to save the measurement of the working standard made on the instrument at the central location. In addition, the program will store the offset data calculated from the comparison of the *Master Standard* and the *Working Standard*.

The offset data is stored on a diskette and sent to a remote location, along with the physical working standard.

The procedure below details how to save the working standard to a disk found on a drive on your system.

1. Measure or recall the master standard. This measurement should become the current desktop standard.
2. Measure the working standard as a batch. This measurement should become the current desktop batch. The color difference displayed is the color difference between the working standard and the master standard.
3. From the menu bar, select **Std, Working Standard**.
4. From the submenu, click on **Save Batch as Working Std**. The *Save As* dialog box displays.
5. Enter the destination location and file name for this file. The file name must not be more than 8 characters. This option creates a file with the .WRK extension for the offset data. Any valid DOS file name can be used. In addition to specifying the file name, you must also specify the location on which you want to save the file—e.g., your hard drive (C:), a floppy (A:), etc.
6. In the *File name* field, type **[drive:]XFER**. This creates a file called XFER.WRK on the disk.



7. Place a disk in the disk drive, and click the **Save** button. The offset data is copied to the disk as a file called XFER.WRK.
8. This disk can be sent to the remote system. At that location, the *Create Master Std From Working Std* option is used to recreate the master on the remote system.

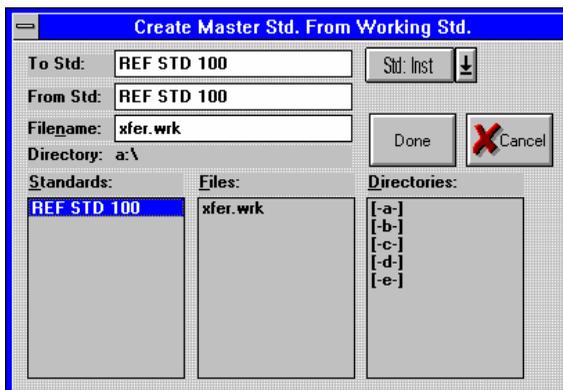
Master Standard from Working Std

This option is used at the remote location to apply the offset data from the central location to the measurement of the working standard at the remote location. This recreates the master standard on the remote system.

NOTE

Before you use this option, calibrate the instrument at the remote location to ensure the accurate measurement of the working standard in the second part of procedure.

1. Click on **Std** menu. **Working Standard**.
2. From the submenu, click on **Create Master Std from Working Std**. A dialog box displays requesting a filename. The file that is requested is the *.WRK file that contains the offset data sent from the central location.
3. Place the diskette in the disk drive. The file "XFER.WRK" displays in the files list box.
4. Double click on the XFER.WRK file to list the contents of the file. The working standard (REF STD 100) displays in the list of standards. That is the only standard in the XFER.WRK file. To select the standard, click on the standard name.



5. The name of the working standard stored in the file displays in both the *From* and *To* input boxes.
6. To change the name of the working standard, you can edit the name in the *To* input box.
7. Place the working standard on the instrument and click the **Std:Inst** (measure) button.
8. Click the **Done** button. This creates the new master standard and places it on the desktop. It also exits the dialog box.

The standard *REF STD 100* on the desktop, is the master standard. The offset differences from measurement of the master standard at the central location have been applied to the reflectance values of the working standard just measured on the remote instrument.

NOTE

To verify the data, the working standard can be measured as a batch and compared to this new *master*. The color difference should be the original (offset) color difference between the working standard and the master standard.

WARNING

The verification test is not valid if you have enabled instrument correlation.

Illuminant Observer Specification

All color coordinates and color difference data displayed are calculated for a specific Illuminant/Observer condition. Changing this selection will change the data on the display, and may change the outcome of an evaluation. The Illuminant/Observer selections are accessed through the *Illuminant Menu*. The selections can also be specified on a form.

What is Illuminant/Observer Data? Whenever you visually evaluate a color, your evaluation is influenced by two factors:

- The light under which you are viewing the sample
- The way that your eyes respond to color *stimuli*

Changes to the Illuminant/Observer selection can change a color evaluation.

- **Illuminants.** The Illuminant data is a numerical description of the amount of energy emitted from the light at every wavelength in the visible spectrum. There are many illuminants commonly used in industrial color matching, and each has a unique energy output. Because of this, you must select the correct Illuminant data in order to calculate a color difference.
- **Standard Observer.** In order for an instrumental color evaluation to simulate a visual evaluation, the system must have information about how the eye responds to color stimuli across the visible spectrum. The Standard Observer data describes the response of the human eye to color.

There are 2 sets of Observer data: 1931 (2°) and 1964 (10°) data. The 1964 Standard Observer data is most commonly used in instrumental color evaluations, and is preferred for large samples. The 2° (1931) is sometimes preferred for small samples.

Illuminant/Observer tables integrate the spectral power distribution of the illuminant and the Standard Observer data into a single table that is used in the calculation of colorimetric coordinates.

NOTES

- The Illuminant and Standard Observer information are combined in the tables. You are only required to make a single selection.
- When you change the Illuminant/Observer selection, the output data appearing on your display will change, even when you HAVE NOT changed the Standard or Batch selections.
- If you are communicating color coordinates or color differences to someone in a different location, it is important to specify the Illuminant/Observer data you are using.
- The 2° (1931) and 10° (1964) Standard Observer data have no connection to the instrument geometry (0° - 45° or diffuse/8°).

Table 5 vs. Table 6 Data

The programs use the Illuminant/Observer tables published by the ASTM. The ASTM has developed two tables: Table 5 and Table 6. Table 6 is the default data used by the program. Both Table 5 and Table 6 data are provided with Datacolor TOOLS. The differences in the data from each table may create small differences in the calculated color difference. If you are working with standards whose tolerance history is based on Table 5 data, you should configure the program to use Table 5 data.

Table 5 data is identified in the Illuminant name. To view the list of available Illuminant/Observer data:

- Click on **Illuminant Menu, Select**. The window below is displayed:

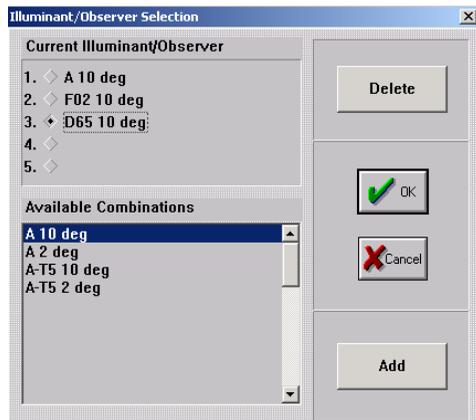


Table 5 data includes *T5* in the combination name. When no *T5* is displayed, the data is Table 6 data.

NOTE

For Illuminant/Observer data that is imported into the program, *T5* is also included in the folder name. See *Illuminant/Observer Menu, Import* for details to import the data into the program.

Gloss Compensation

NOTE

This option is not enabled for Datacolor TOOLS^{QCX}.

The lack of agreement between visual and instrumental evaluations of samples having different glosses has been a major problem in making color appearance judgments. The human eye has much greater resolving power than most instruments, and can distinguish very small appearance differences between objects. A human observer can easily change the viewing conditions and the viewing angles in order to make an appearance judgment, taking into account both color and gloss simultaneously. Color measuring instruments are not as versatile as the eye, since measurements are made at fixed illumination, and viewing conditions, that do not correspond to the way we see objects. The basic problem encountered when viewing samples having different gloss can be illustrated in the following example.

Suppose we have two black samples: one with a high gloss surface and the other with a low gloss or matte surface. If these samples are measured with an integrating sphere instrument, specular included (type SCI d/8), the color difference will show that there is a small color difference between the matte sample and the high gloss sample. A visual assessment of these samples will indicate that there is a larger color difference. The high gloss sample appears visually to be much darker and more saturated than the low gloss sample. However the color difference based on the instrumental evaluation will report that the low gloss sample is *darker* than the high gloss sample.

Gloss compensation adjusts the spectral data for gloss differences, and reports color evaluations based on the adjusted data. This adjustment provides better agreement with a visual evaluation, than does the *unadjusted* evaluation.

Program Configuration

Three steps must be completed to enable and use the gloss compensation feature:

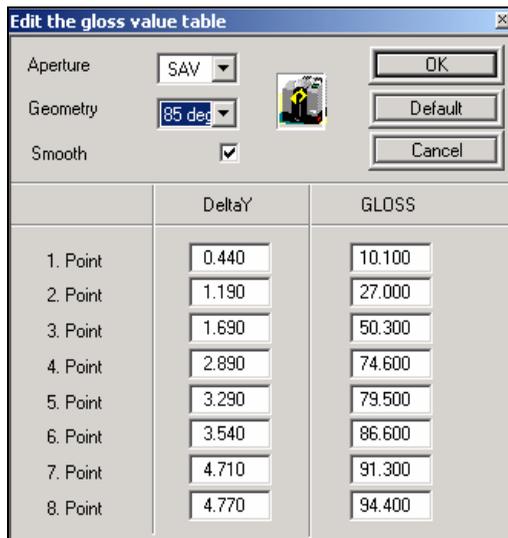
- Gloss data tables must be added to the system. The tables are added using the **Instrument Menu, Calibrate** option. Under normal operating circumstances, this is only done once.
- Review/edit the system gloss defaults to be sure they match the conditions you want to use.
- Select a screen form that contains the appropriate buttons and output for displaying the results of gloss compensation.

Installing Gloss Data

1. Click **Instrument Menu**, **Calibrate**, or the **Calibrate** button on the button bar. The window below displays:



2. Click on the **Gloss Table** button. The program will prompt you for a diskette containing the gloss information. This table is included on the calibration diskette provided with the instrument. After the table is copied from the diskette, the screen below displays:



3. This window displays the gloss correction values for the current aperture/geometry selections. You can review the data for each available combination.

NOTE

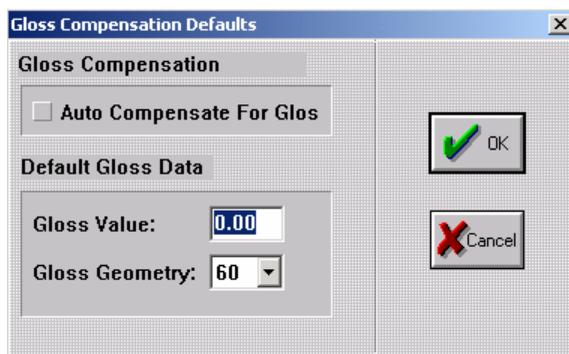
The *Aperture* and *Geometry* fields on this screen identify the conditions associated with the data displayed on the screen. Each aperture/gloss geometry combination uses a different set of factors to correct the measurement for gloss differences.

4. Click **OK** to close the window.

Configuring System Gloss Defaults

You must enable gloss compensation, and provide defaults for the gloss value and gloss geometry to be used.

1. Click on **System Menu, Gloss Compensation Defaults**. The window below displays:



2. Enter the appropriate values in each field, and click **OK**.

Fields in the Window

- **Auto Compensate for Gloss.** When enabled, every measurement will be adjusted using the gloss value and gloss value defined in this window.
- **Gloss Value.** Identifies the target gloss value to be used for the adjustment.
- **Gloss Geometry.** All gloss values are associated with a gloss geometry. Identifies the geometry associated with the gloss value.

Applying Gloss Compensation

1. Add the *Std/Bat gloss adjustment* buttons to the button bar, or retrieve a form containing these buttons.
2. Measure the samples.
3. Adjust the gloss data for the samples as required by the evaluation you are performing.

NOTE

If *Auto Compensate for Gloss* is enabled, the data is automatically adjusted based on the defaults. See *Manual Gloss Adjustment below for instructions to manually enable/disable the gloss adjustment.*

4. Display/print the results of the gloss adjustment as needed.

NOTE

QC Input Gloss Compensation is the form designed for use with Gloss Compensation. It includes the appropriate buttons and output fields. To design your own form, see the *Datacolor TOOLS Form Editor program and Datacolor TOOLS Form Editor.PDF*. They are included on the program disk.

5. Disable the gloss adjustments as appropriate. To disable *Auto Compensate for Gloss*, click on **System Menu, Gloss Defaults**, or on the **Gloss Defs** button (button bar) to access the option.

Manual Gloss Adjustment

To selectively enable/disable gloss adjustments for individual standards or batches:

1. Disable the **Autocompensate for Gloss** feature.
2. Add the buttons for gloss compensation to the button bar, or to a form you are using. The four buttons to be added are:



See *System Menu, Edit Button Bars* for instructions to add the buttons.

3. After you have measured the samples, you can enable/disable the gloss compensation selectively, using the buttons on the button bar or form. To adjust the standard gloss, click on **Std Gloss Adj**. To adjust the batch gloss, click on **Bat Gloss Adj**.
4. Another button, **Gloss Defs** gives you the ability to selectively activate/deactivate/edit gloss values. This button can also be added to the button bars or a gloss output form.



Miscellaneous Applications Notes

This section is a collection of information regarding various program options.

KN Value or Print Contrast

The KN Value or Print Contrast is a calculation specific to the paper industry that measures the absorptive capacity of paper. This option is similar to the opacity or contrast ratio option. It is calculated by comparing measurements of *printed* and *unprinted* paper. . The calculation is based on the following equation:

$$KN = (Y_U - Y_P) / Y_U$$

Where...

Y_U = Y of Unprinted Paper

Y_P = Y of Printed Paper

- The unprinted paper sample is measured as the normal standard or batch.
- The printed paper is measured using the opacity or CR measurement buttons

A form provided for this option is called *QC INPUT - KN Value*.

The *DOS filename* for this form is *SNPKN1.FRM*.

The following fields for this evaluation are available in the program and can be added to forms:

Type	Field Description in Form Editor
Standard Field	Std KN - Print Contrast
Batch Field	Bat KN - Print Contrast
Delta Field	Delta KN Value

Contrast Ratio (Form = QC INPUT CR)

A contrast ratio calculation requires two measurements of the sample. One is made over a light background, and the same sample is measured over a dark background. Datacolor TOOLS uses a separate measurement button to measure the color sample over a black background. Two buttons are available:

- One measures the standard over black (**CR Std:Inst**)
- One measures the batch over black (**CR Bat:Inst**)

To generate the contrast ratio of the standard:

- Measure the standard over the white background as the desktop standard.
- Place the standard over the dark background, and use the button, **CR Std: Inst**, to make the second measurement.

To generate the contrast ratio of the batch:

- Measure the batch over the white background as the normal desktop batch.
- Place the sample over the dark background and used the button **CR Bat:Inst** to make the second measurement.

The screen form *QC INPUT CR* provides all of the input and output fields needed for this option:

Standard Name 2 of 4 Today's Date: 30-Jun-96
 STD GOLD PL Standard and Batch Contrast Ratio
 Measure Standard
 CR Std: Inst Standard CR = 47.41
 Over Black
 Batch Name 4 of 4
 BAT 4 Measure Batch
 CR Bat: Inst Batch CR = 32.88
 Over Black
 Date: 13-Jan-94 Time: 15:08:03
 New Bat Retrieve Hist All Bats to Hist List Bat

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	Delta CR
D65 10 Deg	0.32	0.04	2.47	2.28	0.95	2.49	-14.53
A 10 Deg	0.37	-0.14	2.58	2.34	1.11	2.62	-14.53
F2 10 Deg	0.43	-0.56	2.71	2.48	1.22	2.80	-14.53

Glossary

Absorption (A)

One type of optical constant that describes the ability of a material to absorb light. It is calculated during colorant set calibration, and is based on transmittance measurements.

(formal) Absorption of radiant energy for a unit concentration through a unit path length for a specified wavelength and angle of incidence and viewing. *See Beer-Bouguer Law, Kubelka-Munk Theory, Mie Theory.*

Acceptability

A subjective evaluation to determine whether a detectable color difference can be tolerated. Color differences may be measurable and perceptible, and still be tolerated.

Appearance Properties

Appearance properties are attributes of a sample, other than color, that can affect both the instrumental measurement and the visual assessment of a colored sample. These properties include gloss, film thickness, opacity, and surface characteristics such as haze, roughness, etc.

Auxiliary

One of six ingredient types used by the program. It identifies a collection of ingredients sometimes worked with as a group, usually for purposes of formula scaling. An auxiliary cannot be a colorant and does not have a strength factor. It can only exist as a component ingredient.

Use auxiliary for the ingredient type when the material does not fit any other category.

Colorimetric Data

A set of numbers, usually 3, that locates a sample in a color space. The coordinates are specific to a particular color space. The most commonly used coordinates include XYZ, CIEL*a*b*, and Hunter Lab.

X, Y, Z coordinates are used to plot samples in the CIE chromaticity diagram

L*a*b* coordinates are used to plot samples in CIEL*a*b* color space.

Hunter Lab coordinates are used to plot samples in Hunter Lab space

Colorimetric data is directly linked to one Illuminant/Observer condition. If you do not carefully identify the Illuminant/Observer selection to use, the evaluations you make using this data may be incorrect. In addition, if you input colorimetric to describe a sample, you can only perform color evaluations. You will not be able to perform matching or correction activities.

Also referred to as "color space coordinates."

Color Space

Three-dimensional solid enclosing all possible colors. Colors are located in the solid through their calculated color coordinates. The distance between the samples in the color space solid is the color difference. The properties of the solid is transformed through the application of various equations, i.e. , giving rise to different calculations of the distance between the samples.

Color Difference

Magnitude and character of the difference between two colors located in a color space solid, or map, under specified conditions. The total color difference is generally designated as DE, the lightness difference as DL. In addition, differences are expressed along the redness-greenness axis, and the yellowness-blueness. Certain color difference calculations offer additional components to the color difference expression.

Color Space Coordinates

A set of numbers, usually 3, that locates a sample in a color space. The coordinates are specific to a particular color space. The most commonly used coordinates include XYZ, CIEL*a*b*, and Hunter Lab.

- X,Y,Z coordinates are used to plot samples in the CIE chromaticity diagram
- L*a*b* coordinates are used to plot samples in CIEL*a*b* color space.
- Hunter Lab coordinates are used to plot samples in Hunter Lab space.

Colorant Set

A collection of colorants and default settings used to create them. The type of colorant set created determines the optical model/type of optical data calculated

Ingredient records for a particular ingredient system contain the physical data (e.g., density, strength, lot identification, etc.) for the colorants in a colorant set.

The colorant set contains all of the optical data for a colorant. This includes spectral data, optical constants (K/S, K & S, or A) and specular and internal reflectance values. Optical constants are used to calculate formula predictions.

Contrast Ratio

A calculation used to determine if a sample is translucent or opaque. The sample is measured over a light and dark background and the two measurements are compared. When the sample has a contrast ratio greater than 99.9%, it is completely opaque. A number less than 99.9 indicates that some light is passing through the sample.

The contrast ratio of a sample is directly affected by its film thickness. If the material is not applied at the proper film thickness, the contrast ratio and the color tolerance may not be achieved.

Contrast DE

Contrast DE is the color difference between the samples measured over a pair of contrasting backgrounds. Typically the backgrounds are 'light' and 'dark' but there are other types of contrasting background used in industrial applications, such as red and gray primers used in automotive applications, and black and white contrast cards.

Curve Fit

A method for evaluating the differences between two spectral curves. It is a comparison, point by point, of the reflectance or transmittance values for each curve. When the curves are an exact fit, the match is referred to as an invariant match, and it is not metameric.

Curve Fit is used as a technique for evaluating the differences between a measured target, and formula prediction. A spectral curve is synthesized from the formula prediction, and compared to the measured curve of a target.

Curve Fit is also used as a technique for evaluating the performance of colorant data used in correction predictions. The curves of the measured trial sample and the synthesized correction prediction are compared, and the differences are used to adjust the correction prediction.

D65/D6500

A standard daylight illuminant. It refers to the spectral power distribution curve of a daylight illuminant having a correlated color temperature of 6500 K.

Da

Difference in red/green component

In certain transformed color spaces, generally used as the Δa , or difference in "a" between a sample and a standard reference color along the redness-greenness axis. It is always calculated for a specific Illuminant/Observer condition. If "a" or Δa is plus, the sample has more redness than greenness than the standard. If "a" or Δa is minus, there is more greenness than redness. It is normally used with b to express the chromaticity or chromaticity differences between samples. Da^* is the redness-greenness differences calculated using the 1976 CIEL*a*b* color difference calculation. Da is the redness-greenness differences calculated using the Hunter Lab color difference calculation.

- +Da More red (less green)
- -Da More green (less red)

Db

Difference in yellow/blue component.

In certain transformed color spaces, generally used as Δb , the difference in "b" between a sample and a standard reference color along the yellowness-blueness axis. It is always calculated for a specific Illuminant/Observer condition. Generally, if "b" is plus, there is more yellowness than blueness, if "b" is minus, there is more blueness than yellowness. . It is normally used with "a" to express the chromaticity or chromaticity differences between the samples.. Db^* is the yellowness-blueness differences calculated using the 1976 CIEL*a*b* color difference calculation. Db is the yellowness-blueness differences calculated using the Hunter Lab color difference calculation.

- +Db More yellow (less blue)
- -Db More blue (less yellow)

DC

Difference in chroma.

In certain transformed color spaces (generally used as Δc) the differences in chroma or chromaticity between a sample and a standard. It is always calculated for a specific Illuminant/Observer condition.

The concept of Chroma is used in CIEL*a*b* color difference calculation, and is expressed in terms of hue and saturation, excluding the luminous intensity of the samples.

The concept of chromaticity is included in FMC/FMC II color difference calculation, and refers to the dimensions of both redness-greenness and yellowness-blueness, excluding the luminous intensity.

+C Sample is more intense; higher chroma

-C Sample is less intense; lower chroma.

DE(DE)

Total color difference, computed by all color difference equations. It is always calculated for a specific Illuminant/Observer condition. The interpretation of this number is directed related to the color difference equation used to calculate it.

DE is always a positive value.

DH*

Difference in hue.

In certain transformed color spaces, a parameter used to express the differences between the sample and the standard along the hue axis/circle. It is always calculated for a specific Illuminant/Observer condition. Typically, differences in hue have the greatest impact on the **visual** evaluation of colored samples.

+DH Sample is moving from standard counter-clockwise around the hue circle.

-DH: Sample is moving from standard clockwise around the hue circle.

DL

Difference in lightness.

In certain transformed color spaces, generally used as ΔL to express the differences between the sample and the standard along the achromatic dimension in a three dimensional color space. This axis ranges from black through various levels of gray to white. It is always calculated for a specific Illuminant/Observer condition. This expression is included in all color difference calculations.

- +DL. Sample is lighter
- -DL. Sample is darker

Default

Defaults are responses used automatically by the program to automate the operation of the program, making it easier and faster to use. Defaults are typically applied to file locations, sample names, constants used in color evaluations, and to enable/disable specific program options. The program will use a default value unless you explicitly specify a different input, usually from a menu option or command button on the button bar.

Density

Density is weight per volume. It is a number used to convert ingredient amounts from a weight form to an equivalent volume form, and vice versa. The specific gravity of an ingredient is one example of a density value. It is expressed as single number that represents the weight of the material per unit volume; for example grams/cc, lbs/Gal, KG/L, etc.

The user can create a density using a combination of any defined weight unit and any defined volume unit.

Film Thickness

Film thickness is a physical property that is related to the dry film. It can be expressed in percentage (%), or a number representing a unit of measurement.

If you are working with transparent or translucent samples, differences in film thickness have a large impact on the acceptance of a color match. A formula from Formula Central must be applied at the displayed film thickness in order to achieve the other specifications included in the formula display, such as contrast ratio, color difference, or others.

Formula Mode

The mode refers to how you measure the ingredients that go into the formula. For example, If you weigh the amounts of each ingredient, the formula mode is weight units. If you assemble formulas based on volume, or specific gravity (gallons, liters, cc's, etc.) you will need the formula expressed in volumetric units.

Gloss

Refers to the smooth, mirror-like reflection coming from a sample. It is also referred to as specular. This feature can be measured and evaluated. Gloss values are specific to the type of gloss meter used for the evaluation.

Gloss data is typically provided from one of from 3 gloss types of gloss geometry: 20°, 60° and 85. Please be sure to verify the gloss meter you are using.

The program includes a feature called "gloss compensation". This feature provides the ability to adjust a sample measurement to simulate the color at a different gloss level. See Applications Technology, Gloss Compensation for a detailed explanation of the concept and operation of this feature.

Instrument Driver

An instrument interface refers to the connection between the color measuring instrument (usually a spectrophotometer), and a computer. For every instrument, the interface includes both hardware and software instructions to enable successful communication.

Illuminant/Observer

Mathematical description that *integrates* the relative spectral power distribution of a real or imaginary light source with the standard observer functions for either the 2° or 10° condition.

Illuminant

Mathematical description of the relative spectral power distribution of a real or imaginary light source. This is the amount of relative energy emitted by a source at each wavelength in its emission spectrum, as compared to an equal energy source.

Index of Refraction

The index of refraction is the speed at which light travels through a medium. Air is one medium and its index of refraction is 1.0. The colored sample you measure is made of some material, and it has an index of refraction different from air. Because of index of refraction differences, when the light travels through air and encounters the sample, some the light is reflected at the sample surface and never penetrates the sample,

Instrument Calibration

Daily procedure used to standardize the performance of the instrument. It is done to account for changes in the environment (humidity, heat, dust, etc.) that can change the performance of the instrument.

Inter-instrument Agreement/reproducibility

A comparison of measurements made of the same sample by different instruments. The variation in sample measurements is expressed in terms of DE. Manufacturers of spectrophotometers that are used commercially include a value for inter-instrument agreement in the instrument specification.

Instrument manufacturers typically provide a specification for inter-instrument agreement. This specification is valid when comparing the same instrument models. When comparing two different instrument models or manufacturers, you may see significant differences in the inter-instrument agreement.

Internal Reflectance

That amount of the energy that enters a sample, and is trapped inside the sample because it is unable to travel across the air/sample boundary.

K S Kubelka Munk

The ratio of the Kubelka-Munk optical constants, K(absorption coefficient) and S(scattering coefficient) for a colorant. It is part of the equation used to calculate formulations and corrections. The equation states that K/S can be calculated from the reflectance of a sample:

$$K/S = \frac{(1-R)^2}{2R}$$

It also states that K/S is directly proportional to colorant concentration. Knowing the reflectance measurements of the samples, and the concentration of colorants in the mixtures, the K/S of the mixture can be calculated.

Light

Electromagnetic radiation that a human detects through visual sensations that arise from the stimulation of the retina of the eye. This portion of the electro-magnetic spectrum includes wavelengths from about 380nm – 770nm. It is incorrect to refer to electromagnetic radiation outside of this range (i.e. ultra-violet wavelengths) as 'light', since the human observer does not detect it visually.

Adjective meaning high reflectance, transmittance, or level of illumination as contrasted to dark, or low level of intensity.

Light Source

An object that emits radiant energy (light) to which the human eye is sensitive. The emission of a light source can be described by the relative amount of energy emitted at each wavelength in the visible spectrum. This numeric description is an Illuminant.

The light source can also be described in terms of its color temperature, expressed in Kelvin. For example, there are several daylight sources, such as D5000 and D6500 that have different color temperatures.

Colorant Loading

The proportion of a formula represented by the colorant. The proportions of all of the ingredients in a formula must remain balanced in order for the finished product to satisfy the function(s) for which it was developed. For example, house paint must stick to the walls and hide the background. These properties are achieved by mixing the ingredients in specific proportions. When the colorant load exceeds a certain amount, the product loses its integrity.

Masstone

A colorant/vehicle mixture that contains a single colorant.

Measurement Condition

Identifies the settings on the instrument. These include:

- Measurement type (reflectance or transmittance)
- Aperture Size
- Specular Port position (Specular Included or Specular Excluded)
- Position of adjustable UV filter

Measurement Method

Identifies the source of the spectral data for the sample. The choices include:

- Instrument
- Folder
- Keyboard spectral values
- Keyboard Color Coordinates

Metamerism

A phenomenon exhibited by a pair of colors that only match under one set of viewing conditions. Each sample has the same tristimulus values for a described set of viewing conditions (i.e. illuminant, observer, geometry of illumination and viewing), but have different spectral curves. When any of the viewing conditions (the light source, the observer, the orientation of the sample) are changed, the samples no longer appear to match, and are said to be metameric.

Metamerism Index/Index of Metamerism

A metamerism index is used to quantify the amount or degree of metamerism that exists between two samples. It takes into account the color difference between two samples, under two different Illuminant/Observer conditions.

Nanometer

One billionth of a meter (10^{-9}). It is also known as a millimicron. It is used to measure the wavelengths of energy found in the electro-magnetic spectrum. Wavelengths of energy in the form of visible light measure from 400 – 700 nanometers.

Opacity

A general term used to describe the degree to which a material obscures a substrate. It is the opposite of 'translucency', the degree to which a material does not obscure a substrate. Opacity and/or translucency are measured in terms of a contrast ratio.

Opaque

Adjective used to describe complete opacity.

Optical Brightener

An ingredient that fluoresces. When this happens, the ingredient absorbs light at a specific wavelength in the ultra violet range of the spectrum, and re-emits it at a wavelength in the visible spectrum. The energy is usually re-emitted at the shorter wavelengths of the visible spectrum (i.e. in the blue region of the visible spectrum), and the resulting effect is that the material displays brighter, bluer, or 'whiter than white'.

Also referred to as a fluorescent agent or fluorescent brightener

Optical Model

The mathematical approach used to calculate the K(absorption) and S(scattering), K/S values or A(absorbance) values for colorants. There are four models to choose from:

- Transparent
- Transmission
- Translucent
- Opaque

Each type of uses a specific method for sample preparation and sample presentation, and a specific mathematical equation for calculating the optical constants.

Optical Constants

Also referred to as optical data/optical properties.

A numerical description of the way an ingredient interacts with light. Optical data is typically generated for colorants, but may also be calculated for other ingredient types such as resins, depending on the ingredient composition. Optical data can be expressed using the following terms:

- K(absorption) and S(scattering) values
- K/S values
- A(absorbance)

The same colorant used in different product lines may generate different optical data.

Optical Data

Also referred to as optical constants/optical properties. A numerical description of the way an ingredient interacts with light. Optical data is typically generated for colorants, but may also be calculated for other ingredient types such as resins, depending on the ingredient composition. Optical data can be expressed using the following terms:

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- K/S values
- A(absorbance)

The same colorant used in different product lines may generate different optical data.

Paste

Intermediate, semi-aqueous form of a colorant that contains dry colorant, resin and solvents.

Perceptibility

Refers to a difference between samples than can be detected visually. In the case of colored samples, color differences detected using an instrument may not be perceptible.

Reflectance

The ratio of the intensity of the reflected light to that of the incident light. In popular usage, it is considered as the ratio of the intensity of reflected radiant energy to that reflected from a defined (white) reference standard.

Repeatability (Instrument)

A comparison of measurements made of the same sample, using the same instrument. The variation in measurements is expressed in terms of DE. Manufacturers of spectrophotometers for commercial use include a value for repeatability in the instrument specification. This value is only valid for comparisons of measurements of an achromatic sample (typically a white). The sample being used must have a uniform surface free of defects, and cannot exhibit any characteristics of geometric metamerism.

Repeatability (Sample)

A comparison of differences in samples made using the same raw materials, equipment and processing technique. Repeatability can be expressed through a DE value. The more repeatable your sample preparation techniques are, the more accurate your formulas will be.

Reproducibility (Sample)

A comparison of the differences between samples due to changes in the sample preparation procedure. Differences can be caused by changing one or more of the following:

the technician	the type of equipment used
the mixing method	the curing method
the method of application	the batch size

The degree of reproducibility can be expressed through DE. The more reproducible your process is, the more accurate your formulas will be.

Reproducibility/Inter-instrument Agreement

A comparison of measurements made of the same sample by different instruments. The variation in sample measurements is expressed in terms of DE. Manufacturers of spectrophotometers for commercial use include a value for inter-instrument agreement in the instrument specification. This value is only valid for comparisons made using instruments of the same model.

Resin

One or a group of organic materials, either natural or synthetic, that serves as a vehicle for the colorant. Resins can impart gloss, adhesion, heat resistance, odor retention, resistance to chemicals, hardness, film-forming abilities, and other properties to the finished product.

Alternate names include vehicle, clear, and extender.

Sample

A colored object that may be measured, evaluated, matched, or corrected. When you are working on a job, a sample may be a Target (standard), or Trial (batch). The spectral and or colorimetric description of a sample can be stored in a folder, at any time, for future use.

Saturation

The attribute of color perception that expresses the degree of departure from a gray of the same lightness. All neutrals (white/black/gray) have zero saturation. The term saturation is often associated with the intensity or brightness of a sample. When working with the 1976 CIEL*a*b* or CMC color difference equations, the dimension of chroma(C^* and DC^*) approximately relates to the saturation of the sample.

Saunderson Correction

Equation for calculating a correction for the Fresnel reflectances at the surface of a dielectric material for both the incident light and the exiting light.

Scattering

Diffusion or redirection of radiant energy when light encounters particles having different refractive indices. Scattering occurs at boundaries between different mediums regardless of whether they are external to the sample (i.e. air/resin interface) or internal to the sample (i.e. resin/pigment particle interface).

Scattering Coefficient (S)

An optical constant that quantifies the ability of a colorant to scatter light. Based on reflectance data for a sample, it is one of the values calculated during colorant set calibration, using the Kubelk-Munk equation. It is part of the data used to calculate color matches and corrections.

Scattering Resin

A resin that is not completely transparent. The resin can contain particles that absorb light, scatter light, or both. The result is that the background is obscured. This causes the material to appear cloudy, or translucent.

Single Constant/One Constant

Two sets of equations, the Kubelka Munk equations, are used to describe color mixing properties of colorants. Two equations are used to cover the transparency of the colorants and the type of colorants used. . A single constant approach assumes that colorants selectively absorb light, and that the light scattering properties of the colorants are constant.

The theory assumes that the absorption (K) is done by the colorant, and the scattering (S) by the substrate. Separate K and S values are not calculated for the colorant. A "single constant" approach is used to match transparent samples using dyes, and transparent or translucent samples that are made from a selection of pigments that does not include a white pigment. If white is used, it is used in a fixed amount regardless of the colorant.

Solvent

Another term for thinner. It is a component ingredient, usually a solvent or diluent, added to a formula for viscosity adjustment.

Spectral Curve

A graphic representation of the spectral data for a sample. The relative reflectance or transmittance (or absorption) of the sample is plotted on the ordinate, and the wavelength or frequency as the abscissa. The most common curves in the visible region use wavelength units of nanometers, with the short wavelength units at the left of the scale.

Spectrophotometric Curve

A graphic representation of the spectral measurement for a sample. The relative reflectance or transmittance (or absorption) of the sample is plotted on the vertical axis, and the wavelength or frequency on the horizontal axis. The most common curves in the visible region use wavelength units of nanometers, with the short wavelength units at the left of the scale.

Spectrum, Visible

A band of the electromagnetic spectrum that is detected by the human eye as light. It typically includes wavelengths from 380 –770nm.

Specular

The smooth, mirror-like reflection coming from a sample. When the light travels through air and encounters the sample, some the light is reflected at the sample surface and never penetrates the sample. We refer to this portion of the reflected light as the specular component.

For the calculation of optical constants, matching and correction predictions, all spectral measurements must be corrected to account for the loss of energy due to this specular effect.

Specular Component Included (SCI)

A type of measurement geometry. Measurement of reflectance made in such a way that the regular surface reflection is included in the measurement.

Specular Component Excluded (SCE)

A type of measurement geometry. Measurement of reflectance made in such a way that the regular surface reflection is not part of the measurement. This can be accomplished through the following techniques:

- Using 0° (perpendicular) incident light on the samples, thereby reflecting the specular component of the reflectance back into the instrument.
- Using black absorbers or light traps at the specular angle when the incident angle is not perpendicular.
- Measuring at an angle different from the specular angle in directional measurements.
- For a sphere instrument, opening a hole in the sphere opposite the measuring optics.

Standard

A sample that serves as a reference for comparison. In some cases, it is an official standard whose attributes are formally recorded and agreed upon by all who use it; i.e., reference samples produced by institutions such as the NBS, samples formally designated as references for SPC evaluations, etc.

In other cases a standard may be informally designated for the purposes of defining a target or objective to be achieved. Color differences are expressed relative to a standard, and designation of the standard is required to interpret these differences.

Standard Observer

A numeric description of the way the human eye responds to color.

The spectral response characteristics of the average observer are officially defined by the CIE. Two such sets of data are defined, the 1931 data for the 2° visual field (distance viewing) and the 1964 data for the annular 10° visual field (approximately arm's length viewing).

NOTE

All of the expressions of colorimetric data (screen displays and hard copy) explicitly state the illuminant/observer condition used to determine the values.

Strength

The relative ability of a unit quantity of colorant to alter the color of another colorant to which it is added. In popular usage, tinting strength is an index of the effectiveness with which a chromatic colorant imparts color to a standard white pigment. In a mixture of pigments, the absorption strength or the scattering strength, or both, may affect its apparent strength. In any case, tinting strength comparisons of materials of different chemical type may vary with the concentrations of colorants used, so care must be exercised in selecting relative concentrations or concentration ranges.

-OR-

Relative change in the absorption of a standard white pigment when a specified amount of absorbing pigment, black or chromatic, is added. This is basically the common definition of tinting strength.

Substrate

The substrate is the background over which a colored material is applied. When a colored material does not totally hide the background, the background has an influence on the color difference of the match. If you are working with a transparent or translucent material, using a different substrate will change the color of the material.

Sub-menu

Windows menus frequently include submenus. The submenu contains an additional set of choices related to a particular menu selection. An ? next to a menu option indicates that you must move to a submenu to view the choices. Place the cursor over the arrow to display the submenu.

Thinner

A specific ingredient type that identifies a collection of ingredients sometimes worked with as a group usually for purposes of formula scaling. It is a component ingredient, usually a solvent or diluent, added to a formula for viscosity adjustment. A thinner cannot be a colorant, and does not have a strength factor.

Tolerance

A number or series of numbers that define a range of acceptability around a numerical standard. Tolerances are used to evaluate the acceptability of both incoming raw materials, and outgoing finished products. Tolerance specifications typically include a sample, and a choice of color space/color difference equation you use. If you are using colorimetric values for tolerances, the tolerance must also specify the selection of an Illuminant/Observer combination. A tolerance can also include limits on film thickness, opacity, etc.

Translucent

A term used to describe a sample that is not completely transparent, nor opaque. Light is partially absorbed and scattered by the materials in the sample, and by the background of the sample. Samples that are translucent are also said to exhibit 'incomplete hide'.

Transmittance

Ratio of transmitted light to incident light. It is that fraction of the emitted light of a given wavelength that is not reflected or absorbed, but passes through a substance.

Transparent

Adjective to describe a material that transmits light without diffusion or scattering.

Transparent Resin

A resin that does not scatter or absorb any light.

Tristimulus Values, CIE

Amounts (in percent) of the three components necessary for matching a color; in the CIE System. This is a three-color additive mixture and the components are designated as X, Y, Z. Tristimulus values are not absolute values characteristic of a sample, but relative values dependent on the method used to obtain them.

The Illuminant and Standard Observer color matching functions used must be designated; if they are not, the assumption is made that the values are for the 1931 (2° field) and Illuminant C.

Approximations of CIE tristimulus values may be obtained from measurements made on a tristimulus colorimeter, giving measurements generally normalized to 100, which must then be normalized to equivalent CIE values. *See equation section for specific details of equations to calculate tristimulus values.*

Two Constant (Kubelka Munk)

Two sets of equations, the Kubelka Munk equations, are used to describe color mixing properties of colorants. Two equations are used to cover the transparency of the colorants and the type of colorants used. A two-constant approach assumes that the colorants being used both selectively absorb and scatter light, and separate K and S values are calculated for the colorant. A 'two constant' approach is used to match opaque and translucent samples using a colorant selection that includes white.

Viewing Geometry

A configuration of light source, object and detector. Most commercial spectrophotometers offer the following geometries:

Configuration	Meaning
d/8°	sample is diffusely illuminated; detector is positioned at an angle of 8° from the sample surface
0°/45°	sample is illuminated at 0°; detector is positioned at a 45° angle from the sample surface
45°/0°	sample is illuminated at 45°; detector is positioned at a 0° angle from the sample surface

Viscosity

Viscosity is a physical property that refers to the rate of flow of the material. For some products, small variations in the viscosity of the material have a significant impact on the color.

When preparing a formula, you must match the viscosity displayed with the formula in order to achieve the other specifications in the formula display such as the hiding, film thickness, color difference or other requirements.

Wavelength

It is the measuring unit used to identify the components of the visible spectrum, designated as λ in spectrophotometry. Distance between two successive points of a periodic wave in the direction of propagation in which the oscillation has the same phase.

Whiteness Index

Any of several numerical indices used to indicate the degree of whiteness.

Yellowness Index

Any of several numerical indices of the degree of departure from a preferred white reflecting material or colorless transparent material towards yellow.

NOTES

Appendix

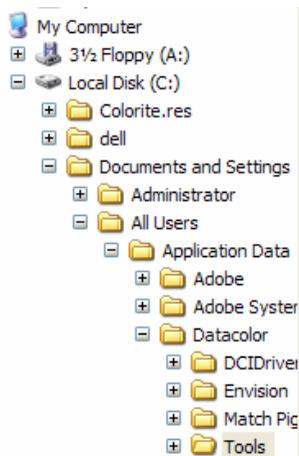
Data File Locations

Overview

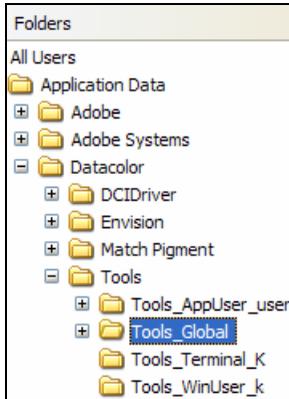
Datacolor TOOLS can be configured to run on stand-alone systems, networks, and terminal servers. Understanding the data structure used is essential to manage the data used, and to support any custom changes you have made to the program settings for individual users.

Default File Locations

The default data location for all TOOLS data is C:\Documents and Settings\All Users\Application Data\Datacolor\Tools:

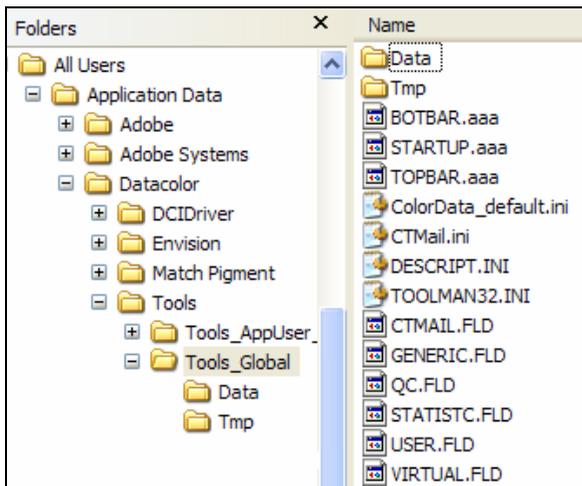


When the TOOLS program is installed, 4 subfolders are created in the TOOLS folder:



Tools_Global

This is the default folder used by the program. It contains important configuration files that are used to start the program, configure specific program options and to control the appearance of the user interface and printed output. If you are a single-user system working with the default login/password selections, you are working from data stored in the Tools_Global folder. When you customize user fields and forms, enable email options, create new users, customize start-up screens, you make changes to files in this folder. Below is a partial listing of the contents of this folder:



The file TOOLMAN32.INI instructs the program regarding where to look for these files. Below is a partial listing of TOOLMAN32. INI

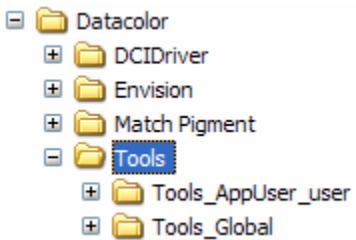
```

[QC_DIRECTORIES]
StdFormatFileDir=%CTGLOBAL%Data\
StdFileDir=%CTGLOBAL%Data\
WorkDir=%CTGLOBAL%Tmp\
FormFileDir=%CTGLOBAL%
FieldFileDir=%CTGLOBAL%
IlluminantFileDir=%CTGLOBAL%
ConfigFileDir=%CTGLOBAL%
ColorantFileDir=%CTGLOBAL%colorant\
FormulaFileDir=%CTGLOBAL%formula\

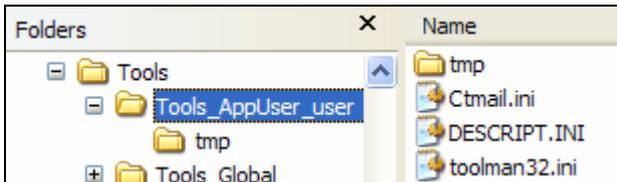
```

Tools_AppUser_user

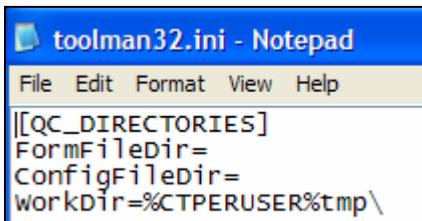
This is the folder dedicated to an individual user. The name assigned to this folder includes the login associated with the user. For example, the default login/password for TOOLS (pigment applications) is **User/CC3**.



This folder contains a TOOLMAN32.ini file that is used to direct the program regarding the location of the data to be used by this user.



Below is the default TOOLMAN32.ini file contents for this user:



The locations for *FormFileDir* and *ConfigFileDir* in the default TOOLMAN32.INI file for this user are empty. When the program sees this, it immediately looks in the TOOLMAN32.ini file in the Tools_global directory for the location of these files.

Customizing Users

You can customize the program settings to the needs of an individual user. Five steps are required to successfully complete the customization:

1. In the TOOLS program, create a new user. This copies all files from Global folder to User folder you have just created.
2. Close the TOOLS program.
3. Using Windows Explorer, browse to the User folder you have just created. Using a text editor such as notepad, you must edit the file directory information in the TOOLMAN32.INI file. This is located under the heading [QC_DIRECTORIES]. The path below should be entered for *FormFileDir*, *ConfigFileDir* and *WorkDir*.

```
%C%PERUSER%
```

When you are finished, the entries should be as follows:

```
[QC_DIRECTORIES]
FormFileDir=%CTPERUSER%
ConfigFileDir=%CTPERUSER%
WorkDir=%CTPERUSER%tmp\
```

4. Relaunch the program. In this example, when an operator logs in as User/cc3, the program works with the files in the directory Tools_AppUser_User.
5. Make changes to program settings, forms and button bars as needed. These changes will be saved to the files in the user folder.

NOTE

When the user directory is created, all *.FRM files are copied from the Tools_Global directory to the user directory. If the user will not use all of these forms, you can delete unused forms from the user directory. They will disappear from the forms list inside TOOLS.

Tools_Terminal_”...”

Used only by Terminal Server applications. See also *Datacolor TOOLS Technical Reference.PDF* for supplemental information to configure Datacolor TOOLS for terminal server systems.

Tools_WinUser_”...”

Used only by Terminal Server applications. *See also Datacolor TOOLS Technical Reference.PDF for supplemental information to configure Datacolor TOOLS for terminal server systems.*

File Backup

If you customize your TOOLS program in any way, there are several configuration files that should be backed up on a regular basis. If you do not, in the event of a system failure you will not be able to restore the system to its previous level of function.

User Interface Files

There are 4 files that define the current Datacolor TOOLS user interface.

- **QCSETUP.cnf.** Saves the current Datacolor TOOLS setup. All of the default settings for the QC program are saved to this file when you exit the QC program. This includes illuminant/observer settings, default folder locations, default measurement setup, and default desktop settings.
- **TOPBAR.cnf.** Saves the current top button bar configuration.
- **BOTBAR.cnf.** Saves the current bottom button bar configuration.
- **STARTUP.scr.** Saves the current QC form configuration. When QC starts up, this file determines which screen forms will be active on the desktop.

If these files are saved and copied to a second Datacolor TOOLS system, the second system would have the same user interface as the first system.

Whenever you re-install the software, these files are overwritten. If you have customized button bars, forms or startup screens, you must make a backup of the appropriate files to maintain the custom changes.

Each form is stored in a separate file (*.FRM on the system. If you have customized any forms provided with the program, we strongly recommend that the changes made to default forms be saved under a new form name. You should also maintain current backup copies of these files. If do not rename the forms, and do not make backup copies of the changes, you will lose the changes if you re-install the program. The original form will be re-installed from the CD. *See also Datacolor TOOLS Form Editor.PDF, User Field Maintenance for instructions to edit this form. See also Data File Locations in this appendix for information regarding the location(s) of these files.*

Settings Files

If you have customized any user fields, you must back up the following files:

- **USER.FLD.** Whenever you add custom fields using the Form Editor, the fields are added to this file. If you are using the data email or data import/export options, this file may also have been edited to recognize custom fields being sent by another user. *See also Form Editor, User Field Maintenance for instructions to edit this file. See also Data File Locations in this appendix for information regarding the location(s) of this file.*
- **CTMAIL.FLD.** This file defines the database fields sent and received when the email and data import/export options are used. If you are using the data email or data import/export options, this file may have been edited to recognize custom fields being sent by another user. *See also Datacolor TOOLS User's Guide, Applications Technology, Exchanging Data with Other TOOLS Users for a discussion of the email options. See also Data File Locations in this appendix for information regarding the location(s) of this file.*
- **TOOLMAN32.INI.** This file contains fundamental setup information. This file is typically modified only for terminal server configurations that require multiple login accounts. *See also Datacolor TOOLS Technical Reference for information on the contents of this file, and editing instructions. See also Data File Locations in this appendix for information regarding the location(s) of this file.*

Summary of Files to Backup

If you re-install your software, the files listed below are overwritten. These files may be found in both global and user folders, and may be configured differently in each case. You must keep track of the various user and program customizations you have made. *See also Data File Locations in this Appendix for a discussion of where the files are stored, and how they interact.*

- **USER.FLD.** User field file. If you have created new fields, they are stored in this file (QC.FLD for TOOLS Ver 1.0)
- **TOOLMAN32.INI.** Fundamental program settings. If several different users are active, this file has been changed and must be updated.
- **QCSETUP.CNF.** QC default settings.
- **TOPBAR.CNF.** Top button bar.
- **BOTBAR.CNF.** Bottom button bar.
- **STARTUP.SCR.** Startup screen.
- ***.SCR.** Screen setups.
- ***.FRM.** If you have edited any forms and did not change the form name, they will be overwritten when the program is re-installed.

- **Database folder:** C:\Program Files\datacolor\Database. Folders included:
 - **Color.db, color.log, translation.db** (for pigment database setup)
 - **Dci_itm.db, printforms.db** (for textile database setup only)

Complete Database Backup

You should regularly backup the entire database. The Database folder is found in *C:\Program Files\datacolor\Database*. The files that need to be saved are specific to the database structure (Pigment or Textile setup).

- **Pigment database setup.** Color.db, color.log, translation.db
- **Textile database setup.** Dci_itm.db, printforms.db

See also Datacolor TOOLS Technical Reference. PDF for instructions to make a complete backup the database (pigment setup only).

Accelerator Keys

Accelerator keys are function keys that when pressed perform a QC operation. These keys can help simplify program operation by reducing the need to use a mouse. The most common use for an accelerator key would be to activate the batch measurement sequence.

The accelerator keys and their function are listed below:

Function Key	Operation Performed
F3	Move to Standard Name Input
F4	Measure Standard
F5	Move to Previous Standard
F6	Move to Next Standard
F7	Move to Batch Name Input
F8	Measure Batch
F9	Move to Previous Batch
F10	Move to Next Batch
Ctrl + Home	Move to Top Field in Form
Ctrl + X	Exit the Program

Command Buttons

Below is an alphabetized list of all command buttons included with the program.

Command Description	Button Name
%R / %T Plot	%R(%T)Plot
%R IR Plot	%R IR Plot
3DPlot Multiple Batch	3DPlotMulti
3Dplot Single Batch	3DPlotSingle
Adjust Batch Curve	AdjBat%R
Adjust Standard Curve	Adj%RCurve
AI Pass/Fail Plot	AIP/FPlot
Automatically Email Desktop	AutoSend
Batch Contrast Ratio	CR BAT
Batch Curve Adjustment Defaults	AdjBat%RDefs
Batch Defaults	BatDefaults
Batch Haze	HZ BAT
Batch Input	Bat:
Batch Opacity	OP BAT
Batch Training FAIL Judgment Flag	F
Batch Training PASS Judgment Flag	P
Batch Training REMOVE Judgment Flag	X
Calculate Pigment / Clear Add	Calc.Add
Calibrate All Instrument Conditions	CalibrateAll
Calibrate Instrument	CALIBRATE
Calibrate White Only	Calib.White
Chromaticity Plot	Chroma.Plot
CIELab DE Plot	CIELabDEPlot
CIELab Plot	CIELabPlot
CIELCh Elliptical Plot	LChElipPlot
CIELCh Rectangular Plot	LChRect.Plot
CIELuv Plot	CIELuvPlot
Close All Forms	CloseAll
Close Current Form	CloseCurrent
CMC Plot	CMCPlot
Colorite Color Evaluation	EvalColor
Copy Batches From Instrument	CopyBats

Create Master Std from Working Std	CreateMaster
Delete All Stds from Desktop	DeleteAllStds
Delete All Stds from Desktop / Prompt	DeleteAllStds
Delete Current Batch	DeleteBat
Delete Current Standard	DeleteStd
Disable CIE Whiteness Measurements	DisableCIEW
Disable Main Menu	DisableMenu
Disable R457 Measurements	DisableR457
Display Form	Display Form
Edit Batch	EditBat
Edit Grade (Virtual Std.)	EditGrade
Edit Standard	EditStd
Email Options	EmailOptions
Enable CIE Whiteness Measurements	EnableCIEW
Enable Main Menu	EnableMenu
Enable R457 Measurements	EnableR457
End Production Sort Run	EndProdSort
End Timed Measurements	TimedMeasOFF
Execute Datamatch Program	Datamatch
Execute DCIMatch Correction Program	DCICorrect
Execute DCIMatch Match Program	DCIMatch
Exit Datacolor TOOLS	ExitCT
Export Current Std And Batch(es)	ExportSTD/BAT
Export Desktop	ExportDesktop
FMCII Plot	FMCIIPlot
Get Closest Batch From Desktop	ClosestBatch
Get Dye Lot	GetDyeLot
Histogram Plot	HistogramPlot
HunterLab Plot	HunterLabPlot
Illuminant/Observer	Illum/Obs
ImageMaster Environment	Environment
ImageMaster Image	Image
ImageMaster Tiles	Tiles
Import Desktop	ImportDesktop
Instrument Setup	Inst.Setup
K/S-Absorbance Plot	K/S(Absorb.)
Launch Application	LaunchApp

List and Delete Batches	ListBat
List and Delete Current Stds	ListStd
List Batches	ListBat
List Current Desktop Stds	ListStd
Load Screen Setup	LoadScreen
Load Standards from Job File	LoadJob
Log K/S-Absorbance Plot	LogK/S(Abs.)
Measure Paper Batch	PaperBatch
New Batch	NewBat
New Standard	NewStd
Next Batch (Arrow)	
Next Batch (Large Size)	NextBatch
Next Illuminant	NextIllu
Next Standard (Arrow)	
Next Standard (Large Size)	NextStd
Previous Batch (Arrow)	
Previous Batch (Large Size)	PrevBatch
Previous Standard (Arrow)	
Previous Standard (Large Size)	PrevStd
Print Current Form	PrintForm
Procedure	StartProc
Production Sort Current Batch	ProdSortCurr
Recalculate and Update Current Bat	RecalcBat
Recalculate and Update Current Std	ReCalcStd
Receive Desktop	ReceivEmail
Reset Instrument	ResetInst.
Retrieve Batch from Sample File	RetrieveBat
Retrieve Batch from Standards File	RetrieveSamp
Retrieve Job Data By	AutoJob
Retrieve Sample As Bat	RetrieveAsBat
Retrieve Sample As Std	RetrieveAsStd
Retrieve Sorted Batches from Sample File	GetSortBat
Retrieve Sorted Standards from Sample File	GetSortStd
Retrieve Std From File	RetrieveStd
Save Screen Setup	SaveScreen
Save Standards to Job File	SaveJob
Scale Formula To Batch Size	ScaleFormula

Search	SEARCH
Select DataFlash 100	DF100
Select File Forms	FileForms
Select ImageMaster Environment File	SelEnvironment
Select ImageMaster Image	SelectImage
Select Microflash	Microflash
Select Print Forms	PrintForms
Select Screen Forms	ScreenForms
Send Current Batch	SendBAT
Send Current Standard	SendSTD
Send Current STD and Batch	SendBoth
Send Desktop	SendDesktop
Send Standards To Instrument	SendStds
Set Focus to Batch Name	FocusBatch
Set Focus to Standard Name	FocusStd
Set Illuminant/Observer	SetIll/Obs
Set Instrument Condition	SetCond
Single/All Batches Form Plot Toggle	Single/All
Standard AI P/F Training	StdP/FTrain
Standard Contrast Ratio	CR STD
Standard Curve Adjustment Defaults	AdjStd%RDefs
Standard Defaults	StdDefaults
Standard Haze	HZ STD
Standard Input	Std:
Standard Opacity	OP STD
Standard Pass/Fail Tolerances	StdP/FTols
Standard's Read Averaging Defaults	ReadAvgDefs
Standard's Strength Defaults	StrengthDefs
Start Timed Measurements	TimedMeasON
Store All Batches in Sample File	StoreAllBats
Store All Pieces To Sybase	StorePieces
Store All Stds to File	StoreAllStds
Store Batch as Working Std	StoreRefStd
Store Current Batch in Sample File	StoreBat
Store Current Batch in Standards File	StoreSamp
Store Std To File	StoreStd
Strength Adjustment OFF	StrengthAdjOFF

Strength Adjustment ON	StrengthAdjON
Substrate Correction ON/OFF	SubstrateCorr.
Surface Correction Defaults	SurfCorrDefcs
Swap Standard And Batch	SwapStd/Batch
System File Defaults	SysFileDefcs
System Pass/Fail Tolerances	SysP/FTols
System Read Averaging Defaults	SysReadAvg
System Setup	SystemSetup
System Statistics Defaults	SysStatistics
System Strength Defaults	SysStrength
Trend Plot	TrendPlot
Turn Batch Auto Numbering OFF	AutoNumberOFF
Turn Batch Auto Numbering ON	AutoNumberON
Turn Batch Auto Store In File OFF	BatStoreOFF
Turn Batch Auto Store In File ON	BatStoreON
Turn Surface Correction OFF	SurfCorrOFF
Turn Surface Correction ON	SurfCorrON
Unadjust batch Curve	UnAdjBat%R
Unadjust Standard Curve	UnAdj%RCurve
Update All Open Forms	UpdateForms
Update Batch History	UpdateHistory
Update Current Batch	UpdateBat
Update Current Standard	UpdateStd
UV Calibration	UVCalibration
Zoom In Form Plot	ZoomIn
Zoom Out Form Plot	ZoomOut

Screen Forms

% Reflective 10 nm Hor

% Reflectance 10nm Hor						
Standard: %R						
K0010 VIOLETT K						
		%R / %T Plot		K/S (Absorb.)		
400-450 nm	8.57	9.28	9.79	10.24	10.24	9.27
460-510 nm	7.97	6.81	5.80	5.17	4.67	4.01
520-570 nm	3.53	3.63	3.86	3.87	3.89	5.19
580-630 nm	7.31	8.96	10.61	11.96	13.95	17.49
640-690 nm	22.25	28.30	35.32	43.36	51.44	58.44
700 nm	64.75					
Batch: %R						
N0010 VIOLETT N						
400-450 nm	9.85	10.71	11.15	11.25	11.23	10.10
460-510 nm	8.38	7.07	5.96	5.28	4.76	4.08
520-570 nm	3.59	3.70	3.97	4.02	4.09	5.68
580-630 nm	8.19	10.21	12.19	13.78	15.97	19.78
640-690 nm	24.82	31.15	38.38	46.47	54.42	61.08
700 nm	66.85					

% Reflective 10 nm Ver

% Reflectance 10nm Ver				
Standard: %R		Batch: %R		
K0010 VIOLETT K		N0010 VIOLETT N		
400-550 nm	560-700 nm	400-550 nm	560-700 nm	
8.57	3.89	9.85	4.09	
9.28	5.19	10.71	5.68	
9.79	7.31	11.15	8.19	
10.24	8.96	11.25	10.21	
10.24	10.61	11.23	12.19	
9.27	11.96	10.10	13.78	
7.97	13.95	8.38	15.97	
6.81	17.49	7.07	19.78	
5.80	22.25	5.96	24.82	
5.17	28.30	5.28	31.15	
4.67	35.32	4.76	38.38	
4.01	43.36	4.08	46.47	
3.53	51.44	3.59	54.42	
3.63	58.44	3.70	61.08	
3.86	64.75	3.97	66.85	
3.87		4.02		
%R / %T Plot		K/S (Absorb.)		

% Reflectance 20nm Hor

% Reflectance 20nm Hor							
Standard: %R							
I60 S B'tiv Blind. CO-Nit. n. merc							
		%R / %T Plot		K/S (Absorb.)			
400-500 nm	77.57	81.68	84.36	86.47	88.18	89.62	
520-620 nm	90.65	91.39	91.90	92.52	93.07	93.33	
640-700 nm	93.63	94.00	94.14	94.65			
Batch: %R							
DJ003 Blue 3							
400-500 nm	4.86	5.77	5.38	4.81	4.51	4.16	
520-620 nm	3.69	3.37	3.20	3.10	3.00	2.95	
640-700 nm	2.97	3.14	3.49	4.64			

% Reflective 20 nm Ver

Standard: %R		Batch: %R	
K0010 VIOLETT K		N0010 VIOLETT N	
400-700 nm		400-700 nm	
8.57		9.85	
9.79		11.15	
10.24		11.23	
7.97		8.38	
5.80		5.96	
4.67		4.76	
3.53		3.59	
3.86		3.97	
3.89		4.09	
7.31		8.19	
10.61		12.19	
13.95		15.97	
22.25		24.82	
35.32		38.38	
51.44		54.42	
64.75		66.85	

Buttons: %R / %T Plot | K/S (Absorb.)

%R-IR Range

Spectral Values - IR Range 710 nm-1100 nm				
Standard Name: WHITE STOCK				
710-790 nm	800-890 nm	900-990 nm	1000-1100 nm	
89.61	90.33	90.98	90.53	
89.86	90.53	90.97	90.57	
89.86	90.59	90.89	90.81	
89.93	90.67	90.94	90.77	
90.06	90.66	90.80	91.05	
90.26	90.77	90.84	91.28	
90.29	90.89	90.81	91.56	
90.32	90.90	90.81	92.03	
90.37	91.09	90.66	92.74	
	91.14	90.52	93.20	
			92.79	

%R 10nm Hor – 360-700nm%RH31X.FRM

Standard: %R		Batch: %R	
K0010 VIOLETT K		N0010 VIOLETT N	
360-390 nm		8.57	9.85
400-450 nm	8.57 9.28 9.79 10.24	8.57	9.85
460-510 nm	7.97 6.81 5.80 5.17 4.67 4.01	10.24	11.15
520-570 nm	3.53 3.63 3.86 3.87 3.89 5.19	11.23	12.19
580-630 nm	7.31 8.96 10.61 11.96 13.95 17.49	8.38	9.27
640-690 nm	22.25 28.30 35.32 43.36 51.44 58.44	4.76	5.08
700 nm	64.75	3.59	3.89

Buttons: %R / %T Plot | K/S (Absorb.)

%R 10nm – 360 – 750nm
%RH31X2.FRM

%R 10nm Hor - 360-750nm						
Standard: %R						
K0010 VIOLETT K						
	%R / %T Plot			K/S (Absorb.)		
360-390 nm					8.57	8.57
400-450 nm	8.57	9.28	9.79	10.24	10.24	9.27
460-510 nm	7.97	6.81	5.80	5.17	4.67	4.01
520-570 nm	3.53	3.63	3.86	3.87	3.89	5.19
580-630 nm	7.31	8.96	10.61	11.96	13.95	17.49
640-690 nm	22.25	28.30	35.32	43.36	51.44	58.44
700-750 nm	64.75	64.75	64.75			
Batch: %R						
N0010 VIOLETT N						
360-390 nm					9.85	9.85
400-450 nm	9.85	10.71	11.15	11.25	11.23	10.10
460-510 nm	8.38	7.07	5.96	5.28	4.76	4.08
520-570 nm	3.59	3.70	3.97	4.02	4.09	5.68
580-630 nm	8.19	10.21	12.19	13.78	15.97	19.78
640-690 nm	24.82	31.15	38.38	46.47	54.42	61.08
700-750 nm	66.85	66.85	66.85			

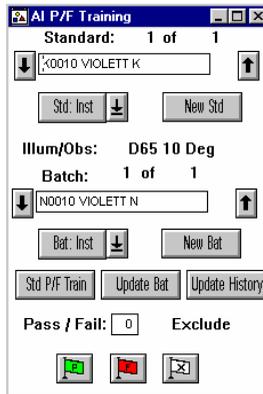
%R 10nm 360-700nm
%RV31X.FRM

%R 10nm Ver - 360-700nm			
Standard: %R		Batch: %R	
K0010 VIOLETT K		N0010 VIOLETT N	
360-530 nm	540-700 nm	360-530 nm	540-700 nm
	3.86		3.97
	3.87		4.02
8.57	3.89	9.85	4.09
8.57	5.19	9.85	5.68
8.57	7.31	9.85	8.19
9.28	8.96	10.71	10.21
9.79	10.61	11.15	12.19
10.24	11.96	11.25	13.78
10.24	13.95	11.23	15.97
9.27	17.49	10.10	19.78
7.97	22.25	8.38	24.82
6.81	28.30	7.07	31.15
5.80	35.32	5.96	38.38
5.17	43.36	5.28	46.47
4.67	51.44	4.76	54.42
4.01	58.44	4.08	61.08
3.53	64.75	3.59	66.85
3.63		3.70	

%R 5nm
%R5NM.FRM

%R 5nm										
	8.57	10.24	5.00	3.53	3.09	10.61	22.25	51.44	64.75	
										Max
		9.28	9.27	5.17	3.63	5.19	11.96	28.30	58.44	
Std	8.57	9.79	7.97	4.67	3.86	7.31	13.95	35.32	64.75	
	8.57	10.24	6.81	4.01	3.87	8.96	17.49	43.36	64.75	
		9.85	11.23	5.96	3.59	4.09	12.19	24.82	54.42	66.85
		10.71	10.10	5.28	3.70	5.68	13.78	31.15	61.08	
Bat	9.85	11.15	8.38	4.76	3.97	8.19	15.97	38.38	66.85	
	9.85	11.25	7.07	4.08	4.02	10.21	19.78	46.47	66.85	

**A.I. P/F Training
DATTRA.I.N.FRM**



AI P/F Training

Standard: 1 of 1

X0010 VIOLETT K

Std. Inst. New Std.

Illum/Obs: D65 10 Deg

Batch: 1 of 1

N0010 VIOLETT N

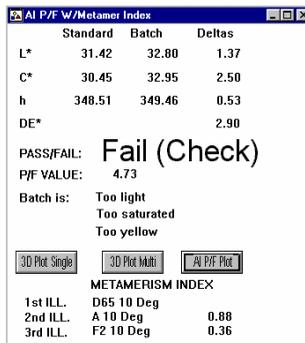
Bat. Inst. New Bat.

Std P/F Train Update Bat Update History

Pass / Fail: 0 Exclude

3D Plot Single 3D Plot Multi AI P/F Plot

**A.I. P/F w/Metamer Index
CA.I.PFMET.FRM**



AI P/F w/Metamer Index

	Standard	Batch	Deltas
L*	31.42	32.80	1.37
C*	30.45	32.95	2.50
h	348.51	349.46	0.53
DE*			2.90

PASS/FAIL: Fail (Check)

P/F VALUE: 4.73

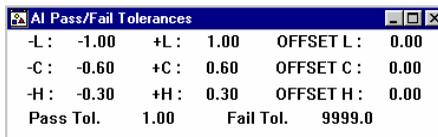
Batch is: Too light
Too saturated
Too yellow

3D Plot Single 3D Plot Multi AI P/F Plot

METAMERISM INDEX

1st ILL.	D65 10 Deg	
2nd ILL.	A 10 Deg	0.88
3rd ILL.	F2 10 Deg	0.36

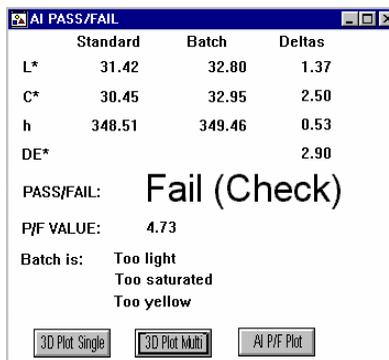
**A.I. Pass/Fail Tolerances
CA.I.PFTOL.FRM**



AI Pass/Fail Tolerances

-L:	-1.00	+L:	1.00	OFFSET L:	0.00
-C:	-0.60	+C:	0.60	OFFSET C:	0.00
-H:	-0.30	+H:	0.30	OFFSET H:	0.00
Pass Tol.	1.00	Fail Tol.	9999.0		

**A.I. PASS/FAIL
CA.I.PF.FRM**



AI PASS/FAIL

	Standard	Batch	Deltas
L*	31.42	32.80	1.37
C*	30.45	32.95	2.50
h	348.51	349.46	0.53
DE*			2.90

PASS/FAIL: Fail (Check)

P/F VALUE: 4.73

Batch is: Too light
Too saturated
Too yellow

3D Plot Single 3D Plot Multi AI P/F Plot

ALL P/F

ALLPF.FRM replaced
with Ctform 29.jpg

Datacolor

Standard	CIE	CMC	FMC2	Hunter
PALE GREEN				
Batch	Pass	Pass	Pass	Pass
BATCH23	0.05	0.04	0.15	0.05

BERGER Whiteness
Index
BERGERWI.FRM

BERGER Whiteness Index

Illum/Obs: D65 10 Deg

STD. K0010 VIOLETT K

BAT. N0010 VIOLETT N

STD WI:	0.12
BAT WI:	-0.99
DELTA WI:	-1.11

CIE L*a*b* Difference – 3
MUTLI3_S.FRM

CIE L*a*b* Difference - 3

Standard Name: K0010 VIOLETT K

CIE L*a*b* Color Difference

Batch Name	Illum/Obs	DL*	Da*	Db*	DC*	DH*	DE*
N0010 VIOLETT N	D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90
N0010 VIOLETT N	A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73
N0010 VIOLETT N	F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52

CIE L*a*b* Difference
MULTI2_S.FRM

CIE L*a*b* Difference

Standard Name: K0010 VIOLETT K

CIE L*a*b* Color Difference

D65 10 Deg

Batch Name	DL*	Da*	Db*	DC*	DH*	DE*
N0010 VIOLETT N	1.37	2.55	0.04	2.50	0.53	2.90

CIE OUTPUT
CIEDATA.FRM

CIE OUTPUT

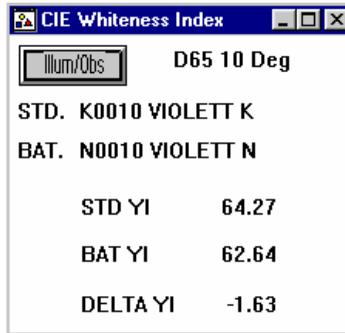
ILL/OBS: D65 10 Deg

Standard: K0010 VIOLETT K

Batch: N0010 VIOLETT N

	Standard	Batch	Differences
X	9.75	10.85	
Y	6.83	7.44	
Z	9.09	9.83	
L*	31.42	32.80	1.37
a*	29.84	32.40	2.55
b*	-6.07	-6.03	0.04
C*	30.45	32.95	2.50
h	348.51	349.46	0.53
DE*			2.90

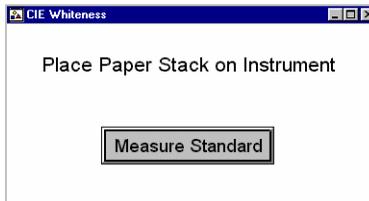
CIE Whiteness Index
WICIE.FRM



The screenshot shows a window titled "CIE Whiteness Index". It features a button labeled "Illum/Obs" and the text "D65 10 Deg". Below this, it lists "STD. K0010 VIOLETT K" and "BAT. N0010 VIOLETT N". At the bottom, it displays three rows of data: "STD YI 64.27", "BAT YI 62.64", and "DELTA YI -1.63".

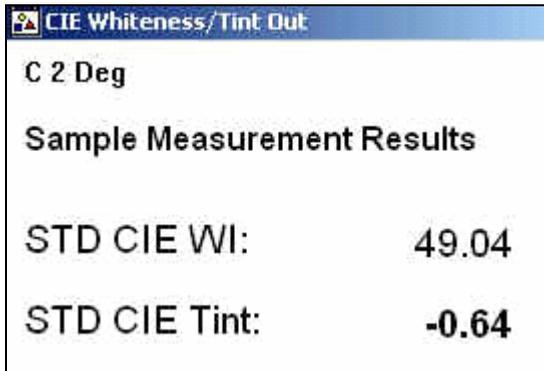
Illum/Obs	D65 10 Deg
STD.	K0010 VIOLETT K
BAT.	N0010 VIOLETT N
STD YI	64.27
BAT YI	62.64
DELTA YI	-1.63

CIE Whiteness
CIEWHT.FRM



The screenshot shows a window titled "CIE Whiteness". It contains the instruction "Place Paper Stack on Instrument" and a button labeled "Measure Standard".

CIE Whiteness/Tint Out
SCIEWHT.FRM (



The screenshot shows a window titled "CIE Whiteness/Tint Out". It displays "C 2 Deg" and "Sample Measurement Results". Below this, it shows two rows of data: "STD CIE WI: 49.04" and "STD CIE Tint: -0.64".

C 2 Deg	
Sample Measurement Results	
STD CIE WI:	49.04
STD CIE Tint:	-0.64

CIE Whiteness/Tint
WCIE1.FRM



The screenshot shows a window titled "CIE Whiteness/Tint". It features a button labeled "Illum/Obs" and the text "D65 10 Deg". Below this, it lists "Standard: K0010 VIOLETT K" and "Batch: N0010 VIOLETT N". At the bottom, it displays two columns of data: "STD CIE WI: 64.27", "STD CIE Tint: -101.5", "BAT CIE WI: 62.64", "BAT CIE Tint: -107.8", "DELTA CIE WI: -1.63", and "Delta CIE Tint: -6.27".

Illum/Obs	D65 10 Deg		
Standard:	K0010 VIOLETT K		
Batch:	N0010 VIOLETT N		
STD CIE WI:	64.27	STD CIE Tint:	-101.5
BAT CIE WI:	62.64	BAT CIE Tint:	-107.8
DELTA CIE WI:	-1.63	Delta CIE Tint:	-6.27

**CIE Yxy Output
CIEYXY.FRM**

CIE Yxy Output			
ILL/OBS:	D65 10 Deg		<input type="button" value="Illum/Obs"/>
Standard:	K0010 VIOLETT K		
Batch:	N0010 VIOLETT N		
	Standard	Batch	Differences
Y	6.83	7.44	0.61
x	0.3798	0.3857	0.0059
y	0.2662	0.2647	-0.0015
Dominant Wavelength:	*504.71	*504.66	
Purity:	18.15	19.21	

**CIELAB P/F Tolerances
CLABTOL.FRM**

CIELAB P/F Tolerances	
L* LO:	L* HI:
a* LO:	a* HI:
b* LO:	b* HI:
DE: 1.00	

**CIELAB Pass/Fail
CIELABPF.FRM**

CIELAB Pass/Fail			
	Standard	Batch	Deltas
L*	31.42	32.80	1.37
a*	29.84	32.40	2.55
b*	-6.07	-6.03	0.04
DE			2.90
PASS/FAIL: Fail			
Batch is:	Too light Too saturated Too yellow		
<input type="button" value="CIElab Plot"/>			

**CIELCH Pass/Fail
CIELCHPF.FRM**

CIELCH Pass/Fail			
	Standard	Batch	Deltas
L	31.42	32.80	1.37
C	30.45	32.95	2.50
h	348.51	349.46	0.53
DE			2.90
PASS/FAIL: Fail			
Batch is:	Too light Too saturated Too yellow		
<input type="button" value="LCh Rect. Plot"/>			

**CIEluv P/F Tolerances
CLUVTOL.FRM**

CIEluv P/F Tolerances			
L* LO:	-1.00	L* HI:	1.00
u* LO:	-0.60	u* HI:	0.60
v* LO:	-0.30	v* HI:	0.30
DE: 1.00			

**CIELuv Pass/Fail
CIELUVPF.FRM**

	Standard	Batch	Deltas
L*	31.42	32.80	1.37
u*	33.37	37.34	3.97
v*	-5.22	-5.46	-0.24
DE			4.21

PASS/FAIL: **Fail**

Batch is: Too light
Too saturated
Too yellow

**CMC P/F Tolerances
CMCTOL.FRM**

CMC DE TOLERANCE:	1.00
l:	2.00
c:	1.00

**CMC Pass/Fail
CMCPF.FRM**

	Standard	Batch	Deltas
L*	31.42	32.80	0.83 [L*/SL]
C*	30.45	32.95	1.23 [C*/SC]
h	348.51	349.46	0.36 [H*/SH]
DE*			1.53

PASS/FAIL: **Fail**

P/F TOL [DE] 1.00

Batch is: Too light
Too saturated
Too yellow

**CMC vs A.I. P/F
SCMCVA.I.1.FRM**

Standard Name	1 of 1	CMC DATA	
k0010 VIOLETT K		CMC SL / l = 0.83 2.00	
		CMC SC / c = 2.03 1.00	
		CMC SH = 1.47	
Batch Name	1 of 1	CMC DE TOL = 1.00	
N0010 VIOLETT N		CMC DE = 1.53	
		CMC P/F = Fail	

CIE L*a*b* DATA

DL* = 1.37 DL* +/- TOL: 1.00 -1.00
 Da* = 2.55 DC* +/- TOL: 0.60 -0.60
 Dp* = 0.04 Dh* +/- TOL: 0.30 -0.30
 Dc* = 2.90
 Df* = 0.53
 DE* = 2.90

AI PF DATA

AI/PF DE = 4.73
 AI P/F = Fail [Check]

**Datacolor TOOLS QC
SNPTOOL1.FRM**

ColorTools QC

Standard Name 1 of 1 Today's Date: 21-Sep-00

K0010 VIOLETT K

List Std

Batch Name 1 of 1

N0010 VIOLETT N

Date: Time:

List Bat

Fail (Check)

Pass / Fail DE = 4.73

Batch is : Too light
Too saturated
Too yellow

Ill/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52

**Contrast Ratio
CONRATIO.FRM**

Contrast Ratio

CR Std: Inst

CR Bat: Inst

Contrast Ratio

Standard: 99.86

Batch: 97.97

Delta: -1.89

**D1925 Yellowness Index
YI1925.FRM**

D1925 Yellowness Index

Illum/Obs D65 10 Deg

STD. K0010 VIOLETT K

BAT. N0010 VIOLETT N

STD YI 32.75

BAT YI 37.77

DELTA YI 5.02

**D56 Color Out
D65OUT.FRM**

D65 Color Out

Instrument Condition:

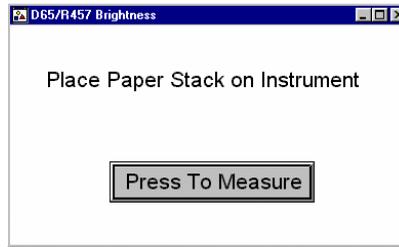
D65 10 Deg

L* = 31.42

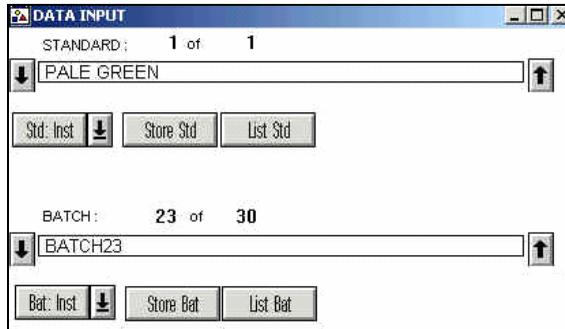
a* = 29.84

b* = -6.07

**D65/R457 Brightness
R457.FRM**



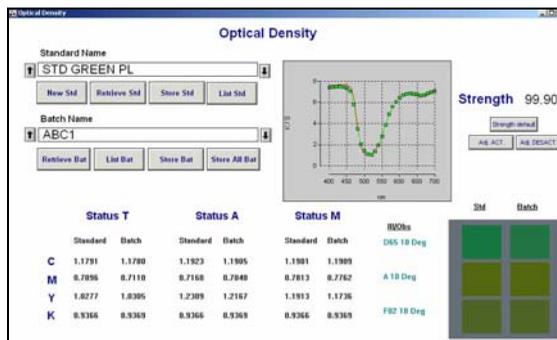
**DATA INPUT
INPUT.FRM)**



**Delta %R's
%RDELTA.FRM**

	Standard: %R K0010 VIOLETT K		Batch: %R N0010 VIOLETT N			
400-450 nm	1.28	1.43	1.36	1.01	0.98	0.83
460-510 nm	0.41	0.25	0.16	0.11	0.09	0.07
520-570 nm	0.06	0.07	0.11	0.14	0.20	0.49
580-630 nm	0.88	1.25	1.59	1.81	2.02	2.29
640-690 nm	2.56	2.85	3.06	3.11	2.98	2.64
700 nm	2.10					

Optical Density



**Display A.I.
P/FSMBA.I.PF1.FRM**

Standard Name	AI Pass/Fail				Current Illuminant
K0010 VIOLETT K					D65 10 Deg
Batch Name	DL*	DC*	DH*	DE*	AI Pass/Fail Value
N0010 VIOLETT N	1.37	2.50	0.53	2.90	Fail (Check) 4.73

**Display CIELAB Diff
SMBCIE1.FRM**

Standard Name	CIE L*a*b* Color Difference					
K0010 VIOLETT K						
Batch Name	DL*	Da*	Db*	DC*	DH*	DE*
N0010 VIOLETT N	1.37	2.55	0.04	2.50	0.53	2.90

Display CMC 555 Sort
SMB555A2.FRM

Display CMC 555 Sort					
Standard Name CMC 555 Sort					
Standard Name	K0010 VIOLETT K				
D65 10 Deg	Box Tolerances	9 Boxes			
	-1.00	-1.00	-1.00		
	1.00	1.00	1.00		
Batch Name	DL*SL	DC*JSC	DH*JSH	DE CMC	555 Sort Code
N0010 VIOLETT N	0.83	1.23	0.36	1.53	566

Display CMC
P/FSMBCMC1.FRM

Display CMC PF					
Standard Name CMC Color Difference					Current Illuminant
K0010 VIOLETT K					D65 10 Deg
Batch Name	DL*SL	DC*JSC	DH*JSH	CMC DE	CMC Pass/Fail
N0010 VIOLETT N	0.83	1.23	0.36	1.53	Fail

Display DIN99 Color
Difference (lg)

Standard Name: 17 of 17

Batch Name: 20 of 20

Date: 13 May 02 Time: 13:45:19

P/F: Fail

Batch is: Slightly light
Noticeably green

Box	Decision	DE	DL	Da	Db	DC	DH	DM99 Kc	Std	Bat
D65 10 Deg	Fail	1.66	1.53	-0.65	-0.24	0.42	0.55	DM99 Kc: 1.00		
A 10 Deg	Fail	1.64	1.38	-0.81	-0.36	0.58	0.67	DM99 L: 1.00	55.34	56.85
F2 10 Deg	Fail	1.54	1.36	-0.65	-0.34	0.34	0.66	DM99 ac: 1.00	-19.50	-19.23
								DM99 C: 1.00	11.76	11.52
								DM99 G: 1.00	21.99	22.42
								DM99 h: 1.00	147.66	149.07

Display LAB 555 Sort
SMB555A1.FRM

Display LAB 555 Sort					
Standard Name CIE L*a*b* 555 Sort					
Standard Name	K0010 VIOLETT K				
D65 10 Deg	Box Tolerances	9 Boxes			
	-1.00	-1.00	-1.00		
	1.00	1.00	1.00		
Batch Name	DL*	Da*	Db*	DE*	555 Sort Code
N0010 VIOLETT N	1.37	2.55	0.04	2.90	566

Display LAB P/F
SMBLAB1.FRM

Display LAB PF					
Standard Name CIE L*a*b* Color Difference					
K0010 VIOLETT K					D65 10 Deg
Batch Name	DL*	Da*	Db*	DE*	L*a*b* Pass/Fail
N0010 VIOLETT N	1.37	2.55	0.04	2.90	Fail

Display LCH P/F
SMBLCH1.FRM

Display LCH PF					
Standard Name CIE L*C*h Color Difference					Current Illuminant
K0010 VIOLETT K					D65 10 Deg
Batch Name	DL*	DC*	DH*	DE*	LCH Pass/Fail
N0010 VIOLETT N	1.37	2.50	0.53	2.90	Fail

Display MS89 P/F
SMBMS89A.FRM

Display MS89 PF					
Standard:	K0010 VIOLETT K		Batch:		N0010 VIOLETT N
III/Obs	DE	DL	DC	DH	Pass/Fail Decision
D65 10 Deg					
A 10 Deg					
F2 10 Deg					
Standard:	K0010 VIOLETT K		Batch:		N0010 VIOLETT N
III/Obs	DE	DL	DC	DH	Pass/Fail Decision
D65 10 Deg					
A 10 Deg					
F2 10 Deg					
Standard:	K0010 VIOLETT K		Batch:		N0010 VIOLETT N
III/Obs	DE	DL	DC	DH	Pass/Fail Decision
D65 10 Deg					
A 10 Deg					
F2 10 Deg					

**Display CIE Whiteness and Opacity values
SNGENPAP.FRM**

Brightness	Whiteness CIE	CIE L*	CIE a*	CIE b*	Opacity
161.58	178.88	115.88	16.88	-8.60	100.00

**Display T519 Opacity
SNPAPWE2.FRM**

Std T519 Opacity	Bat T519 Opacity
100.00	100.00

**Display Paper Basis weight
SNPAPER2FRM**

Batch Opacity	Batch Transparency	Batch SDC	Batch KDC	Batch S	Batch K	Projected Basic Weight	Projected Opacity	Projected Transparency	Projected SDC	Projected KDC
100.00	0.89	1038.9	78.04	10389.706	780.389	0.40	98.00	10.45	418.91	31.46

**E313 Whiteness Index
WIE313.FRM**

STD YI	10.29
BAT YI	10.98
DELTA YI	0.68

E313 Yellowness Index

This screen is currently unavailable.

YID313.FRM
 FMCII Pass/Fail
 FMCII PF.FRM

FMCII Pass/Fail

STANDARD: K0010 VIOLETT K

BATCH: N0010 VIOLETT N

FMCII DELTAS

DL	3.39	DCYB	0.71
DCRG	5.74	DE	6.70

PASS/FAIL:

Batch is: Too light
 Too saturated
 Too yellow

GANZ Whiteness Index
 GANZWI.FRM

GANZ Whiteness Index

D65 10 Deg

STD. K0010 VIOLETT K

BAT. N0010 VIOLETT N

NEUTRAL VM	GREEN VM	RED VM
64.27	-46.97	254.12
62.64	-55.10	263.86
-1.63	-8.12	9.73

Ganz-Griesser
 Whiteness
 GGWHITE.FRM

GE PQS II Equation

Standard Name 1 of 1

Keyboard %R-31

Batch Name 1 of 5

Date: 11-Apr-02 Time: 09:06:47
 Keyboard %R-31

III/Obs	GE POS DC	GE POSII D/Y/Y	GE POSII Dx	GE POSII Dy	Metameric shift x	Metameric shift y
F2 2 Deg	0.88	-0.18	0.48	-26.16	-5.21	39.90
A 2 Deg	0.88	-0.05	7.29	-10.65	-5.21	39.90
C 2 Deg	1.45	-0.48	9.47	-43.78	-6.36	20.87

GE PQS II Color
 Difference

GE PQS II Equation

Standard Name 1 of 1

Keyboard %R-31

Batch Name 1 of 5

Date: 11-Apr-02 Time: 09:06:47
 Keyboard %R-31

III/Obs	GE POS DC	GE POSII D/Y/Y	GE POSII Dx	GE POSII Dy	Metameric shift x	Metameric shift y
F2 2 Deg	0.88	-0.18	0.48	-26.16	-5.21	39.90
A 2 Deg	0.88	-0.05	7.29	-10.65	-5.21	39.90
C 2 Deg	1.45	-0.48	9.47	-43.78	-6.36	20.87

Gray Scale/Color
Change
CTGSCC.FRM

Gray Scale/Color Change

Today's Date: 21-Sep-00

ISO / AATCC

Gray Scale for Color Change

GS Value = 3.65 GS Rating = 3-4

Gray Scale/Staining
CTGSST.FRM

Gray Scale/Staining

Today's Date: 21-Sep-00

ISO / AATCC

Gray Scale for Staining

GS Value = 4.57 GS Rating = 4-5

Helmholtz
HELM1.FRM

Helmholtz

Helmholtz Coordinates

	Standard	Batch
Dominant Wavelength:	573.25	573.23
Purity:	3.95	3.86

Hunter DATA
HUNDATA.FRM

Hunter DATA

Standard: K0010 VIOLETT K
Batch: N0010 VIOLETT N

	Standard	Batch	Differences
X	9.75	10.85	
Y	6.83	7.44	
Z	9.09	9.83	
L	26.14	27.28	1.14
a	22.72	25.21	2.49
b	-4.18	-4.20	-0.02
DEh			2.74

HunterLAB P/F
Tolerance
HLABTOL.FRM

HunterLAB P/F Tolerances			
L LO:	-1.00	L HI:	1.00
a LO:	-0.60	a HI:	0.60
b LO:	-0.30	b HI:	0.30
DE		1.00	

HunterLAB Pass/Fail
HUNLABPF.FRM

HunterLAB Pass/Fail			
	Standard	Batch	Deltas
L	26.14	27.28	1.14
a	22.72	25.21	2.49
b	-4.18	-4.20	-0.02
DE			2.74

PASS/FAIL: **Fail**

Batch is: Too light
Too saturated
Too yellow

Image Master
(IMASTER.FRM)

ImageMaster Launch	
Environments:	<input type="button" value="Environment"/>
<input type="text" value="Printer Test-Chart"/>	
Tiles:	<input type="button" value="Tiles"/>
Substrates:	<input type="button" value="Image"/>
Std: <input type="text" value="best rib"/>	
Bat: <input type="text" value="chip"/>	
<input type="button" value="Sel Environment"/>	<input type="button" value="Select Image"/>

Color Inconstancy
INCONST.FRM

Color Inconstancy - CMCCON97 equation									
Standard:	Reference Illuminant	Test Illuminant	DL	Da	D _b	DC	DH	DE	
STD GREEN PL	D65 10 Deg vs. D65 10 Deg		0.00	0.00	0.00	0.00	0.00	0.00	
	A 10 Deg		-2.08	2.02	-6.67	-4.41	5.40	7.27	
	F02 10 Deg		-2.84	8.78	-3.70	-9.51	0.62	9.94	
Batch:	D65 10 Deg vs. D65 10 Deg		0.00	0.00	0.00	0.00	0.00	0.00	
	A 10 Deg		-2.19	2.00	-6.83	-4.29	5.68	7.45	
	F02 10 Deg		-3.01	9.20	-3.84	-9.96	0.38	10.42	

LCH Pass/Fail
Tolerances
LCHPFTOL.FRM

LCH Pass/Fail Tolerances			
L* LO:		L* HI:	
C* LO:	-0.60	C* HI:	0.60
H* LO:	-0.30	H* HI:	0.30
	DE:		1.00

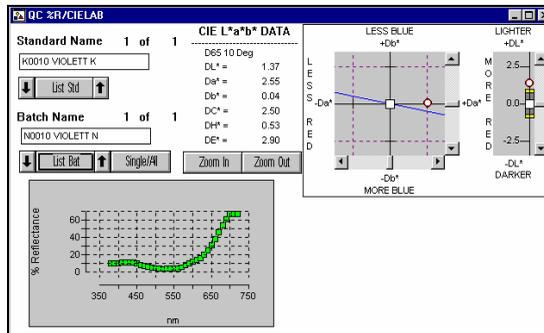
LUV DATA
LUVDATA.FRM

LUV DATA			
Standard: K0010 VIOLETT K			
Batch: N0010 VIOLETT N			
	Standard	Batch	Differences
X	9.75	10.85	
Y	6.83	7.44	
Z	9.09	9.83	
L*	31.42	32.80	1.37
u*	33.37	37.34	3.97
v*	-5.22	-5.46	-0.24
DEuv			4.21

METAMER INDEX
METINDEX.FRM

Metamerism Index - DIN 6172 (Multiplicative)			
STD: STD GREEN PL			
BAT: AB2			
Primary Illuminant D65 10 Deg			
D65 10 Deg	vs.	A 2 Deg	0.60
D65 10 Deg	vs.	F02 10 Deg	0.27

QC %R / CIELAB
SM2PLOT.FRM



**QC INPUT – 555 Sort
SNP555.FRM**

QC INPUT - 555 Sort

Standard Name 1 of 1 Today's Date: 04-Oct-00
K0010 VIOLETT K

555 Sort Parameters
 Color Space: CIE Lab 9 Boxes
 555 Sort Tolerance - Box Size Low High

Batch Name 1 of 1
N0010 VIOLETT N

Date: Time:

555 Sort Code: **566**

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52

**QC INPUT –A.I. P/F
SNPA.I.PF1.FRM**

QC INPUT - AI P/F

Standard Name 1 of 1 Today's Date: 04-Oct-00
K0010 VIOLETT K

Batch Name 1 of 1
N0010 VIOLETT N

Date: Time:

Fail (Check)
 AI Pass / Fail DE = 4.73
 Batch is : Too light
 Too saturated
 Too yellow

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52

**QC INPUT A.I. PLOT
SNPA.I.PL1.FRM**

QC INPUT - AI PLOT

Standard Name 1 of 1
K0010 VIOLETT K

Batch Name 1 of 1
N0010 VIOLETT N

Date: Time:

Fail (Check)

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	AI/PF DE
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90	4.73
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73	4.44
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52	4.43

**QC INPUT – A.I.
PLOT/CD
SNPCDPL4.FRM**

QC INPUT - AI PLOT/CD

Standard Name 1 of 1
K0010 VIOLETT K

Batch Name 1 of 1
N0010 VIOLETT N

Date: Time:

Standards
 Batch

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	AI/PF DE
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90	4.73
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73	4.44
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52	4.43

**QC INPUT CIE Color
Difference
Ciediff.FRM**

Standard Name 1 of 1

 Today's Date: 04-Oct-00

New Std Retrieve Std List Std Store Std

Batch Name 1 of 1

 Date: Time:

Retrieve Bat List Bat Store Bat Store All Bats

P/F : Fail Batch is : Too light
Too saturated
Too yellow

III/Obs	Decision	DE	DL	Da	Db	DC	DH	III/Obs
D65 10 Deg	Fail	2.90	1.37	2.55	0.04	2.50	0.53	D65 10 Deg
A 10 Deg	Fail	2.73	1.69	1.98	0.82	2.03	0.70	A 10 Deg
F2 10 Deg	Fail	2.52	1.54	1.98	0.20	1.80	0.86	F2 10 Deg

**QC INPUT-CIE Color
Difference (lg)
Ciediff.FRM**

Standard Name 1 of 1

 Today's Date: 04-0

New Std Retrieve Std List Std Store Std

Batch Name 1 of 1

 Date: Time:

Retrieve Bat List Bat Store Bat Store All Bats

P/F : Fail Batch is : Too light
Too saturated
Too yellow

III/Obs	Decision	DE	DL	Da	Db	DC	DH
D65 10 Deg	Fail	2.90	1.37	2.55	0.04	2.50	0.53
A 10 Deg	Fail	2.73	1.69	1.98	0.82	2.03	0.70
F2 10 Deg	Fail	2.52	1.54	1.98	0.20	1.80	0.86

**QC Input CIE94
SNPCIE94.FRM**

QC Input - CIE94
 Standard Name 1 of 1

 Today's Date: 04-Oct-00

New Std Retrieve Std Store Std List Std

Batch Name 1 of 1

 Date: Time:

New Bat Retrieve Hist All Bats to Hist List Bat

Fail

Standard From Stds File:
 Batch From History File:

CIE94 DE = 1.77

K(L) = 1.00 SL = 1.00
 K(C) = 1.00 SC = 2.37
 K(H) = 1.00 SH = 1.46

III/Obs	DL* _k SL	DC* _k SC	DH* _k SH	DE CIE94
D65 10 Deg	1.37	1.05	0.36	1.77
A 10 Deg	1.69	0.87	0.49	1.96
F2 10 Deg	1.54	0.90	0.65	1.90

**QC INPUT - CIELAB/MI
SQNCIE1.FRM**

QC INPUT - CIELAB/MI
 Standard Name 1 of 1

 Today's Date: 04-Oct-00

New Std Retrieve Std Store Std List Std

Batch Name 1 of 1

 Date: Time:

New Bat Retrieve Hist All Bats to Hist List Bat

**Batch is : Too light
Too saturated
Too yellow**

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	Metamerism
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90	
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73	0.888
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52	0.36

**QC INPUT – CMC 555
Sort
SNPCMC5.FRM**

QC INPUT - CMC 555 Sort

Standard Name 1 of 1 Today's Date: 04-Oct-00
K0010 VIOLETT K

555 Sort Parameters
 Color Space: CIE Lab 9 Boxes
 555 Sort Tolerance - Box Size

Batch Name 1 of 1
N0010 VIOLETT N

Date: Time:
 555 Sort Code: **566**

III/Obs	DL*/SL	DC*/SC	DH*/SH	DE CMC
D65 10 Deg	0.83	1.23	0.36	1.53
A 10 Deg	0.96	1.01	0.52	1.49
F2 10 Deg	0.94	1.03	0.68	1.55

**QC INPUT – CMC P/F
SNPCMC1.FRM**

QC INPUT - CMC P/F

Standard Name 1 of 1 Today's Date: 04-Oct-00
K0010 VIOLETT K

Standard From Stds File:
 Batch From History File:

Fail
 CMC DE = 1.53
 CMC Commercial Factor = 1.00
 CMC l = 2.00 CMC c = 1.00

Batch Name 1 of 1
N0010 VIOLETT N

Date: Time:
 CMC DE = 1.53

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52

**QC INPUT – CMC PLOT
SNPDEPL3.FRM**

QC INPUT - CMC PLOT

Standard Name 1 of 1
K0010 VIOLETT K

Batch Name 1 of 1
N0010 VIOLETT N

Date: Time:

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	CMC DE
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90	1.53
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73	1.49
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52	1.55

**QC INPUT – CMC
PLOT/CD
SNPCDPL3.FRM**

QC INPUT - CMC PLOT/CD

Standard Name 1 of 1
K0010 VIOLETT K

Batch Name 1 of 1
N0010 VIOLETT N

Date: Time:

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	CMC DE
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90	1.53
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73	1.49
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52	1.55

**QC INPUT – Color Patch
SNPCLRP1.FRM**

QC INPUT - Color Patch

Standard Name 1 of 1
K0010 VIOLETT K

Batch Name 1 of 1
N0010 VIOLETT N

Date: Time:

New Std Retrieve Std Store Std List Std
New Bat Retrieve Bat All Bats to Hist List Bat

D65 10 Deg
A 10 Deg
F2 10 Deg

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52

**QC INPUT – CR
SNPDECR1.FRM**

QC INPUT - CR

Standard Name 1 of 1
PALE GREEN

Batch Name 30 of 30
BATCH30

Date: 20-Nov-03 Time: 15:14:38

New Std Retrieve Std Store Std List Std
New Bat Retrieve Bat Store All Bats List Bat

Today's Date: 20-Nov-03

Standard and Batch Contrast Ratio

Measure Standard
CR Std: Inst Standard CR = 99.86
Over Black

Measure Batch
CR Bat: Inst Batch CR = 97.97
Over Black

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	Delta CR
D65 10 Deg	-0.02	0.03	0.00	-0.02	-0.01	0.03	-1.89
A 10 Deg	-0.01	0.03	0.01	-0.03	-0.02	0.03	0.00
F02 10 Deg	-0.02	0.02	0.01	-0.01	-0.01	0.02	-0.31

**QC INPUT – DE PLOT/CD
SNPCDPL1.FRM**

QC INPUT - DE PLOT/CD

Standard Name 1 of 1
PALE GREEN

Batch Name 30 of 30
BATCH30

Date: 20-Nov-03 Time: 15:14:38

New Std Retrieve Std Store Std List Std
New Bat Retrieve Bat Store Bat List Bat

MORE YELLOW +Db* LIGHTER +DL*
LESS YELLOW -Db* DARKER -DL*

Standard
Batch

Single/All Zoom In Zoom Out CIE Lab DE Plot

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	-0.02	0.03	0.00	-0.02	-0.01	0.03
A 10 Deg	-0.01	0.03	0.01	-0.03	-0.02	0.03
F02 10 Deg	-0.02	0.02	0.01	-0.01	-0.01	0.02

**QC INPUT CIE 2000
SNPCIE2000.FRM**

QC Input - CIE2000

Standard Name 1 of 1
STD GREEN PL

Batch Name 1 of 5
ABC1

Date: 11-Apr-02 Time: 09:06:47

New Std Retrieve Std Store Std List Std
New Bat Retrieve Bat Store All Bats List Bat

Today's Date: 17-Nov-03

Pass

CIE2000 DE = 0.56

k(L) = 1.00 SL = 1.08
k(C) = 1.00 SC = 2.90
k(H) = 1.00 SH = 1.85

CIE2000 P/F Tol: 1.00 CIE94 DE Tol: 1.00

III/Obs	DL*/SL	DC*/SC	DH*/SH	DE_CIE2000
D65 10 Deg	-0.14	-0.54	0.09	0.56
A 10 Deg	-0.06	-0.29	0.14	0.33
F02 10 Deg	-0.07	-0.38	0.19	0.43

**QC INPUT – Diagnostic
SNPDIAG1.FRM**

QC INPUT - Diagnostic

Standard Name 1 of 1 Today's Date: 20-Nov-03
PALE GREEN
 Timed Measurements
 New Std Retrieve Std Store Std List Std Timed Meas ON Timed Meas OFF

Batch Name 30 of 30 CMC DE = 0.03
BATCH30
 AI Pass / Fail DE = 0.06
 Date: 20-Nov-03 Time: 15:14:38
 New Bat Retrieve Bat Store All Bats List Bat

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	Mean	Std Dev
D65 10 Deg	-0.02	0.03	0.00	-0.02	-0.01	0.03	0.92	3.23
A 10 Deg	-0.01	0.03	0.01	-0.03	-0.02	0.03	0.91	3.21
F02 10 Deg	-0.02	0.02	0.01	-0.01	-0.01	0.02	0.91	3.22

QC INPUT - Diagnostic

Standard Name 1 of 1 Today's Date: 04-Oct-00
K0010 VIOLETT K
 Timed Measurements
 New Std Retrieve Std Store Std List Std Timed Meas ON Timed Meas OFF

Batch Name 1 of 1 CMC DE = 1.53
N0010 VIOLETT N
 AI Pass / Fail DE = 4.73
 Date: Time:
 New Bat Retrieve Hist All Bats to Hist List Bat

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	Mean	Std Dev
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90		
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73		
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52		

**QC INPUT – FMCII
SNPFMC1.FRM**

QC INPUT - FMCII

Standard Name 1 of 1 Today's Date: 04-Oct-00
K0010 VIOLETT K
 Strength Adj Off Strength Adj On Strength Defs
 New Std Retrieve Std Store Std List Std

Batch Name 1 of 1 Std Max Wt: 550 nm Fixed
N0010 VIOLETT N
 Bat Max Wt: Status:
 Strength: 96.18 %
 Date: Time: Batch is : Too light
 Too saturated
 Too yellow
 New Bat Retrieve Hist All Bats to Hist List Bat

III/Obs	DL	DCRG	DCYB	DC	DE
D65 10 Deg	3.39	5.74	0.71	5.78	6.70
A 10 Deg	3.54	2.87	0.89	3.01	4.64
F2 10 Deg	3.69	4.62	0.96	4.72	6.00

**QC INPUT – Gen Tol
SNPGENT1.FRM**

QC INPUT - Gen Tol

Standard Name 1 of 1 Today's Date: 04-Oct-00
K0010 VIOLETT K
 New Std Retrieve Std Store Std List Std

Batch Name 1 of 1
N0010 VIOLETT N
 Date: Time:
 New Bat Retrieve Hist All Bats to Hist List Bat

Description	Low	Value	High

QC Input Gloss Compensation

QC INPUT - Gloss Compensation

Standard Name: 5 of 5
green gloss

Std: 20.395 20 Std Gloss Adj On Std Gloss Adj Off

Batch Name: 1 of 2
BATCH1

Date: 08-Aug-03 Time: 11:02:04

Batch is: darker
 less saturated
 more blue

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	-0.01	0.01	-0.01	-0.01	0.00	0.01
A 10 Deg	-0.01	0.00	-0.01	0.00	0.00	0.01
F02 10 Deg	-0.01	0.01	-0.01	-0.01	0.00	0.02

QC INPUT – KN Value SNPKN1.FRM

QC INPUT - KN Value

Standard Name: 1 of 1
PALE GREEN

KN / Print Contrast

Std KN = 0.14

Batch Name: 30 of 30
BATCH30

Date: 20-Nov-03 Time: 15:14:38

Bat KN = 2.03

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	Delta KN Value
D65 10 Deg	-0.02	0.03	0.00	-0.02	-0.01	0.03	1.89
A 10 Deg	-0.01	0.03	0.01	-0.03	-0.02	0.03	0.00
F02 10 Deg	-0.02	0.02	0.01	-0.01	-0.01	0.02	0.31

QC INPUT – LAB DE PLOT SNPDEPL1.FRM

QC INPUT - LAB DE PLOT

Standard Name: 1 of 1
K0010 VIOLETT K

Batch Name: 1 of 1
N0010 VIOLETT N

Date: Time:

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73
F2 10 Deg	1.54	1.98	0.20	1.00	0.86	2.52

QC INPUT – LAB P/F SNPLAB1.FRM

QC INPUT - LAB P/F

Standard Name: 1 of 2
!60 S B'tiv Blind. CO-Nit. n.

Batch Name: 1 of 1
DJ003 Blue 3

Date: Time:

Today's Date: 06-Nov-00

Standard From Stds File:
 Batch From History File:

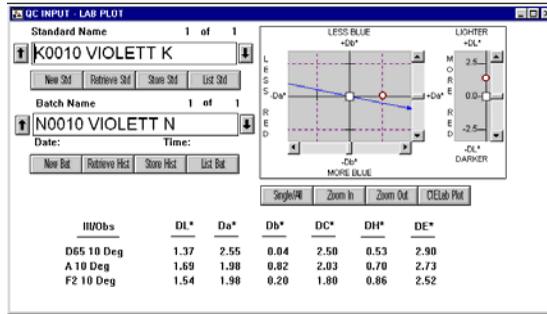
Fail

Pass/Fail Tolerances

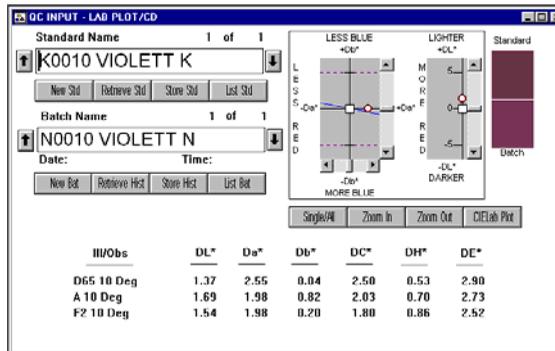
	DL* Tol	Da* Tol	Db* Tol	DE* Tol
Low:				
High:				1.00

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	-74.73	0.76	-12.97	4.41	12.22	75.85
A 10 Deg	-75.66	-2.69	-13.63	5.04	-12.94	76.82
F2 10 Deg	-75.48	0.74	-15.06	5.34	-14.10	76.97

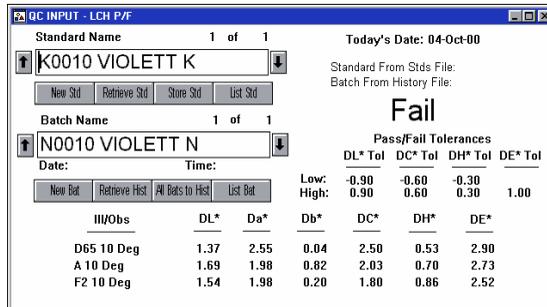
**QC INPUT – LAB PLOT
SNPDEPL2.FRM**



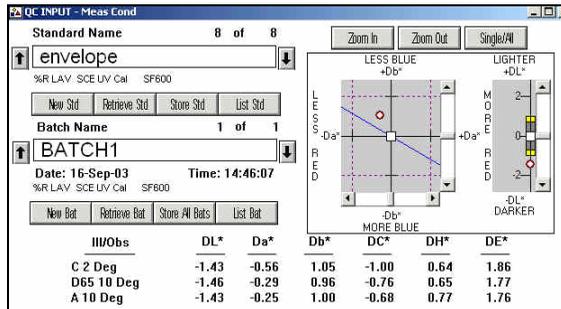
**QC INPUT – LAB
PLOT/CD
SNPCDPL2.FRM**



**QC INPUT – LCH P/F
SNPLCH1.FRM**



**QC INPUT – Meas Cond
SNPMCONDFRM**



QC INPUT – MS89 Color Difference
Ms89cdif.frm

M&S89 Colour Difference ColorTools V3.1
20-Nov-03 17:04

Standard: PALE GREEN
 Instrument: 999, d/8, Specular Included, Large Area View, UV 100%,
 360...700nm, d = 10, 20-Nov-03 at 15:08:33

Batch: BATCH23
 Instrument: 999, d/8, Specular Included, Large Area View, UV 100%,
 360...700nm, d = 10, 20-Nov-03 at 15:13:23

Equation: MS89 *Tolerances shown in brackets*

Illuminant	Decision	DE	DH	DC*	DL*
msTL84-10	Pass	(1.20) 0.05	(0.60) 0.05	(0.80) 0.01	(0.80) 0.03
msD65-10	Pass	(1.50) 0.06	(0.75) 0.05	(1.00) 0.03	(1.00) 0.03
msA-10	Pass	(1.50) 0.07	(0.75) 0.05	(1.00) 0.04	(1.00) 0.04

QC INPUT – MS89
SNPMS89.FRM

QC INPUT - MS89 Today's Date: 20-Nov-03

Standard Name: 1 of 10
PALE GREEN

Batch Name: 8 of 30
BATCH8

Date: 20-Nov-03 Time: 15:11:02

Std Checksum: 1740,05
 Std Inst Type: SF600
 Std Inst Cond: %R LAV SCI UV Inc.

Bat Checksum: 2538,20
 Bat Inst Type: SF600
 Bat Inst Cond: %R LAV SCI UV Inc.

Fail **ELC**

Batch is :
 brighter
 thinner

III/Obs	MS89 Decision	Indicator	DE	'DL'	'DC'	DH
msTL84-10	Fail	ELC	4.03	-2.36	3.26	-0.07
msD65-10	Fail	ELC	3.92	-2.08	3.32	-0.08
msA-10	Fail	ELC	4.07	-2.48	3.23	-0.08

QC INPUT – Paper
SNPAPER1.FRM

QC INPUT - Paper Today's Date: 04-Oct-00

Standard Name: 1 of 1
K0010 VIOLETT K

Batch Name: 1 of 1
N0010 VIOLETT N

Date: Time:

Measure Standard: Over Stack
 Measure Standard: Over Black Trap

Std R457 UV Inc = 8.11
 Std R457 UV Exc =
 Std Delta R457 =
 Std T519 Opacity =

Bat R457 UV Inc = 8.69 Deltas
 Bat R457 UV Exc = 0.58
 Bat Delta R457 =
 Bat T519 Opacity =

QC INPUT – STRENGTH
SNPSTR1.FRM

QC INPUT - STRENGTH Today's Date: 04-Oct-00

Standard Name: 1 of 1
K0010 VIOLETT K

Batch Name: 1 of 1
N0010 VIOLETT N

Date: Time:

Strength Adj: Off Strength Adj: On Strength Defs

Std Max Wt: 550 nm Fixed
 Bat Max Wt: Status:
 Strength: 96.18 %

Batch is :
 Too light
 Too saturated
 Too yellow

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52

**QC INPUT – SURF CORR
SNPSCOR1.FRM**

QC INPUT - SURF CORR

Standard Name 1 of 1
K0010 VIOLETT K

Batch Name 1 of 1
N0010 VIOLETT N

Date: Time:

Surf Corr Status: OFF Value: 0.00
Std Surf Corr Status: Unadjusted
Std Surf Corr Value: 0.00
Bat Surf Corr Status: Unadjusted
Bat Surf Corr Value: 0.00

Surf Curve Adjust Value: 0.00
Std Curve Adj Status: Unadjusted

Bat Curve Adjust Value: 0.00
Bat Curve Adj Status: Unadjusted

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52

**QC INPUT – T519
Opacity
SNPDEOP1.FRM**

QC INPUT - T519 Opacity

Standard Name 1 of 1
PALE GREEN

Batch Name 30 of 30
BATCH30

Date: 20-Nov-03 Time: 15:14:38

Today's Date: 20-Nov-03
Tappi 519 Diffuse Opacity

Measure Standard
Std Opacity = 99.86

Measure Batch
Bat Opacity = 97.97

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	Delta Opacity
D65 10 Deg	-0.02	0.03	0.00	-0.02	-0.01	0.03	-1.89
A 10 Deg	-0.01	0.03	0.01	-0.03	-0.02	0.03	0.00
F02 10 Deg	-0.02	0.02	0.01	-0.01	-0.01	0.02	-0.31

**QC PLOT1
QC PLOT1.FRM**

QC PLOT1

Standard Name 1 of 1
K0010 VIOLETT K

Batch Name 1 of 1
N0010 VIOLETT N

Batch is: Too light
Too saturated
Too yellow

III/Obs	DL*	Da*	Db*	DC*	DH*	DE*	Melamerism
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90	
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73	0.88
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52	0.36

**QC INPUT DCI
Tolerancing
DCITOL.frm**

DCI Color Difference

Standard: K0010 VIOLETT K

Batch: N0010 VIOLETT N

Used Tolerance Block: Datacolor Default

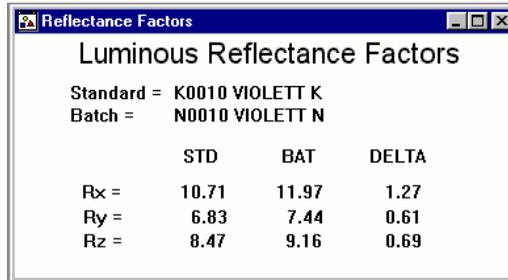
Illuminant	delE*	delL*	delC*	delB*
D65 10 Deg	1.69	0.70	1.43	0.55
A 10 Deg	1.65	0.83	1.22	0.74
F2 10 Deg	1.78	0.79	1.23	1.02

Batch,ok	Fail	Lighter	more saturated	more red

CI/E Lab Differences	dE	dL	da	db
D65 10 Deg	0.00	1.37	2.55	0.04
A 10 Deg	2.73	1.69	1.98	0.82
F2 10 Deg	2.52	1.54	1.98	0.20

Standard Batch

Reflectance Factors
CTREFAC.FRM



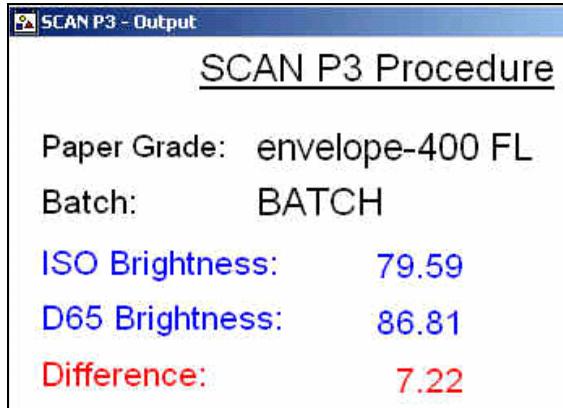
Reflectance Factors

Luminous Reflectance Factors

Standard = K0010 VIOLETT K
Batch = N0010 VIOLETT N

	STD	BAT	DELTA
Rx =	10.71	11.97	1.27
Ry =	6.83	7.44	0.61
Rz =	8.47	9.16	0.69

SCAN P3 – Output
SCANP3.FRM



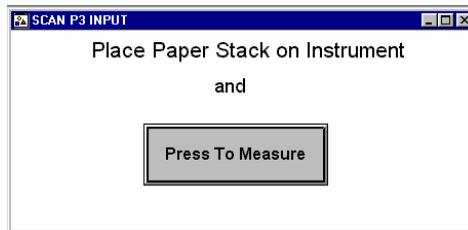
SCAN P3 - Output

SCAN P3 Procedure

Paper Grade: envelope-400 FL
Batch: BATCH

ISO Brightness: 79.59
D65 Brightness: 86.81
Difference: 7.22

SCAN P3 INPUT
D_SCANP3.FRM

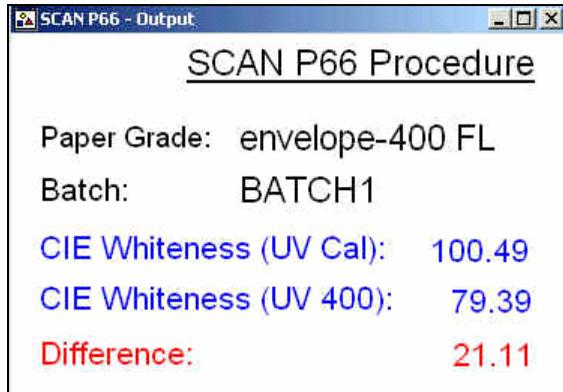


SCAN P3 INPUT

Place Paper Stack on Instrument
and

Press To Measure

SCAN P66
OUTPUTSCANP66.FRM



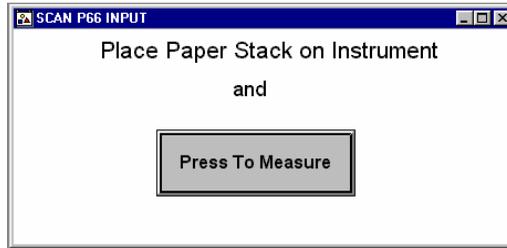
SCAN P66 - Output

SCAN P66 Procedure

Paper Grade: envelope-400 FL
Batch: BATCH1

CIE Whiteness (UV Cal): 100.49
CIE Whiteness (UV 400): 79.39
Difference: 21.11

**SCAN P66 INPUT
D_SCAN66.FRM**

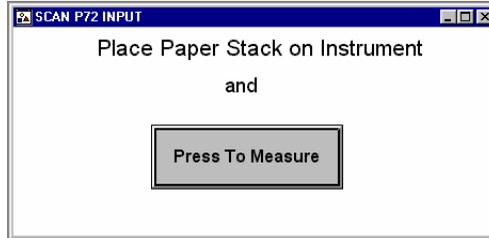


SCAN P66 INPUT

Place Paper Stack on Instrument
and

Press To Measure

**SCAN P72 INPUT
D_SCAP72.FRM**

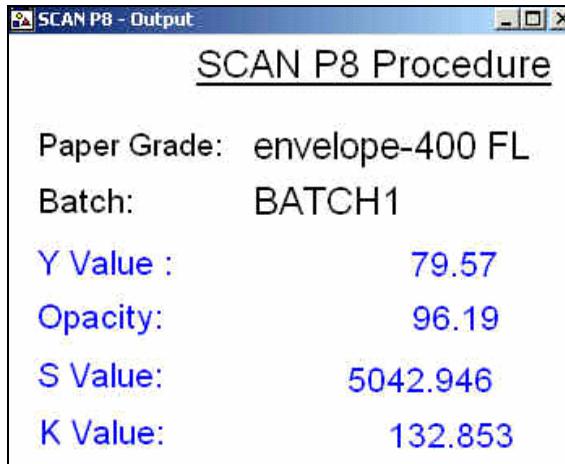


SCAN P72 INPUT

Place Paper Stack on Instrument
and

Press To Measure

**SCAN P8 – Output
SCANP8.FRM**



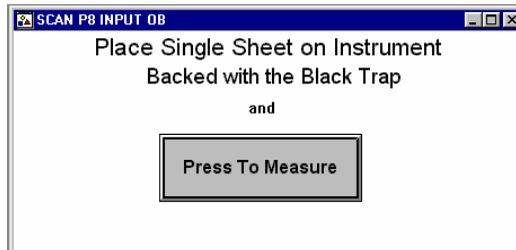
SCAN P8 - Output

SCAN P8 Procedure

Paper Grade: envelope-400 FL
Batch: BATCH1

Y Value : 79.57
Opacity: 96.19
S Value: 5042.946
K Value: 132.853

**SCAN P8 INPUT OB
D_SCAP8A.FRM**



SCAN P8 INPUT OB

Place Single Sheet on Instrument
Backed with the Black Trap
and

Press To Measure

**SCAN P8 INPUT
D_SCANP8.FRM**



SCAN P8 INPUT

Place Paper Stack on Instrument
and

Press To Measure

SOUND
SOUND.FRM



Statistics
STATS.FRM (

DESCRIPTOR	30 BATCHES	STD. DEV.	AVERAGE
CIE DL		3.25	0.80
CIE Da		0.23	-0.02
CIE Db		0.09	0.02
CIE DC		0.24	0.02
CIE DH		0.03	-0.01
CIE DE		3.23	0.92

STEPHANSEN WI
STEPHWI.FRM

Illum/Obs D65 10 Deg

STD. K0010 VIOLETT K

BAT. N0010 VIOLETT N

STD WI: -22.89

BAT WI: -23.98

DELTA WI: -1.09

Str Add
STRADD.FRM

STANDARD: PALE GREEN

BATCH: BATCH23

METHOD: Max. Abs.

STATUS=

Pigment Weight: 2.00

Vehicle Weight: 8.00

STRENGTH DIFF: 100.24 %

Pigment To Add:

Vehicle To Add: 0.02

STD. WL of MAX ABS: 420 nm

BAT. WL of MAX ABS: 420 nm

Strength Adj. DN Strength Adj. OFF K/S (Resub.) Strength Defs Print Form

Str Add1
STRADD1.FRM

Str Add1

STRENGTH METHOD: Max. Abs.
STRENGTH DIFF: 100.00 %
STATUS= Str. Adj.
STD. WL of MAX ABS: 420 nm
BAT. WL of MAX ABS: 420 nm

Strength Adj ON Strength Adj OFF Strength Defs
K/S (Absorb.) Print Form

STRENGTH
STRENGTH.FRM

STRENGTH

STANDARD: K0010 VIOLETT K
BATCH: N0010 VIOLETT N
METHOD: 550 nm Fixed
STRENGTH DIFF: 96.18
STD. WL of MAX ABS: nm
BAT. WL of MAX ABS: nm
STATUS:

Strength Adj ON
Strength Defs %R / %T Plot Strength Adj OFF

TAPPI 525 Brightness
TAPPI525.FRM

TAPPI 525 Brightness

Illum/Obs D65 10 Deg

STD. K0010 VIOLETT K
BAT. N0010 VIOLETT N

STD BRIGHTNESS: 8.11
BAT BRIGHTNESS: 8.69
DELTA BRIGHTNESS: 0.58

VISUAL TOLERANCE TRAINING

Standard Name 1 of 1
 K0010 VIOLETT K
 New Std Retrieve Std Store Std List Std

Batch Name 1 of 1
 N0010 VIOLETT N
 New Bat Retrieve Hist All Bats to Hist List Bat

Accept Batch
 Reject Batch
 Exclude Batch

Batch set as : Exclude
 Std P/F Train Update History Update Bat

Ill/Obs	DL*	Da*	Db*	DC*	DH*	DE*
D65 10 Deg	1.37	2.55	0.04	2.50	0.53	2.90
A 10 Deg	1.69	1.98	0.82	2.03	0.70	2.73
F2 10 Deg	1.54	1.98	0.20	1.80	0.86	2.52

**Wait 1
WAIT1.FRM**

Please Wait

Filter Position Currently Changing

UV Included and UV Excluded Measurements
 In Progress

**Wait
WAIT.FRM**

Please Wait

Filter Position Currently Changing

**XYZ
DATAXYZDATA.FRM**

Specular :

	X	Y	Z
STANDARD: K0010 VIOLETT K	9.75	6.83	9.09
BATCH: N0010 VIOLETT N	10.85	7.44	9.83

Datacolor TRACK Forms

All data used by Datacolor TRACK originates from Datacolor TOOLS, and is input using a form. Three forms have been provided in Datacolor TOOLS that include the data fields frequently used by Datacolor TRACK. Two forms, Datacolor New Job Request and Datacolor Sample Analysis, are used to display data on the screen. The third form, Datacolor Print Sample Analysis, is used to send the data to the printer. Below are examples of each of these forms. See also **Datacolor Tools User's Guide, Working with Forms** for an explanation of how forms are used.

Datacolor New Job Request Screen Form

datacolor 		<u>New Job Request</u>	
Standard:	1 of 1	Illuminant/Observer: D65 10 Deg	
<input type="text" value="MAJESTIC RED"/>		DE(CMC) Tolerance: 1.00	
		(L:c) Ratio: (2.00 : 1.00)	
Instrument Conditions: %R MAV SCI UV Inc S/N			
<input type="button" value="Retrieve Std"/>		<input type="button" value="List"/>	
<input type="button" value="Prev"/>		<input type="button" value="Next"/>	
<input type="button" value="Save Std"/>			
Customer:	<input type="text"/>	Start Date:	<input type="text"/>
Customer Attn:	<input type="text"/>	Due Date:	<input type="text"/>
Supplier:	<input type="text"/>	<input type="button" value="Set Dates"/>	
Supplier Attn:	<input type="text"/>		
Fabric Supplier:	<input type="text"/>		
Fabric Supplier Attn:	<input type="text"/>	<input type="button" value="Delete All Stds"/>	
Country of Origin:	<input type="text"/>	<input type="button" value="Copy Data"/>	
Brand:	<input type="text"/>	<input type="button" value="Paste Data"/>	
Brand Manager:	<input type="text"/>	<input type="button" value="Track Current"/>	
Buyer:	<input type="text"/>	<input type="button" value="Track Desktop"/>	
Department:	<input type="text"/>	<input type="button" value="Measure Sample"/>	
Season:	<input type="text"/>	<input type="button" value="Close"/>	
Item Description:	<input type="text"/>		
Style Number:	<input type="text"/>		
Fiber Content:	<input type="text"/>		

Datacolor Sample Analysis Screen Form

Standard: 1 of 1
MAJESTIC RED

Instrument Conditions: %R MAU SCI UV Inc
S/N

Sample Analysis

Illum/Dia	DL*/D5L	Da*	Db*	DC*/cSC	DH*/SH	DEcmc	Decision
D65 10 Deg	-0.17	0.31	-0.33	0.06	-0.27	0.32	Pass
F02 10 Deg	-0.31	0.34	-0.45	0.04	-0.41	0.52	Pass
A 10 Deg	-0.14	0.48	-0.41	0.05	-0.42	0.45	Pass

Sample Is:
Too Dark
Too Bright
Too Blue

DEcmc Tolerance: 1.00
(h-c) Ratio: (2.00 - 1.00)

Comments:

Customer:
Customer Attn:
Supplier:
Supplier Attn:
Fabric Supplier:
Fabric Supplier Attn:
Country of Origin:
Brand:
Brand Manager:
Buyer:
Department:
Season:
Item Description:
Style Number:
Fiber Content:

Start Date:
Due Date:
Submit Date:
Type:

Decision:

Buttons: Insert Job Data, Print, Copy Data, Paste Data, Track Current, Track Desktop, Delete All Stds, Close

Datacolor Print Sample Analysis Printer Form

Standard: 1 of 1
MAJESTIC RED

Instrument Conditions: %R MAU SCI UV Inc
S/N

Sample Analysis

Illum/Dia	DL*/D5L	Da*	Db*	DC*/cSC	DH*/SH	DEcmc	Decision
D65 10 Deg	-0.17	0.31	-0.33	0.06	-0.27	0.32	Pass
F02 10 Deg	-0.31	0.34	-0.45	0.04	-0.41	0.52	Pass
A 10 Deg	-0.14	0.48	-0.41	0.05	-0.42	0.45	Pass

Sample Is:
Too Dark
Too Bright
Too Blue

DEcmc Tolerance: 1.00
(h-c) Ratio: (2.00 - 1.00)

Comments:

Customer:
Customer Attn:
Supplier:
Supplier Attn:
Fabric Supplier:
Fabric Supplier Attn:
Country of Origin:
Brand:
Brand Manager:
Buyer:
Department:
Season:
Item Description:
Style Number:
Fiber Content:

Start Date:
Due Date:
Submit Date:
Type:

Decision:

NOTE

These forms do not contain all the TRACK user fields listed in this Appendix. If you want to include one of the TRACK user fields that does not appear on these forms, you must either create or edit a TOOLS form to include the field. See also **Datacolor TOOLS User's Guide, Form Editor** for instructions to create and edit custom forms.

Embedded Tolerances

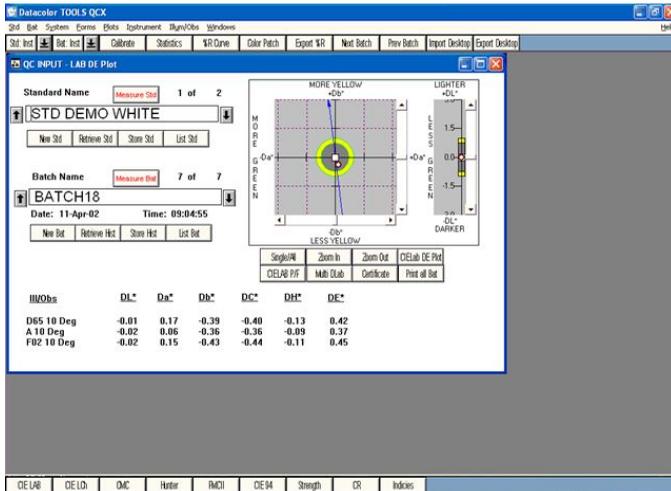
Whenever you select an output form (either printer or screen form) that includes a pass/fail evaluation, you will always receive an evaluation of 'Pass' or 'Fail'. If you have not defined acceptability tolerances for the equation being used, the program will default to tolerances embedded in the program code to perform the evaluation. Below is a table containing the tolerances embedded in the program code for every equation.

Color Difference Equation	Parameter	Low Value	High Value
CIEL*a*b*	DE*	N/A	1.0
	DL*	-1.0	1.0
	Da*	-0.6	0.6
	Db*	-0.3	0.3
CIE L*C*H*	DE*	N/A	1.0
	DL*	-1.0	1.0
	DC*	-0.6	0.6
	DH*	-0.3	0.3
CIE L*C*H* (elliptical)	DL*	N/A	1.0
	DC*	N/A	0.6
	DH*	N/A	0.3
CIE L*u*v*	DE*uv	N/A	1.0
	DL*	-1.0	1.0
	Du*	-0.6	0.6
	Dv*	-0.3	0.3
Hunter Lab	DE	N/A	1.0
	DL	-1.0	1.0
	Da	-0.6	0.6
	Db	-0.3	0.3
CMC	DE	N/A	1.0
	l:c ratio	2:1	N/A
FMC II	DE	N/A	1.0
	DL	-1.0	1.0
	DCRG	-0.6	0.6
	DCYB	-0.3	0.3
A.I. Pass/Fail	L	-1.0	1.0
	C	-0.6	0.6
	H	-0.3	0.3
	Offset L	0.0	N/A
	Offset C	0.0	N/A
	Offset H	0.0	N/A
	Pass Tol	N/A	1.0
	Fail Tol	N/A	9999.0

Color Difference Equation	Parameter	Low Value	High Value
M & S 89 (TL 84)	DE	1.2	
	L	0.8	
	C	0.8	
	H	0.6	
M & S 89 (D65)	DE	1.5	
	L	1.0	
	C	1.0	
	H	0.75	
M & S 89 (A)	DE	1.5	
	L	1.0	
	C	1.0	
	H	0.75	

Datacolor TOOLS^{QCX} Button Bar Configuration

Below is an example of the default button bar configuration for Datacolor TOOLS^{QCX}:



Top Button Bar Options

- **Std: Inst. Identifies the measurement method for the standard.** It is currently set to make a spectral measurement from the instrument. The data (%R or %T) is assigned to the Standard.
- **Bat: Inst. Identifies the measurement method for the standard.** It is currently set to make a spectral measurement from the instrument.
- **Calibrate.** Starts the procedure to calibrate your spectrophotometer.
Statistics. Displays statistical data for multiple batches.
- **%R Curve.** Displays a spectral curve of the sample data.
- **Color Patch.** Displays the color of the standard and batch as a patch on the screen.
- **Export %R.** Exports the sample spectral data to a file.
- **Next Batch.** Moves to the next batch on the desktop.
- **Previous Batch.** Moves to the previous batch on the desktop.
- **Import Desktop.** Imports data from a QTX file format to the Datacolor TOOLS Desktop.
- **Export Desktop.** Exports data from the Datacolor TOOLS desktop to a QTX file.

Bottom Button Bar Options

- **CIELAB.** Displays CIELAB color difference output.
- **CIELch.** Displays CIELAB Lch color difference output.
- **CMC.** Displays CMC color difference output.
- **Hunter.** Displays Hunter Lab color difference output.
- **FMC II.** Displays FMC II color difference output.
- **CIE 94.** Displays CIE94 color different output.
- **Strength.** Displays results of a strength evaluation.
- **CR.** Displays an opacity (contrast ratio) report.
- **Indices.** Displays the results of all whiteness and yellow indices enabled for Datacolor TOOLS^{QCX}.

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