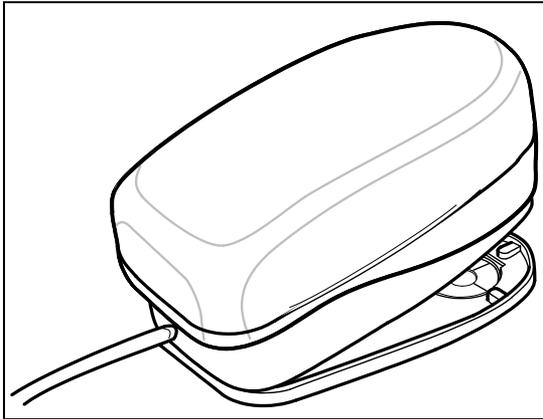# CA22
Spectrophotometer

User Manual

X·rite

CA22 Spectrophotometer User Manual

Federal Communications Commission Notice

FCC Statement: This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Industry Canada Compliance Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled: "Digital Apparatus", ICES-003 of Industry Canada.

Avis de conformité aux normes d'Industrie Canada

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur : "Appareils numériques", NMB-003 édictée par Industrie Canada.

WEEE

As of August 13, 2005, X-Rite products meet the European Union – Waste Electrical and Electronic Equipment (WEEE) directive. Please refer to www.xrite.com for more information on X-Rite's compliance with the WEEE directive.

CE DECLARATION

Manufacturer's Name:	X-Rite, Incorporated
Manufacturer's Address:	4300 44th Street, S.E.
	Grand Rapids, Michigan 49512
	U.S.A.
Model Name:	Spectrophotometer
Model No.:	DTP22
Directive(s) Conformance:	EMC 89/336/EEC LVD 73/23/EEC

PROPRIETARY NOTICE

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This instrument may be covered by one or more patents. Refer to the instrument for actual patent numbers.

LIMITED WARRANTY

X-Rite, Incorporated ("X-Rite") warrants each instrument manufactured to be free of defects in material and workmanship (excluding battery pack) for a period of 12 months. This warranty shall be fulfilled by the repair or replacement, at the option of X-Rite, of any part or parts, free of charge including labor, F.O.B. its factory or authorized service center.

This warranty shall be voided by any repair, alteration, or modification, by persons other than employees of X-Rite, or those expressly authorized by X-Rite to perform repairs, and by any abuse, misuse, or neglect of the product, or by use not in accordance with X-Rite's published instructions.

X-Rite reserves the right to make changes in design and /or improvements to its products without any obligation to include these changes in any products previously manufactured. Correction of defects by repair or replacement shall constitute fulfillment of all warranty obligations on the part of X-Rite.

THIS WARRANTY IS EXPLICITLY IN LIEU OF ANY OTHER EXPRESSED OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. THIS WARRANTY OBLIGATION IS LIMITED TO REPAIR OR REPLACEMENT OF THE UNIT RETURNED TO X-RITE OR AN AUTHORIZED SERVICE CENTER FOR THAT PURPOSE.

This agreement shall be interpreted in accordance with the laws of the State of Michigan and jurisdiction and venue shall lie with the courts of Michigan as selected by X-Rite, Incorporated.
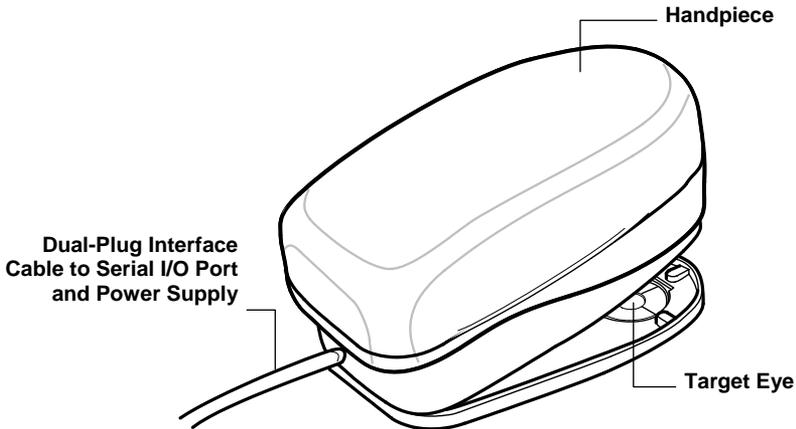
Table of Contents

1 Installation and Maintenance

The X-Rite Model CA22 Spectrophotometer is a 16-band color measurement instrument that reports spectral data to an X-Rite software program, such as X-RiteColor® Master. This instrument can also be used to measure color samples for MatchRite's ColorDesigner application. Your instrument includes a calibration reference for quick calibration of the instrument.

This manual covers the installation, maintenance, and calibration of the CA22 Spectrophotometer.

Instrument Vocabulary

Handpiece

Dual-Plug Interface Cable to Serial I/O Port and Power Supply
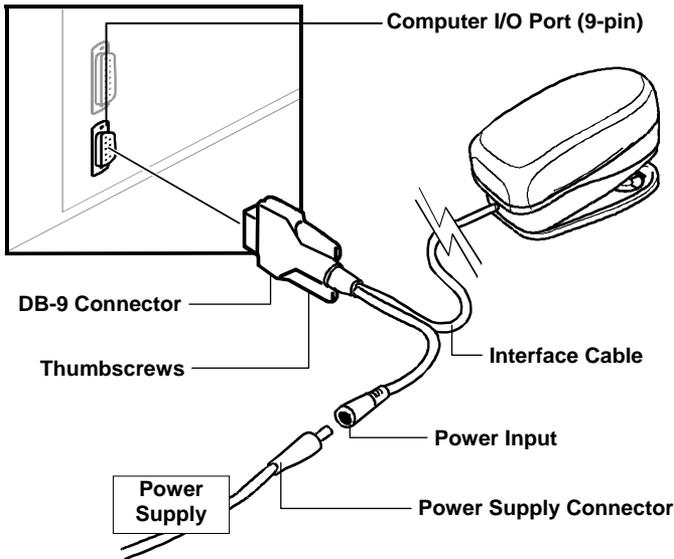
Target Eye

Package Contents

Your CA22 system packaging should contain all the items listed below. If any of these items are missing, contact your X-Rite dealer.

- Model CA22 Instrument with Dual-Plug Interface Cable
- Power Supply—either P/N SE30-73 AC Adapter or P/N SE30-77 Switching AC Adapter with Line Cord
- Calibration Reference with White Opal and Serial Number Plate on bottom
- Documentation and Registration Materials

Installing the Instrument

1. First, close all software programs and shut down your computer.
2. Connect the DB-9 connector from the interface cable to an I/O Port on back of the computer. Secure it with the thumbscrews.

3. Plug the small connector end of the power supply into the power input connector on the interface cable.

4. Plug in the Power Supply.

Computer I/O Port (9-pin)

DB-9 Connector

Thumbscrews

Interface Cable

Power Input

Power Supply

Power Supply Connector

5. Turn on your computer.

6. Select the instrument type (if applicable) and select the I/O port that the instrument is connected to within the
X-Rite application or MatchRite ColorDesigner application. Refer to the application's help system for additional information.

NOTE: If the instrument is ever disconnected from the I/O port, turn off your computer before re-connecting.

Instrument Maintenance

The following maintenance steps ensure dependable performance from your CA22 spectrophotometer and calibration reference.

NOTE: The instrument and reference serial numbers are shown in the Instrument Calibration dialog box. See *Calibrating Your Instrument.*

Cleaning the Instrument

When not in use, store your instrument in a dry, dust-free area. Clean the instrument once weekly or as needed:

- Gently clean bottom of shoe and target eye with a lint-free cloth. Do not use solvents or cleaners of any kind.

- Safe storage ensures proper maintenance of the instrument optics. Do not spray cleaners or compressed air up into optics area. Do not stick cotton swabs into the optics.

Cleaning the Calibration Reference

When not in use, store the calibration reference in a dry, dust free area, away from direct exposure to light. Clean the calibration reference before every calibration:
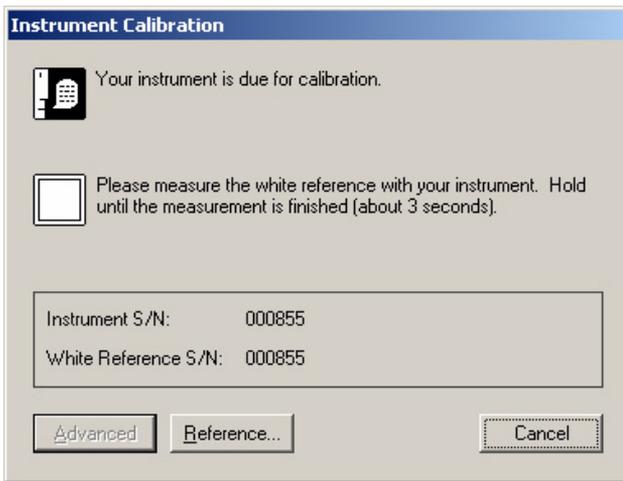
- Gently clean the reference and white opal area with a dry, lint-free cloth. Do not use solvents or cleaners of any kind.

2 Calibration

The calibration procedure is fast and easy. The host computer will inform you when calibration is required. Two separate calibration procedures are shown on the following pages. The first procedure is performed when using an X-Rite quality assurance application, such as X-RiteColor® Master. Follow the second calibration procedure when using this instrument with the MatchRite® ColorDesigner application.

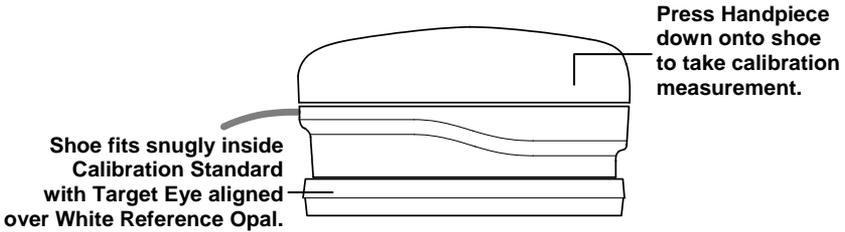## Calibrating Your Instrument – using an X-Rite Quality Assurance Application

1. The following screen appears when calibration is required. You can also select **Instrument / Calibrate…** to open the calibration screen.

2. Place your calibration reference on a flat, steady surface.
3. Place your instrument onto the calibration reference. The instrument fits snugly with the Target Eye aligned squarely over the white opal.

4. Press and hold the Handpiece down onto the Shoe to take a measurement. The reading takes about three seconds. When complete, release the Handpiece. If you receive an error message, simply repeat the previous steps to try again.

Press Handpiece down onto shoe to take calibration measurement.

Shoe fits snugly inside Calibration Standard with Target Eye aligned over White Reference Opal.

5. Once complete, the Instrument Calibration screen disappears.

> **CAUTION**: You should not edit calibration reference values without the assistance of X-Rite Technical Support.
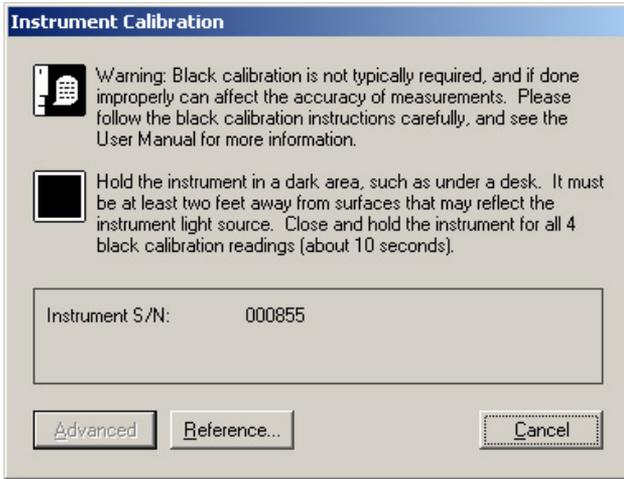
Performing an Advanced (Black) Calibration

The following instructions are for performing "advanced" calibration, which is necessary *only* if you find your instrument is having trouble measuring dark colors.
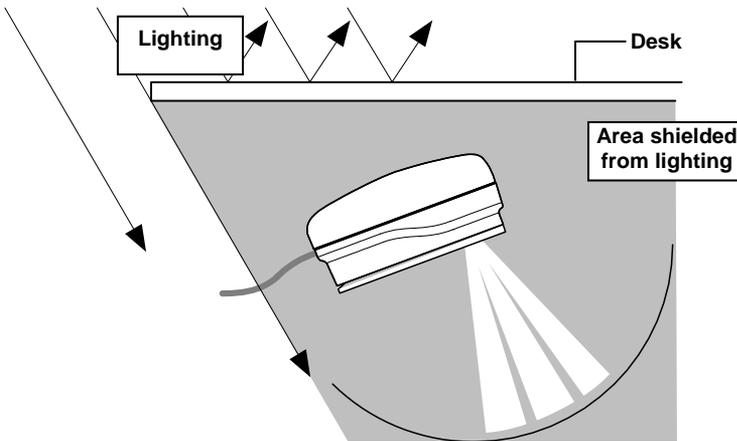
> **NOTE**: *A black calibration is not necessary under most circumstances.* You should perform this calibration *only* if you suspect a problem with the instrument's ability to accurately measure dark colors.
>
> Read the following instructions carefully to ensure that advanced calibration is performed properly. Improper calibration can affect measurement accuracy.

A black calibration does not measure a black *object*. Instead, the instrument measures a dark *area*.

1. Select **Instrument / Calibrate…** to open the Instrument Calibration screen.

2. Press the **Shift**+**Alt**+**1** keyboard sequence. The **Advanced** button becomes active.

3. Click the **Advanced** button. The black calibration screen appears. See next page.

Instrument Calibration

Warning: Black calibration is not typically required, and if done improperly can affect the accuracy of measurements. Please follow the black calibration instructions carefully, and see the User Manual for more information.

Hold the instrument in a dark area, such as under a desk. It must be at least two feet away from surfaces that may reflect the instrument light source. Close and hold the instrument for all 4 black calibration readings (about 10 seconds).

Instrument S/N: 000855

[Advanced] [Reference...]   [Cancel]

4. Point the Target Eye of your instrument toward a dark area that is shielded from lighting, such as underneath a table or desk. Make sure that there are no objects or surfaces within at least two feet of the front or sides of the Target Eye. Remember that these objects could include your legs or chair. See diagram below.

Lighting

Desk

Area shielded from lighting

Allow at least 2 feet of clearance between Target Eye and reflective surfaces.
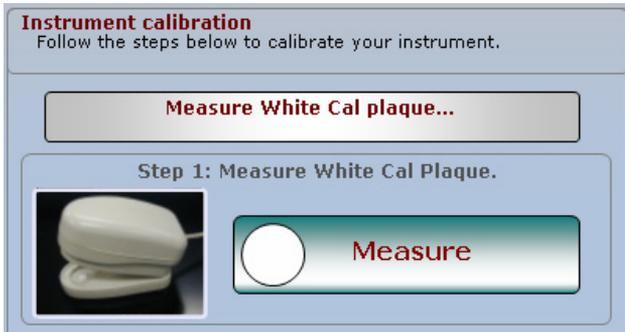
Press the Handpiece together with the Shoe and hold.

> **NOTE**: The advanced calibration takes four measurements over ten seconds, compared to the usual three -seconds for a single measurement.

6. Once complete, the Instrument Calibration screen disappears.

Calibrating Your Instrument – using MatchRite ColorDesigner Application

1. The following option appears on the left side of the screen when calibration is required. You can also click **Housekeeping** and then **Calibrate** to access the instrument calibration option.

2. Place your calibration reference on a flat, steady surface.
3. Place your instrument onto the calibration reference. The instrument fits snugly with the Target Eye aligned squarely over the white opal.

> **NOTE**: If a count down status bar appears, you must wait for it to disappear before taking a calibration measurement.

4. Press and hold the Handpiece down onto the Shoe to take a measurement. The reading takes about three seconds. When complete, release the Handpiece. If you receive an error message, repeat the previous steps to try again.
5. Once complete, DONE will appear in the Step 1 box, or the instrument calibration option disappears.

3 Taking Measurements

Once you have the instrument calibrated, you should refer to the software program's help system that you are using with your spectrophotometer. All applications that utilize the CA22 will require that you have the software running during measurements.

Also, each program will have different setup parameters and criteria, and will utilize the data for different functions. The following information is provided simply to familiarize you with the "sound and feel" of measurement with the CA22 instrument.
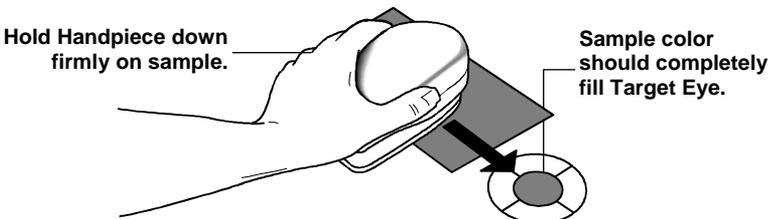
Sample Criteria

The CA22 instrument measures color data from just about any clean, dry surface that is reasonably flat and smooth. The target eye should be able to rest flat and steady on the sample area. (Because the opening is just 6 millimeters in diameter, it can rest sufficiently flat on many curved surfaces.) As a general rule, surfaces with bulky, rough, or loose-weave textures will not provide good results.

NOTE: Never measure wet paint. Wet paint will contaminate the instrument.

Measurement Technique

First, clear the color sample surface of any dirt, dust, or moisture. Next, place the Instrument's Target Eye directly on the sample surface. The Eye opening should be completely filled with the sample color.

1. Press the Handpiece down onto the Shoe and hold it closed.

2. The instrument "hums" for about three seconds. Hold the instrument still for the entire measurement. *Any movement will affect the reading accuracy.*

Hold Handpiece down firmly on sample.

Sample color should completely fill Target Eye.

3. Release the Handpiece. Your software program may provide you with audio and visual (on-screen) signals for the start and end of a measurement. See your software program's help system.

Troubleshooting

Error messages indicate that the instrument is not responding to the software program.

- Make sure your instrument is connected to the Serial Port of your computer. If it is not, shut down your computer, connect to the Serial Port, and then restart your computer. Make sure you select the correct port in the port selection dialog box.

- Make sure your instrument is connected to the power cable and adapter, and that it is plugged in. If it is not, shut down your computer, connect power, and then restart your computer.

Problems with Measurements

- Be sure that the instrument is properly calibrated.

- X-Rite QA applications only - If you are having difficulties measuring dark colors, see the procedures for advanced (black) calibration.

- If you are experiencing serious measurement discrepancies, check to ensure that all three tungsten lamps illuminate during a measurement. To do this, hold the instrument about two inches above a flat surface and close the Shoe to take a measurement. You should see three distinct beams of light reflected on the surface.

Appendix A: Technical Support

If you are having a problem or if you have a question that is directly related to your CA22 instrument, contact X-Rite, Incorporated customer service.

Telephone: 1-888-826-3042 or 1-616-803-2100

Fax: 1-888-826-3043 or 1-616-803-2705

> **NOTE**: Refer to your software documentation for software technical support information.

Customer service departments supporting the CA22 instrument are fully staffed with qualified technicians to assist you via phone or fax. When placing a call (or fax), please have (or include) the following information:

- Instrument serial number and calibration standard serial number
- Software version number
- Your name and company name
- Your telephone number
- Any error messages and what prompted them
- When calling, have the hardware and software running within reach of the telephone.

Appendix B: Specifications

Measurement Functions

Spectral Reflectance, 31 point, 400 – 700 nm, 10nm interval, XYZ, Yxy, L*a*b*, L*u*v*, L*C*h°

Illuminant/Observer

A, C, D50, D55, D65, D75, F2, F7, F11, F12.
2° or 10°

Spectral Sensor

DRS spectral engine
16 band, 400 – 700 nm spectral range
20 nanometer interval, 45°/0° geometry
meeting ISO and ANSI standards
4mm diameter measuring area

Performance

0 to 200% measurement range, no warm-up time
.2 DE max short-term repeatability on white
<1 DE max., <.5 DE average inter-instrument agreement (as compared to X-Rite 900 series)
2 seconds per measurement

I/O Connection

DB9 for IBM® compatible serial port

Data Interface

RS-232 serial interface with baud rates from 1200 to 19.2k communication via RCI commands used under license

Environmental

+10° to +40°C operating, 30% to 76% RH non-condensing

Dimensions:

2.7" H (6.9cm), 3.0" W (7.6cm), 5.4" L (13.7cm)

Net-Weight:

12 ounces (340 g)

▌ Specification and design appearance subject to change without notice.

x·rite

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