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Color and Appearance Measurement Systems

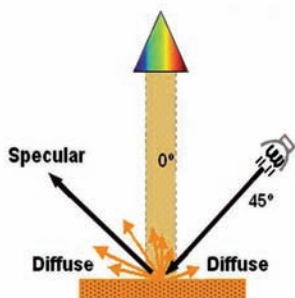


Color Instruments

To Best Meet Your Application Needs



45°/0° Geometry



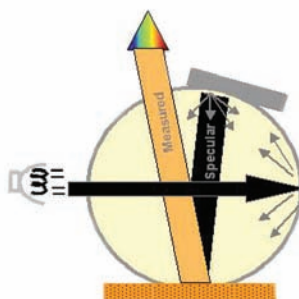
For the blue sample shown above, a d/8° (also called sphere) geometry instrument will tell you that the sample is the same color on both sides. A 45°/0° (or 0°/45°) geometry instrument will indicate that the halves are different. Which is right? That depends on your need.

If you want to know how the sample appears to your customer, then the 45°/0° geometry is the most appropriate. A 45°/0° instrument excludes the glare from the sample (specular excluded) and sees both the effect of the sample's coloration and the effect of its gloss or texture. This is how your customer visually sees it.

If you need to know only the sample's coloration, then the d/8° geometry is most appropriate. The d/8° instrument includes the

sample glare (specular included) and will only see the effect of sample coloration, ignoring the gloss or texture effect. Its measurements will not always agree with what you see. Some d/8° instruments have a mode that approximates specular excluded; however measurements in this mode are less precise than those of a 45°/0° instrument.

d/8° Geometry



Many HunterLab d/8° geometry instruments can measure light transmitted through transparent samples and some also measure transmission haze. The use of sphere geometry is the most effective way to measure the transmitted color of turbid or hazy samples since measurement errors from light scattering variations are minimized.

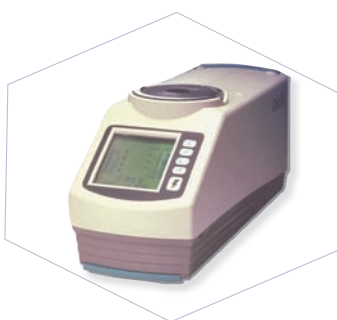
45°/0° Geometry Instruments



LabScan® XE
0°/45°

Our most versatile high performance 0°/45° spectrophotometer measures reflectance of smooth solids, highly textured solids, pellets, granules, powders, pastes and liquids.

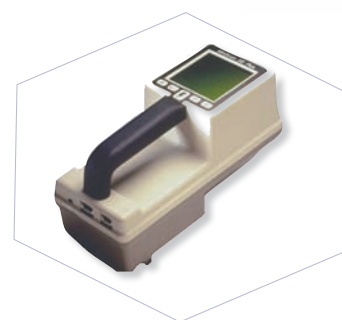
- Provides highest precision of 0°/45° and 45°/0° geometry instruments.
- Wavelength range 400-700nm, with 10nm data interval.
- Large illuminated area of 44mm (1.75 in), optional from 44mm (1.75 in) to 3mm (0.13 in) in 5 steps.
- Optional calibrated and controlled UV illumination.



ColorFlex®
45°/0°

A basic, yet flexible, self-contained 45°/0° spectrophotometer that measures reflected color of smooth to slightly textured solids, powders, pastes and liquids.

- Wavelength range 400-700nm, with 10nm data interval.
- Viewed sample area of 25mm (1.00 in).
- Requires very little bench space.
- Stores up to 1000 measurements.
- Uses internal software. Can be connected to PC for use with optional EasyMatch® software.



MiniScan® XE Plus
45°/0°

Our portable 45°/0° spectrophotometer can be taken to the production floor or to the field.

- Wavelength range 400-700nm, with 10nm data interval.
- Choice of viewed sample area: 25mm (1.00 in) or 5mm (0.20 in).
- Fully portable, one handed operation.
- Stores up to 1000 measurements.
- Uses internal software. Can be connected to PC for use with optional EasyMatch® software.

d/8° Geometry Instruments



UltraScan® PRO
d/8°

The professional color measurement spectrophotometer that is ideal for precise color measurement of liquids and solids; also transmission haze.

- Wavelength range 350nm-1050nm, with 5nm data interval.
- Measures reflectance, transmittance and haze.
- Sample reflectance measurement areas: 25mm (1.00 in), 13mm (0.50 in) and 7mm (0.25 in).
- Automated control of Specular Component Included/Excluded, Large and Small Area View lens and UV control filter using supplied fluorescent standard.
- Uses 15.2cm (6.0 in) sphere.



UltraScan® VIS
d/8°

The visible range color measurement spectrophotometer that scans the entire wavelength range recommended by the CIE.

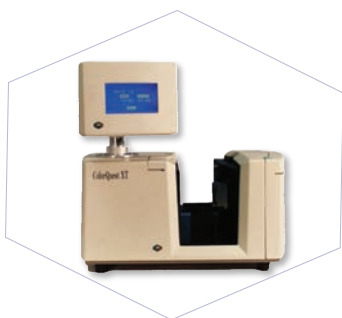
- Wavelength range 360nm-780nm, with 10nm data interval.
- Measures reflectance, transmittance and haze.
- Sample reflectance measurement areas: 25mm (1.00 in) and 9.5mm (0.37 in).
- Automated control of Specular Component Included/Excluded, Large and Small Area View lens and UV control filter using optional fluorescent standard.
- Uses 15.2cm (6.0 in) sphere.



ColorQuest® XE
d/8°

The economical d/8° spectrophotometer for both reflectance and transmittance measurements.

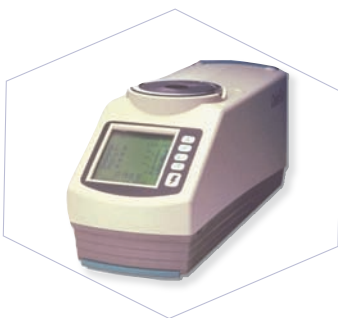
- Wavelength range 400nm-700nm, with 10nm data interval.
- Measures reflectance, transmittance and haze.
- Sample reflectance measurement areas: 25mm (1.00 in) and 9.5mm (0.37 in).
- Automated control of Specular Component Included/Excluded and Large Area View/ Small Area View lens.
- Uses 15.2cm (6.0 in) sphere.



ColorQuest® XT
d/8°

Our self-contained transmittance measurement spectrophotometer for transmission measurement only.

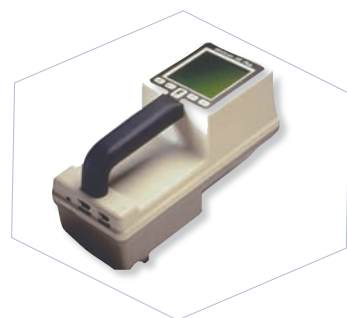
- Wavelength range 400nm-700nm, with 10nm data interval.
- Measures transmitted color of liquids and solids.
- Has easy to use LCD touch screen display.
- Includes metrics for resins, solvents, acids, oils and beer, plus CIE color scales.
- Uses 15.2cm (6.0 in) sphere.



ColorFlex®
d/8°

A basic, yet flexible, self-contained d/8° spectrophotometer that measures reflected color of smooth to slightly textured solids, powders, pastes and liquids.

- Wavelength range 400-700nm, with 10nm data interval.
- Viewed sample area of 8mm (0.30 in).
- Requires very little bench space.
- Stores up to 1000 measurements.
- Uses 6.35cm (2.5 in) sphere.
- Uses internal software. Can be connected to PC for use with optional EasyMatch® software.



MiniScan® XE Plus
d/8°

Our portable d/8° spectrophotometer can be taken to the production floor or to the field.

- Wavelength range 400-700nm, with 10nm data interval.
- Choice of viewed sample area: 20mm (0.80 in) or 8mm (0.30 in).
- Fully portable, with one-handed operation.
- Stores up to 1000 measurements.
- Uses 6.35cm (2.5 in) sphere.
- Uses internal software. Can be connected to PC for use with optional EasyMatch® software.



Sample Handling Devices

Numerous specialized sample handling devices are available to enable optimum sample presentation for a wide range of samples. We will even design a custom device for your specific application.

D25LT

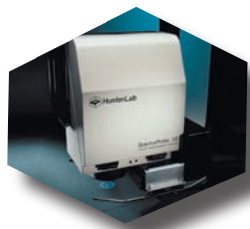
Colorimeter



The large viewing area tristimulus colorimeter for measuring the color of coarse, non-homogeneous and irregularly shaped products. It can be used in the food industry to measure samples such as cookies, crackers, chips, beans, spices, pasta and soups or in other industries to measure products such as ceiling tile, carpet, chemicals and minerals.

- Large sample measurement area of 9.5cm (3.75 in).
- Large touch screen display.
- Available with sample port facing down or up.
- Built-in printer for hard copy.
- Data output to network and PC.
- Convenient sample positioning devices.

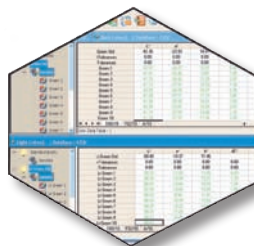
On-Line Instruments



HunterLab on-line instruments make real time color measurements of your product, without contact or intrusion, as it is being produced. From beginning to end, production runs can be continuously monitored to identify color variation and out-of-spec product. Both 45°/0° and d/8° geometry systems are available. Current applications include:

- Building Products - glass, siding, plastic, lumber, insulation and roofing
- Food - processed, baked, fried, and roasted
- Paint - coated aluminum and steel
- Paper - lightweight low opacity paper, coated board, fine paper, and colored/white paper
- Plastic - pellets, film, and extruded sheet products
- Textile - denim dyeing, automotive fabric, carpet, dyeing/finishing, and continuous dyeing for apparel fabrics
- Other - crushed stone, fertilizer

System Software



Several software packages are available for use with HunterLab systems.

- **EasyMatch® QC** is a versatile color quality control package that is used with our bench-top and portable spectrophotometers. The EasyMatch QC-ER version meets the software requirements for 21CFR Part 11.
- **EasyGroup Software** sorts and sequences samples of similar shade.
- **EasyMatch® Coatings** is a color formulation package for paint. It lets you formulate new colors, reformulate existing colors, make batch corrections and work off waste.
- **EasyMatch® On-Line** is used with our on-line spectrophotometers for real time continuous color measurement. It can be used with up to four sensors through one server computer and to use multiple client computers to communicate with the sensors through the server.

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