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Datacolor 200

Datacolor 200R

Datacolor 200M

User Guide



## Datacolor® 200 Family User Guide

Part No. 019-400019, Rev B

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# Datacolor® 200 Family

## About Datacolor 200



Datacolor 200 is a member of the newest generation of Datacolor benchtop color measuring instruments.

Incorporating state-of-the-art CMOS integrated circuit technology in the instrument design, it is intended for use as a device for measuring, specifying and evaluating color in both laboratory and retail settings. The Datacolor 200 Family includes the Datacolor 200R and Datacolor 200M. The Datacolor 200R is intended for use in retail paint applications. It is typically used with Datacolor PAINT software. Datacolor 200M is intended for use in industrial applications such as Quality Control. It is typically used with Datacolor TOOLS software.

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## Electrical/Environmental Requirements

<b>Power</b>	100 – 240 VAC 50 to 60 Hz 1 A
<b>Absolute Operating Environment</b>	5° to 40° C 20-85% RH, non-condensing Altitude up to 2,000 meters

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## Safety Warnings

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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 **CAUTION**

There are no user-serviceable parts for this equipment

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## Light Source

Do not stare directly into the open port located in the front door panel when the measurement is in progress. Staring directly into the light source can result in eye discomfort similar to that caused by staring at a camera flash.

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Power

 **CAUTION**

Disconnect power before servicing.  
The power cord supplied with the unit must be used.

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# Feature Summary

Datacolor® 200 employs state-of-the-art features including the spectrometer, integrating sphere, light source, and optics. Below is a summary of those features:

FEATURE	DESCRIPTION
<b>Integrating sphere</b>	Barium coated sphere
<b>Measurement Geometry</b>	D/8° geometry, specular component included (SCI) or excluded (SCE).
<b>SP2000 Spectral Analyzer</b>	Proprietary dual-channel holographic grating. 256-photodiode linear arrays used for both the reference and sample channels.
<b>Light source</b>	Pulsed xenon flash lamp
<b>Wavelength Resolution</b>	2 nm
<b>Reporting Interval</b>	10nm

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## Accessories

All models come with the following standard accessories:

- Power cable
- USB cable
- Black trap
- White tile
- Green tile
- Memory stick



### NOTE

A serial cable for the instrument is available for purchase.

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## Calibration Tiles

A black trap, white tile and green tile are provided with Datacolor 200.

- The black trap and white tile are used each time the instrument is calibrated.
- The green tile is used during calibration to perform a diagnostic test.



The calibration accessories are located in a drawer at the base of the instrument, and should be kept there when not in use.

## Aperture Plates

Datacolor® 200 is a single aperture instrument. However, a variety of aperture sizes are available to accommodate different applications. Consult with a Datacolor representative to determine the correct aperture size for your application.



### NOTE

Appendix, [Instrument Specifications](#) provides details about the aperture sizes available for Datacolor 200.

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## About This User Guide

This guide is provided in a PDF format for easy access. To return to the page previously viewed when using the hyperlinks, press the following key combination:

**<ALT> <left arrow key>**

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# Cable Installation

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## Cables

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 **WARNING**

Turn off power **BEFORE** working with any cables.

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Datacolor® 200 requires the use of two cables, a power cable and an instrument cable that connects the instrument to the computer.



 **Power Cable**

 **Instrument Cable (USB)**

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 **WARNING**

Refer to [Electrical/Environmental Requirements](#) before connecting the instrument.

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The connections for these cables are located on the back of the instrument.



### Power Cable

A six-foot power cable is provided with the instrument.



Power is supplied to the back of the unit via a 3-prong male connector.





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**⚠ WARNING**

The power cord supplied with the unit *must* be used.

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## Instrument Communications Cable

The instrument is connected to a computer through a USB port.

### USB Cable Connection



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**📄 NOTE**

A serial connection can also be used to connect to the instrument. A serial cable is available for purchase.

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## Cable Installation

1. Plug the female end of the power cord into the power receptacle on the rear panel of the instrument. Insert the plug into a standard AC outlet.
2. Connect the instrument cable to the appropriate connector on the rear panel of the instrument.
3. Connect the instrument cable to a communications port on the back of the computer.



4. Tighten each connection securely to ensure proper signal.

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**📄 NOTE**

When the connection is made and the program is launched, the instrument will be detected automatically.

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# Controls and Indicators

## Status Panel

The status panel indicates the current instrument settings being used. Below is the status panel for the Datacolor® 200:



### OPTION

**Calibration.** Indicates if the calibration interval has expired.

**Red.** Calibration has elapsed. Recalibrate the instrument before using to ensure an accurate measurement.

**Green.** Instrument is calibrated.

**Service.** Indicates when the instrument should be serviced.

**Amber.** Annual service check is recommended.

**Green.** Instrument is performing properly.

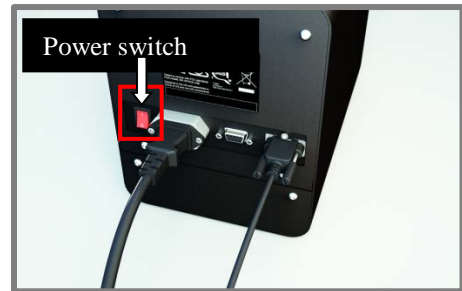
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## Powering Up

### **WARNING**

The power cord supplied with the unit *must* be used.

1. Verify all cable connections.
2. Plug the AC power cord into an outlet.
3. Attach the instrument cable to the instrument, and to a port on the computer
4. Turn on the computer.
5. Turn on the power switch. It is the red switch on the back of the instrument.
6. When power is applied, all mechanisms are automatically reset.



### **NOTE**

If the instrument is not turned on before you launch a Datacolor program, you may receive an error message.

1. When the front panel Calibration LED remains lighted, your instrument is ready to be calibrated.
2. Launch a Datacolor program.

# Instrument Calibration

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## General Calibration Information

Datacolor® 200 must be calibrated regularly to ensure that the measurements are accurate. This section provides instructions for installing the calibration data and performing the calibration. Below are instructions for performing the calibration using [Datacolor PAINT](#) and [other Datacolor programs](#).

### Reflectance Calibration

The instrument measures the reflectance of an object. It should be calibrated periodically to compensate for changes in the environment. A black trap, white tile and green tile are included with the instruments.



The software prompts for instrument calibration vary slightly from one program to another. However, you are always required to measure the black trap, white tile and green tile to complete the calibration.



#### NOTE

The recommended calibration interval with the DC200 Family, when used with Datacolor applications (Datacolor PAINT, TOOLS, MATCH TEXTILE, and MATCH PIGMENT) is 2 weeks.

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### Calibration Data

The calibration data for the instrument is stored on the instrument before it is shipped. The program you run will automatically find it during the first instrument calibration. A backup copy of this data is included on the memory stick provided with the unit.

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# Datacolor® 200 Setup and Calibration

The first time you launch a Datacolor program, you must add the instrument to the system. When running Datacolor PAINT, the program *automatically detects and configures* the instrument for use with the program.

If you are using Datacolor TOOLS, Datacolor MATCH and other Datacolor programs, you must provide inputs for the program to configure the program to recognize the Datacolor 200. See [Instrument Setup and Calibration for Other Datacolor Programs](#) for step-by-step instructions.

You will need the black trap, white tile and green tile to complete the calibration. They are located in the instrument accessory drawer.

Accessories

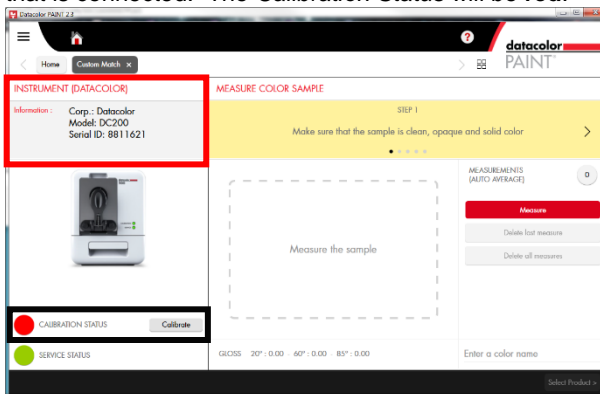


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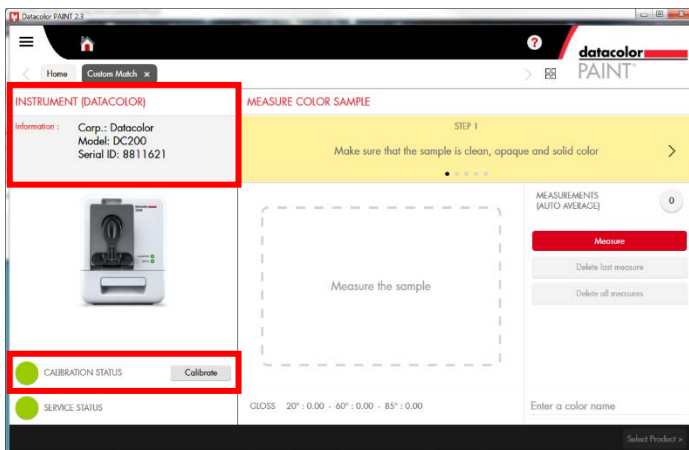
## Instrument Setup for Datacolor PAINT

When you launch Datacolor PAINT for the first time, the program automatically detects the Datacolor 200 and configures the program to use it.

1. Launch Datacolor PAINT and select **Custom Color Match**. Initially, there will not be any information displayed in the Instrument Information box and the *Calibration Status* will be red.
2. The program will locate the instrument and the screen will display information about the instrument that is connected. The *Calibration Status* will be red.



3. Click on the **Calibrate** button and calibrate the instrument before you continue. The *Calibration Status* will turn green.



The next section provides instructions to complete the instrument calibration.

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# Datacolor® PAINT Instrument Calibration

When the *Calibration Status* button is red, you should calibrate the instrument before making any measurements. The calibration routine consists of measuring the black trap, white tile and green tile. They are stored in the accessory drawer.

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 **CAUTION**

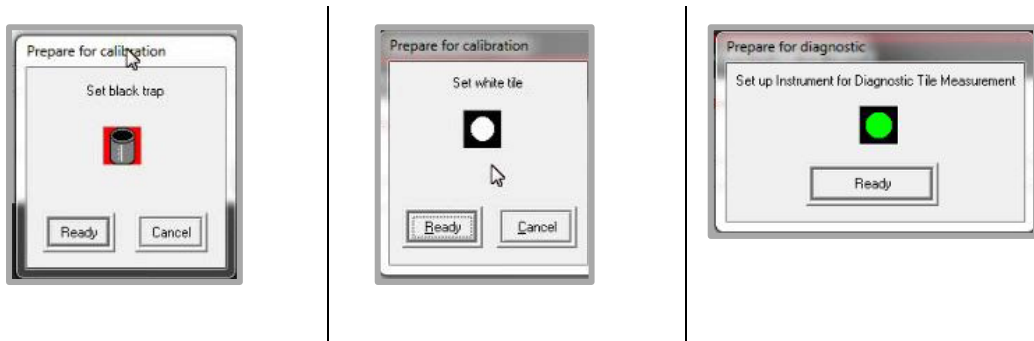
When the *calibration status* is red, the instrument will not operate. You must calibrate the instrument to make a measurement.

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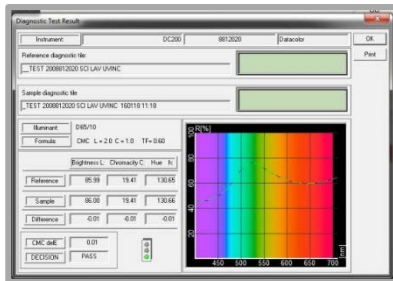
1. Click on the **Calibrate** button.

The program will prompt you to measure the black trap, white tile and green tile.

1. Start with the black trap. Position it at the port and press **Ready**. When the measurement is completed, repeat this procedure for the white and green tiles.



2. When the green tile measurement is completed, the program displays information about the measurement.



3. Click **Ok**. The program stores this as the master measurement for the green tile. You can now measure samples.



**NOTE**

Each time the instrument is calibrated, the current green tile measurement is compared to the stored value. When there are significant differences between the current measurement and the stored value of the green tile, the service indicator will turn amber, indicating that service is required.

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## Setup and Calibration for Other Datacolor Programs

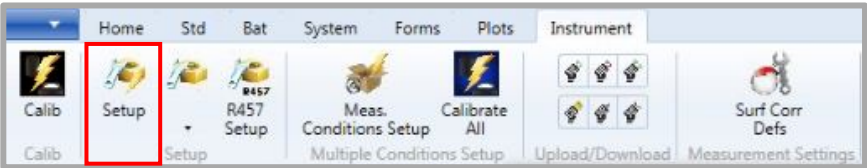
When using programs other than Datacolor PAINT, you must add Datacolor 200 to the instrument list. Below is the procedure for Datacolor TOOLS. This procedure is used for all Datacolor programs *except Datacolor PAINT*.

# Instrument Setup

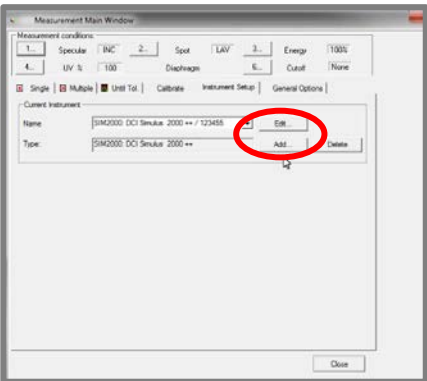
1. Launch the Datacolor® program and enter the user name and password.



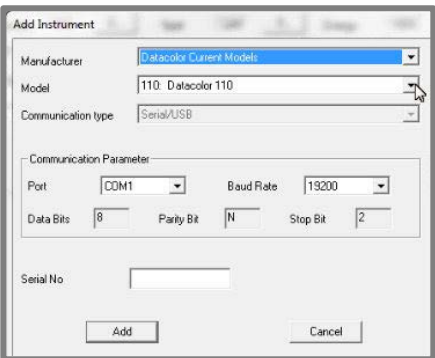
2. The main program window will display. Select the **Instrument** menu option.



3. Select **Setup**. The measurement main window displays:

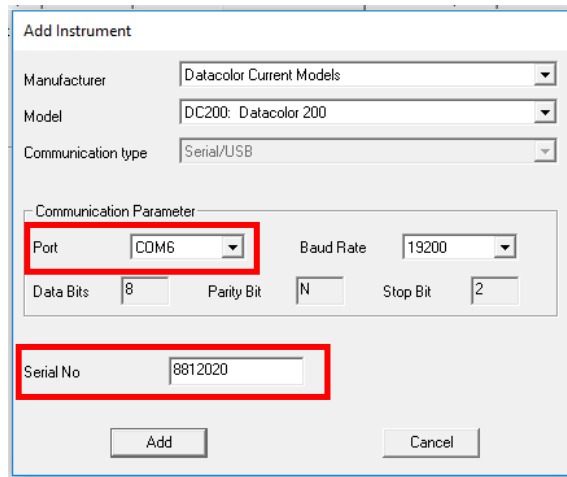


4. Click **Add**. The Add Instrument window displays.

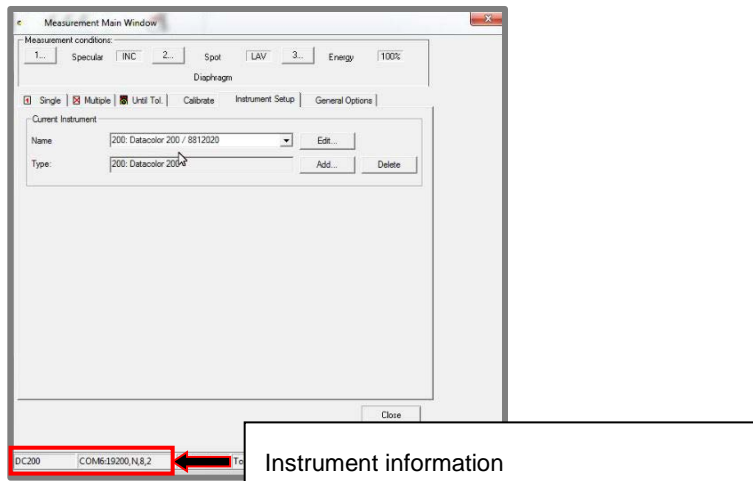


5. **Display** the drop-down menu in the *Model* field, and scroll to Datacolor 200.

6. **Select Datacolor® 200.** Select the Port (found via Windows Device Manager) and enter the instrument's serial number (found on the instrument's label or on the white tile's label).



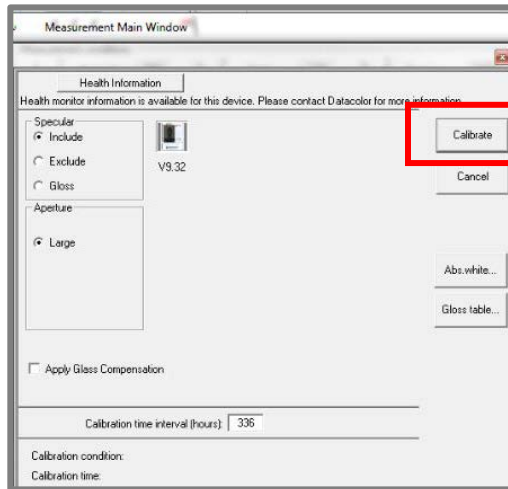
7. Click **Add**. Datacolor 200 will display as the current instrument. At the bottom of the window, the program will display information about the instrument selected:



8. Click **Close**. The Measurement Main Window displays. You can now calibrate the instrument.

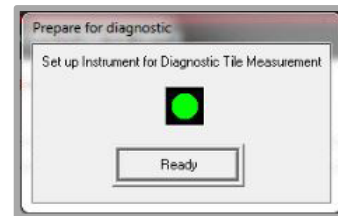
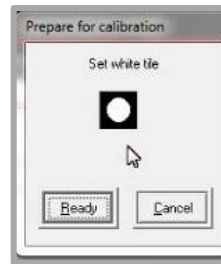
## Instrument Calibration

1. Navigate to the Measurement Main window, and select **Calibrate**.

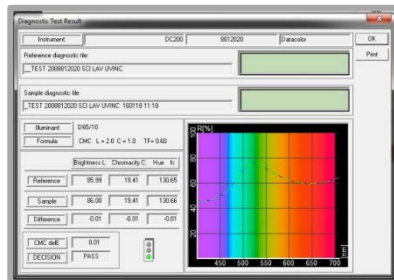


The program will prompt you to measure the black trap, white tile and green tile.

2. Start with the black trap. Position it at the port and press **Ready**. When the measurement is completed, repeat this procedure for the white and green tiles.



3. When the green tile measurement is completed, the program displays information about the green tile measurement.



4. Click **OK**. The program stores this as the master measurement for the green tile. You can now measure samples.



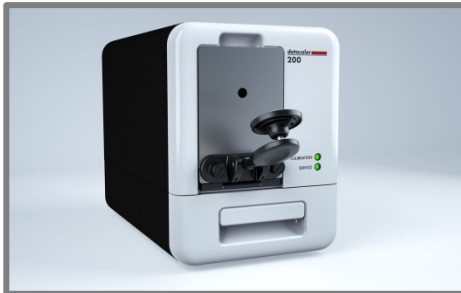
# Sample Presentation and Measurement

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When measuring samples using Datacolor® 200, you must pay close attention to the positioning of the sample to insure an accurate measurement. When positioned correctly, the sample rests between the sample holder and the front panel door. The sample must completely cover the aperture opening.

To position the sample:

1. Grasp the sample holder and pull forward.



2. Position the sample at the port.



3. Return the sample holder to the upright position.



## **WARNING**

Do not allow the sample arm to spring back.

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## Sample Viewing Port

When measuring small samples, you may need to verify that the correct area of the sample is being measured.

To check the sample area being viewed by the lens:

1. Grasp the tab above the aperture plate.



2. Pull the tab down to its full horizontal position. Look at the backside of the door to see the area of the port opening that is covered by the sample.



If necessary, adjust the placement of the sample to properly position the sample area to be measured. The sample must completely cover the port opening.

3. Push the door back to its normal position, and start the measurement.



# Maintenance

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The sections that follow provide detailed instructions for maintaining Datacolor® 200 and calibration tiles. These instructions and tips will help to ensure that the instrument continues to perform properly over its life.

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 **CAUTION**

There are no user-serviceable parts for this equipment.

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## Sphere Cleaning

The sphere should be examined visually for the presence of dust, sample particles, fibers, and excessive yellowing due to environmental influences. *This inspection should be performed frequently, especially if you measure loose materials.*

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 **NOTE**

If you discover loose materials in the sphere, contact Datacolor Service for instructions to remove the loose material.

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## Tile Handling and Cleaning

### Handling Tiles

- Handle calibration tiles with extreme care. Do not drop them, or scratch the glazed surface.
- Always grasp the tile using its edges.

### Cleaning Tiles

- The calibration tiles should be cleaned before each use. Wipe each tile clean with a soft, lint-free cloth.



- A detergent, free of optical brighteners, fluorescent materials or photoactive dyes should be used as needed to clear any oils, fingerprints, or other deposits.

- Liquid dish detergent is a suitable detergent. The detergent/water solution should be prepared as follows:

***1 part detergent: 250 parts water***

- Use a few drops of the detergent solution to moisten a soft, lint-free cloth, and gently wipe the tile surface. Rinse the detergent from the tile by wiping it with a cloth, moistened with clean water.
- **NEVER** use abrasive cleansers, razor blades, or other metal objects to remove dirt or foreign substances from the calibration tiles. This will damage the tile surface.
- **NEVER** immerse the tiles in water.
- Tiles that have scratches, chips, abrasions or cracks must be replaced. Signs of wear on the tile surface will affect the accuracy of the calibration.

## Tile Storage

- Large temperature variations will affect the accuracy of your calibration, requiring more frequent calibration. The calibration tiles should be stored in an environment that simulates the temperature of the samples to be measured.
- Prolonged exposure to sunlight or other sources of ultra-violet radiation will cause the color of the tiles to change. The tiles should always be stored in a protective case or container away from direct sunlight and environmental contaminants.

## Cleaning the Black Trap

- The black trap should be kept dust-free. Dust accumulating in the black trap should be blown out with compressed air. The compressed air ***must be free of moisture.***



# Appendix

## Datacolor 200 Instrument Specifications

*Specifications are subject to change without notice.*

ITEM	DESCRIPTION					
<b>Instrument Type</b>	Dual beam integrating sphere with xenon flash lamp.					
<b>Measuring Geometry</b>	Diffuse illumination, 8° viewing in conformance with CIE publication No. 15.2 Colorimetry.					
<b>Illumination Source</b>	Pulsed xenon, filtered to approximate D65.					
<b>Spectral Analyzer</b>	Proprietary SP 2000 analyzer with dual 256-diode array and high-resolution holographic grating.					
<b>Wavelength Range</b>	400 – 700nm					
<b>Reporting Interval</b>	10nm					
<b>Wavelength Resolution</b>	2nm					
<b>Photometric Range</b>	0 to 200%					
<b>Photometric Resolution</b>	0.003%					
<b>Aperture Configuration</b>	<b>Large Area View</b>		<b>Small Area View</b>		<b>Ultra-Small Area View</b>	
	<b>Illuminated</b> 22mm	<b>Viewed</b> 18mm	<b>Illuminated</b> 9mm	<b>Viewed</b> 5mm	<b>Illuminated</b> 6.5mm	<b>Viewed</b> 2.5mm
<b>Power</b>	100 to 240 VAC, 50 to 60 Hz, 1 A					
<b>Performance— Repeatability*</b>	0.05 CIELAB Max on white ceramic					
<b>Performance—Inter-Instrument Agreement*</b>	<b>Datacolor 200</b>		<b>Datacolor 200R</b>		<b>Datacolor 200M</b>	
	---		---		.54 CIELAB ΔE max of 12 BCRA tiles	
	0.2 CIELAB ΔE average of 12 BCRA tiles		0.2 CIELAB ΔE average of 12 BCRA tiles		0.2 CIELAB ΔE average of 12 BCRA tiles	
<b>Absolute Operating Environment</b>	5° to 40° C, 20-85% RH, non-condensing Altitude up to 2,000 meters					
<b>Interface</b>	USB v2.0 ~or~ (Optional) RS232 9600/19200 baud					
<b>Warranty</b>	One Year					
<b>Dimensions <i>with</i> Drawer</b>	<b>English</b>			<b>Metric</b>		
<b>Height</b>	8.5 inches			21.59 cm		
<b>Width</b>	6.7 inches			17.01 cm		

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<b>Depth</b>	11.1 inches	28.23 cm
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<b>Weight</b>	12 lbs.	5.44 kg
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*\* Specification based on following environmental conditions: 20°C; 50% RH; 2 sigma*

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## Miscellaneous Technical Information

### Datacolor® 200 RS-232C Connector Pin Assignments

Pin #	Purpose	Direction
2	Transmit data	Out (to host)
3	Receive data	In (from host)
7	Signal ground	

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 **WARNING**

- (1) *DO NOT WIRE* to pins other than 2, 3, and 7.  
(2) For all unused inputs, the default is active high.
-