

Model VS450

45/0° Color Spectrophotometer



Operator's Manual





Model VS450

CE Declaration

CE Hereby, X-Rite, Incorporated, declares that this VS450 Series is in compliance with the essential requirements and other relevant provisions of Directives 2014/35/EU (LVD), 2014/30/EU (EMC), and RoHS 2011/65/EU.

Federal Communications Commission Notice

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Industry Canada Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Equipment Information

Use of this equipment in a manner other than that specified by X-Rite, Incorporated may compromise design integrity and become unsafe.

WARNING: This instrument is not for use in explosive environments.



Instructions for disposal: Please dispose of Waste Electrical and Electronic Equipment (WEEE) at designated collection points for the recycling of such equipment.

Proprietary Notice

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Patents: www.xrite.com/ip

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Warranty Information

X-Rite warrants this Product against defects in material and workmanship for a period of twelve (12) months from the date of shipment from X-Rite's facility, unless mandatory law provides for longer periods. During such time, X-Rite will either replace or repair at its discretion defective parts free of charge.

X-Rite's warranties herein do not cover failure of warranted goods resulting from: (i) damage after shipment, accident, abuse, misuse, neglect, alteration or any other use not in accordance with X-Rite's recommendations, accompanying documentation, published specifications, and standard industry practice; (ii) using the device in an operating environment outside the recommended specifications or failure to follow the maintenance procedures in X-Rite's accompanying documentation or published specifications; (iii) repair or service by anyone other than X-Rite or its authorized representatives; (iv) the failure of the warranted goods caused by use of any parts or consumables not manufactured, distributed, or approved by X-Rite; (v) any attachments or modifications to the warranted goods that are not manufactured, distributed or approved by X-Rite. Consumable parts and Product cleaning are also not covered by the warranty.

X-Rite's sole and exclusive obligation for breach of the above warranties shall be the repair or replacement of any part, without charge, which within the warranty period is proven to X-Rite's reasonable satisfaction to have been defective. Repairs or replacement by X-Rite shall not revive an otherwise expired warranty, nor shall the same extend the duration of a warranty.

Customer shall be responsible for packaging and shipping the defective product to the service center designated by X-Rite. X-Rite shall pay for the return of the product to Customer if the shipment is to a location within the region in which the X-Rite service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations. Proof of purchase in the form of a bill of sale or receipted invoice which is evidence that the unit is within the Warranty period must be presented to obtain warranty service. Do not try to dismantle the Product. Unauthorized dismantling of the equipment will void all warranty claims. Contact the X-Rite Support or the nearest X-Rite Service Center, if you believe that the unit does not work anymore or does not work correctly.

THESE WARRANTIES ARE GIVEN SOLELY TO BUYER AND ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR APPLICATION, AND NON-INFRINGEMENT. NO EMPLOYEE OR AGENT OF X-RITE, OTHER THAN AN OFFICER OF X-RITE, IS AUTHORIZED TO MAKE ANY WARRANTY IN ADDITION TO THE FOREGOING.

IN NO EVENT WILL X-RITE BE LIABLE FOR ANY OF BUYER'S MANUFACTURING COSTS, OVERHEAD, LOST PROFITS, GOODWILL, OTHER EXPENSES OR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES BASED UPON BREACH OF ANY WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT, OR ANY OTHER LEGAL THEORY. IN ANY EVENT OF LIABILITY, X-RITE'S MAXIMUM LIABILITY HEREUNDER WILL NOT EXCEED THE PRICE OF THE GOODS OR SERVICES FURNISHED BY X-RITE GIVING RISE TO THE CLAIM.

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1. Introduction and Setup

The VS450 instrument is used to evaluate and identify colors in industrial applications.

The instrument reads color samples from a variety of materials including paper, plastic, textiles, and various painted objects. The instrument can be set to measure a 6 mm or 12 mm spot on a sample. The VS450 requires an AC adapter and USB communication (included) to the host computer. Connections are located on the bottom of the instrument.



How to Use this Manual

This manual is intended to provide setup, operation, and general maintenance of the instrument. Specific software application information is available in the software help system.

Packaging Contents

Your instrument packaging should contain all the items listed below. If any of these items are missing or damaged, contact X-Rite or your authorized representative.

- VS450 instrument with integrated calibration reference
- USB interface cable
- Power supply (X-Rite P/N SE30-209) and line cord
- Documentation and registration material
- Manual and Utilities CD
- Hex driver
- Cleaning kit

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Connecting the Power Supply

1. Verify the voltage indicated on the power supply complies with the AC line voltage in your area.
2. Insert the small plug from the power supply into the input connector at the bottom of the instrument.

AC adapter input



AC Adapter Ratings

Input: 100-240 V 50/60 Hz
Output: 24 VDC @ 1.25 A

3. Plug the detachable line cord into the power supply and plug the line cord into the wall receptacle.



Operational hazard exists if a power supply other than X-Rite SE30-209 is used.

Installing the USB Driver

IMPORTANT: You must install the USB driver before connecting the instrument to your computer.

1. Locate the VS450 Manual and Utilities CD and insert it into the CD drive of the computer. If the CD does not autorun, double-click the VS450 CD icon in the My Computer window.
2. Click the **USB Driver** button on the VS450 Color Spectrophotometer main window.
3. Double-click the **.exe** file in the Driver window.
4. The setup program guides you through the rest of the installation process. Follow the instructions on each setup screen to complete the installation. When finished, remove the CD and store in a safe location.

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Connecting the USB Cable

IMPORTANT: You must install the USB driver before connecting the instrument to your computer.

1. Install the USB driver if not already installed. Refer to Installing the USB Driver on the previous page.
2. Plug the square end of the USB cable into the connector at the bottom of the instrument.
3. Plug the USB cable into an available port on your computer.



Cable Clips

The cable clips located on the bottom of the instrument are used to secure the cables for the power supply and USB as needed. The clips help prevent the cables from inadvertently disconnecting or interfering with sample measurements.

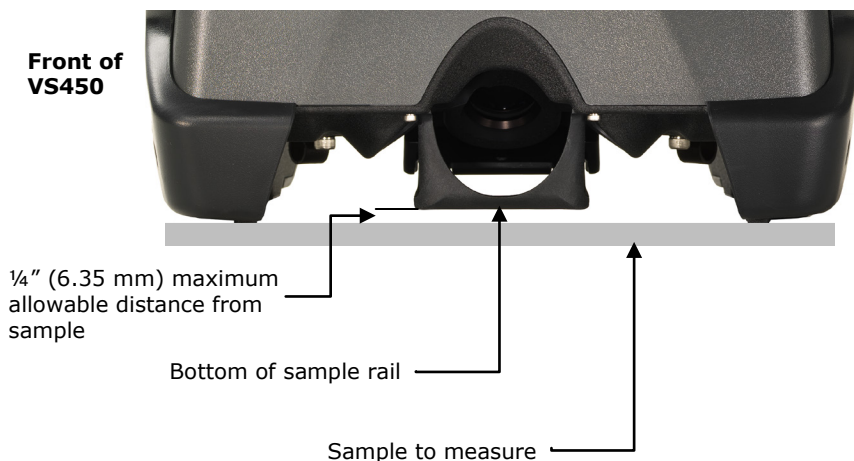


2. Measuring Samples

The instrument measures samples under the sample rail at the bottom. It can take color measurements from almost any surface. The sample should rest steady below the sample rail. The instrument illuminates a ring through the sample rail to allow for easy sample positioning.

Important Sample Information

- Depending on instrument setting, the sample area to measure must be at least 6 mm or 12 mm in diameter.
- The sample color should be uniform and consistent across the measurement area, with no fading or blemishes.
- The sample should be opaque (solid), not clear or translucent.
- Oddly shaped samples may require a fixture to allow proper positioning below the sample rail.
- Consistency in positioning should be maintained from standard to sample to achieve best results.
- The sample must not be positioned more than $\frac{1}{4}$ " (6.35 mm) from the bottom of the sample rail during a measurement (see illustration below).



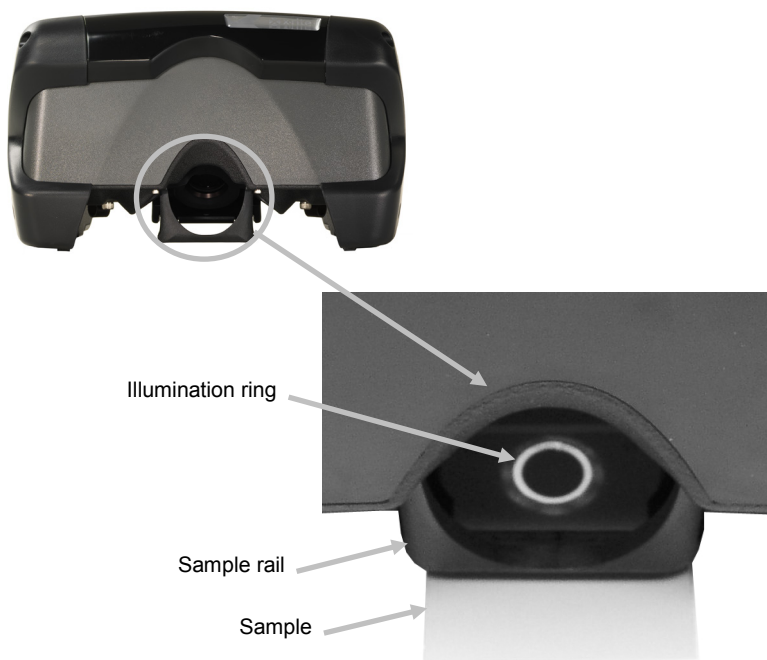
Illumination Ring Descriptions

- **Slow flashing illumination ring (1 per second)** – Indicate the instrument is up and running and ready to take a measurement.
- **Solid green illumination ring** – Indicate that the instrument is not ready to measure. This could typically occur when the instrument is first powered up and is waiting to stabilize. You must wait until the illumination ring starts flashing before you can take a measurement.
- **Rapid flashing green illumination ring (8 per second)** - Indicates a system error/failure. If this occurs, the instrument is not functioning and cannot be used until the problem is resolved.

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Measurement Procedure

1. From the software application, set the aperture size (6 mm or 12 mm) that is to be used for sample measuring.
2. If the sample is flat, slide it under the sample rail until the area to measure is positioned within the illumination ring.



If the sample is large or oddly shaped, lift the instrument and position it on the sample, or rest the instrument on its back and position the sample below the sample rail. Use the illumination ring to guide the spot to the desired location.

3. Initiate the measurement from the software application.

3. Cleaning the Instrument

Your instrument requires very little maintenance to achieve years of reliable operation. However, to protect your investment and maintain measurement accuracy, a few simple cleaning procedures should be performed once a week.

General Cleaning

The exterior of the instrument may be wiped clean with a cloth dampened in water or mild cleaner.



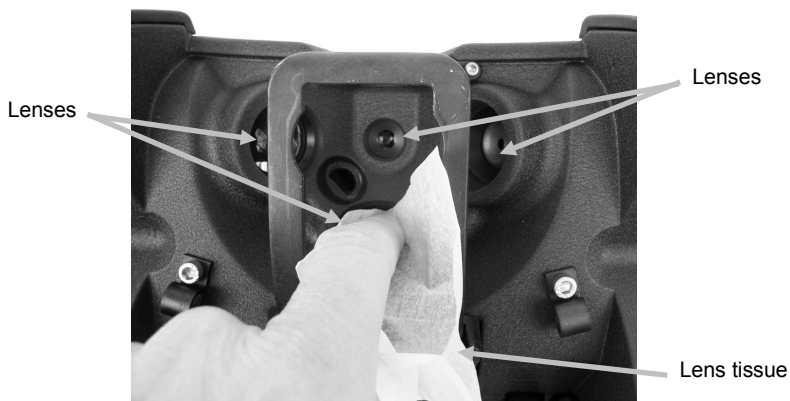
NOTE: DO NOT use any solvents to clean the instrument, this will cause damage to the cover.

Cleaning the Instrument Lenses (weekly)



NOTE: Use of an abrasive material or unnecessary rubbing may scratch the lens surface and eventually cause permanent damage.

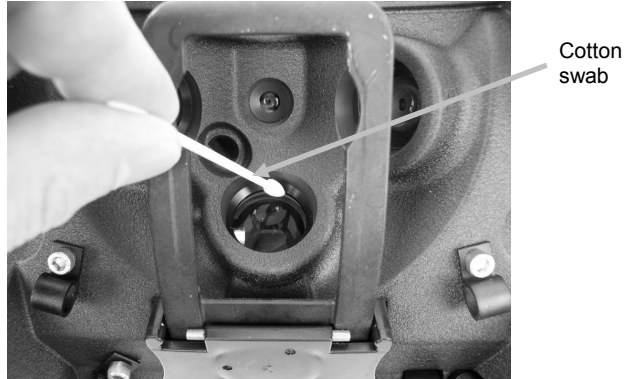
1. Turn the instrument over so that it is resting on its top.
2. Using one of the supplied lens cleaning tissues, clean all four lenses by wiping in a circular motion.



After performing step 2, a certain amount of debris will accumulate around the outer edge of the lens that must be removed. Continue with step 3.

3. Using one of the supplied cone shaped cotton swabs, clean the outer edge of each lens ring to remove remaining accumulated debris.

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4. Turn the instrument back over and clean the calibration reference. Refer to Cleaning the White Calibration Reference that follows.

Cleaning the White Calibration Reference (weekly)

Caution should be used when cleaning the cal plaque. Do not touch the white reference.

1. Use clean, low-pressure air to remove any dust or debris from the white reference. If a more thorough cleaning is required, clean with one of the supplied wipes.



Caution: If the calibration reference is cleaned with the supplied wipes, wait at least 20-30 minutes before performing a calibration.

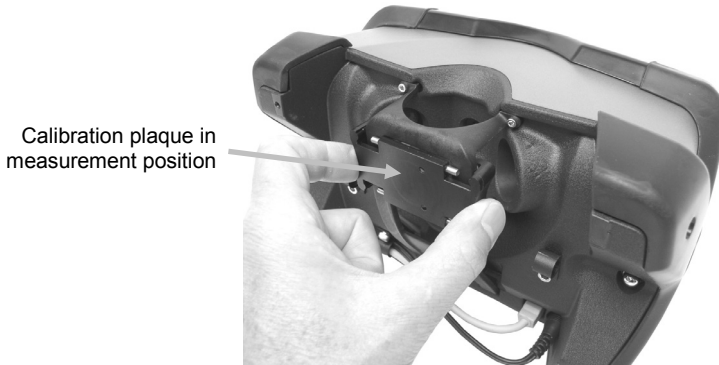
2. Perform a white calibration. Refer Section 4 for procedure.

4. Calibrating

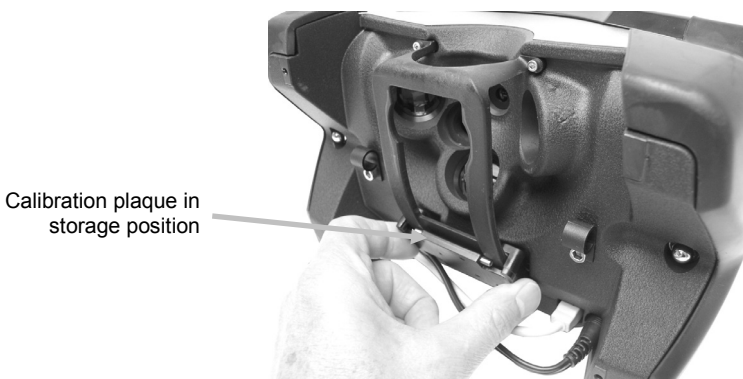
The VS450 should be calibrated at least once a week. The calibration reference is mounted on the back side of the sample rail. Refer below for calibration procedure.

After a calibration is initiated:

1. Tilt the instrument towards the back and slide the calibration plaque to the front position on the sample rail until it stops.



2. Lower the instrument and select the appropriate option in the software application to initiate the calibration measurement.
3. After measurement is completed, tilt the instrument back again and slide the calibration reference back into its storage location.



4. If required, lower the instrument and initiate a second measurement. This measurement is to ensure that the calibration plaque has been slid back into its storage location.

5. Appendices

Service Information

X-Rite provides repair service to their customers. Because of the complexity of the circuitry, all warranty and non warranty repairs should be referred to an authorized service center. For non warranty repairs, the customer shall pay shipping and repair cost to the authorized service center, and the instrument shall be submitted in the original carton, as a complete unaltered unit, along with all the supplied accessories.

X-Rite, Incorporated has offices around the world. You can contact us using one of the following methods:

- To identify the X-Rite service center nearest you, please visit our web site (www.xrite.com) and click the **Contact Us** link.
- For online help, visit our web site (www.xrite.com) and click the **Support** link. Here you can search for software or firmware updates, white papers, or frequently asked questions which can quickly resolve common user problems.
- Send an e-mail to Technical Support (casupport@xrite.com) detailing your problem and listing your contact information. Use "**VS450**" as the subject in your email.
- For sales questions or to order cables and accessories, visit our web site (www.xrite.com) or contact your nearest X-Rite dealer or service center.
- Problems and questions can also be faxed to your local X-Rite office listed on our web site. You may also contact X-Rite using one of the numbers listed on the back page of this manual.

Troubleshooting Tips

Prior to contacting X-Rite support department for instrument problems, try the applicable solution(s) described below. If the condition persists, contact us using one of the methods listed in the Service Information section.

Instrument not responding:

- Ensure power supply is connected to the instrument and the AC wall receptacle.

Measurement error or results appear inaccurate:

- Problem with the sample or sample positioning. Refer to Important Sample Information in Section 2.

Repeated calibration failures:

- Clean the calibration reference. Refer to Cleaning the Calibration Reference.

Repeated sample measurement failures:

- Ensure the sample is being positioned correctly. Refer to Important Sample Information in Section 2.
- Calibrate the instrument.
- Close and reset the software application.

Instrument and software not communicating:

- Check the USB cable connection.
- Close and restart the software application. If this does not solve the problem, reboot the computer.
- Remove power from the instrument, reapply power and see if the condition is corrected.

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Technical Specifications

Instrument Type:

Spectrophotometer with gloss sensor

Geometry:

45°/0° dual illumination, 45° gloss

Illumination:

Full spectrum LED

Spectral Engine:

True Dual beam, 31 channel

Spectral Range:

400 – 700 nm

Spectral Interval:

10 nm measured, 10 nm output

Measurement Range:

0-150% reflectance

Calibration Interval:

Once per week or temperature shift > 14° C (25.2°F) – self detected

Measurement Spot Size:

6 mm (1/4") and 12 mm (1/2")

Measuring Distance:

38 mm (1-1/2") nominal lens to measuring surface

Short Term Repeatability:

12 mm 0.025 dE_{ab}, maximum (white ceramic tile)

6 mm 0.035 dE_{ab}, maximum (white ceramic tile)

Inter-Instrument Agreement:

12 mm 0.15 avg. dE_{ab}, (12 BCRA tiles)

6 mm 0.15 avg. dE_{ab}, (12 BCRA tiles)

Gloss Repeatability:

0-10 GU, ± 0.2 GU

10-100 GU, ± 0.6 GU

Gloss Reproducibility:

5-92 GU, 3.0 GU maximum, 1.5 GU average

Operating Temp:

10° - 40°C (50° - 104°F)

Humidity:

0 - 85% relative, non-condensing

Storage Temp:

-20° - 70°C (-4° - 158°F)

Communication:

USB 2.0

Operating Voltage:

24 VDC ±2 VDC @ 1.2 A Max.

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LED Life:

> 20 million flashes

Functional Size:

L: 9.75 in. (24.80 cm), W: 6.0 in. (15.24 cm), H: 5.57 in. (14.60 cm)

Functional Weight:

4.931 lbs. (2.24 kg)

Safety Compliance:

UL 61010-1, CSA 22.2 No. 1010.1 and IEC (EN) 61010-1

Usage:

Indoor Only

Altitude:

2000 m

Pollution Degree:

2

Overvoltage:

Category II

Design and specifications subject to change without notice.

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