Presenting...

UltraScan® PRO

The Professional Color Measurement Spectrophotometer

HunterLab

Measure Color...Measure Quality

UltraScan® PRO

The ultimate color measurement system

UltraScan PRO is a high-performance color measurement spectrophotometer. It provides the data dependability required for both research and quality control applications. Because of its exceptional inter-instrument agreement, precise spectral measurement and unsurpassed long term stability, you can be confident that differences between measurements are due to product color changes, not instrument variability. Materials on the borderline of accepted tolerances will not be unnecessarily rejected.

The UltraScan PRO measures both reflected and transmitted color as well as transmission haze and meets CIE, ASTM and USP guidelines for accurate color measurement. The instrument's 5nm optical resolution enables it to precisely measure colors with sharp cutoff characteristics. Its D65 illumination source is calibrated in both the ultraviolet and visible regions for the accurate measurement of whitening agents and fluorescent colors. Having an extended measurement range, into both the near infrared and near ultraviolet, permits the measurement of camouflage materials and UV blockers. Both a reflectance tile and a didymium transmission filter are provided as check standards to verify instrument performance. UltraScan PRO uses diffuse/8° geometry with automated specular component inclusion/exclusion. It also features three sizes of sample measurement areas with automated lens change. These measurement capabilities, along with a host of specialized sample handling devices, make UltraScan PRO the most versatile high-performance color measurement spectrophotometer available. Contact your HunterLab representative for a detailed specification sheet.

Exceptional Performance

The high intensity xenon flash lamps used in the UltraScan PRO ensure accurate readings on all colors, including those that are dark and highly saturated. Even carbon black can be measured. The light source generates virtually no heat, eliminates the effect of ambient light, and requires no warm-up. UltraScan PRO uses diffuse/8° geometry with an integrating sphere, permitting both reflection and transmission measurement. For transmission measurement, the sphere geometry virtually eliminates errors introduced by sample turbidity and haze. The dual beam optical system has two state-of-the-art holographic grating polychromators with an effective bandwidth of 5nm. Having an extended wavelength range of 350nm to 1050nm enables the measurement of camouflage materials and solar glazing. Measurements of the entire spectral range are made in a matter of seconds. Spectral data is taken every 2nm and reported for every 5nm. Tristimulus color calculations are performed using 5nm data from 360nm to 780nm as recommended by the CIE.

Easy to Use

UltraScan PRO incorporates many automated functions to make operation simple and reliable. Status indicator lights visually indicate selected mode and reduce the chance of error in instrument setup and operation. Specular included/excluded modes, UV control and sample viewing areas are all under computer control. Additionally, a read button is located close to the sample port for convenient initiation of sample measurement and a sample viewing screen assures the position of small samples at the reflectance port. For system communication both USB and RS-232C outputs are provided.

Unsurpassed Versatility

Use UltraScan PRO for both research and quality control. From opaque solids to clear liquids to transparent films, UltraScan PRO precisely measures both reflected and transmitted color, spectral reflectance, spectral transmittance and transmission haze. A host of measurement features and specialized sample handling devices make UltraScan PRO the most versatile high-performance color measurement spectrophotometer available.

Measure

- Absorbance
- Brightness
- Color
- Haze
- K/S
- Metamerism
- Opacity
- Reflectance
- Strength
- Transmittance
- Whiteness
- Yellowness

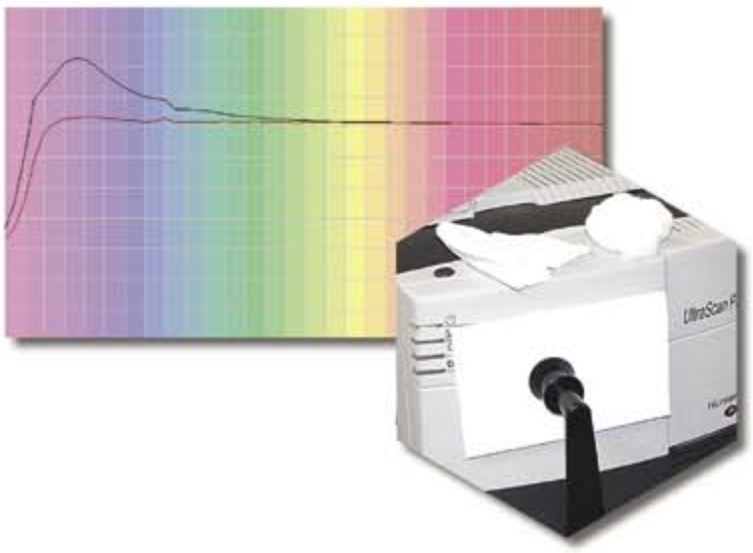
Versatile Transmission Compartment

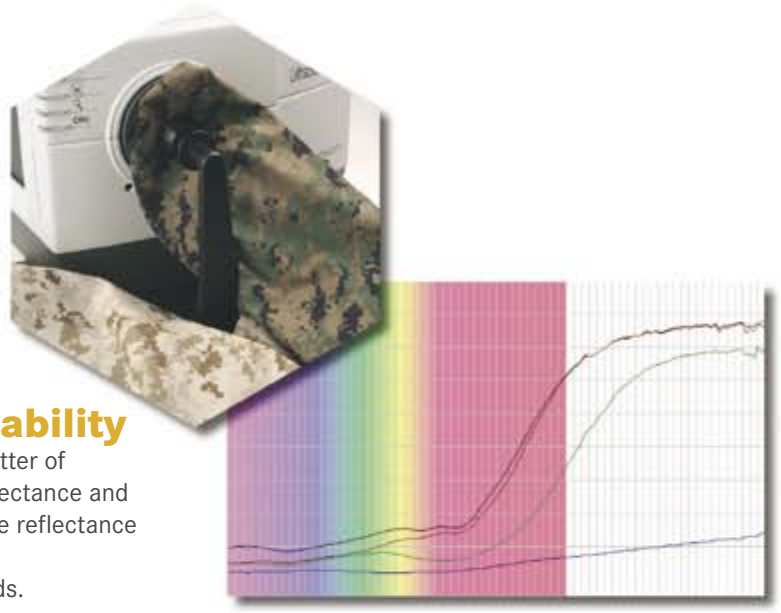
The transmission compartment of UltraScan PRO makes measuring over-sized samples easy and accommodates various sample handling devices. Yet it is capable of measuring liquid volumes as small as 0.4ml. The spacious compartment is open on three sides so you have access from either side or from the top of the sensor. It accommodates thin films, sheets, solids and transmission cells with path lengths up to 80mm. Samples can be positioned to make regular and total transmission measurements.

- **Regular (Direct) Transmission** – with the sample close to the lens system is most similar to traditional UV-VIS spectrophotometer geometry; however, measurement precision is affected by sample haze and turbidity.
- **Total Transmission** – with the sample close to the sphere is the most precise way to measure transmitted color. The effect of sample haze and turbidity on measurement precision is minimized.

Automated UV Control

To measure materials that have UV induced fluorescence, such as optical brighteners, the UltraScan PRO uses D65 illumination that is precisely calibrated and controlled in the ultraviolet. A UV control filter is motorized and automated for convenient system calibration using the fluorescent standard provided with the instrument. This filter can also be fully inserted into the light path to exclude UV energy. Additionally, UltraScan PRO has the ability to measure sample reflectance and transmittance as low as 350nm, permitting the measurement of UV blocking characteristics of coated glass, sunglasses and other UV absorbers.





Near Infrared Measurement Capability

Having the ability to scan from 350nm up to 1050nm in a matter of seconds, the UltraScan PRO is capable of measuring NIR reflectance and transmittance of a wide range of materials. These include the reflectance of paint, plastic and textile camouflage materials and the NIR characteristics of architectural glass and plastic security cards.

Versatile Sample Clamp

Large, small and odd shaped samples are all easily positioned at the reflectance port with the over-sized, spring-loaded sample clamp. Two quick release buttons allow you to adjust and set the clamp position. The clamp pulls down a full 180° and can be pulled out in small increments to accommodate thick samples or be removed entirely.

Multiple Sample Apertures

Three reflectance measurement apertures are provided with the UltraScan PRO to enable you to use the size that is appropriate for your sample. They are 25mm (1.00inch), 13mm (0.50inch) and 7mm (0.25inch) in diameter with respective optical viewing areas of 19mm (0.75inch), 9mm (0.35inch) and 4mm (0.16inch). The back of these apertures have a white coating to maintain sphere efficiency. The user selects a viewing area and the system automatically inserts the appropriate lens. To assure that the proper viewing area has been selected, the system monitors agreement between sample port inserts, lens position and standardization mode. Standardization modes can be stored, then quickly recalled, to speed and simplify multiple mode measurements. A sample viewing screen assures the position of small samples at the reflectance port.

Automated Specular Included/Excluded

A motorized port door permits measurement with the specular component included to measure reflected color without the effect of gloss or texture. The specular exclusion mode is used to measure color including the effects of gloss and texture. The port door position is controlled by the system computer which also stores standardization modes for quick recall when multiple mode measurements are desired.

System Features

- Diffuse/8° geometry with automated specular inclusion/exclusion
- Wavelength range of 350-1050nm with 5nm optical resolution
- Full wavelength scan in a matter of seconds
- D65 source illumination calibrated and controlled in the UV
- Sample measurement areas of 19mm (0.75inch), 9mm (0.35inch) and 4mm (0.16inch)
- Retro-viewer for viewing position of small area samples
- Transmittance path lengths up to 80mm
- Large transmission compartment open on three sides
- Read button for convenient initialization of sample measurement
- Status indicator lights visually indicate selected mode
- USB and RS-232C interfaces

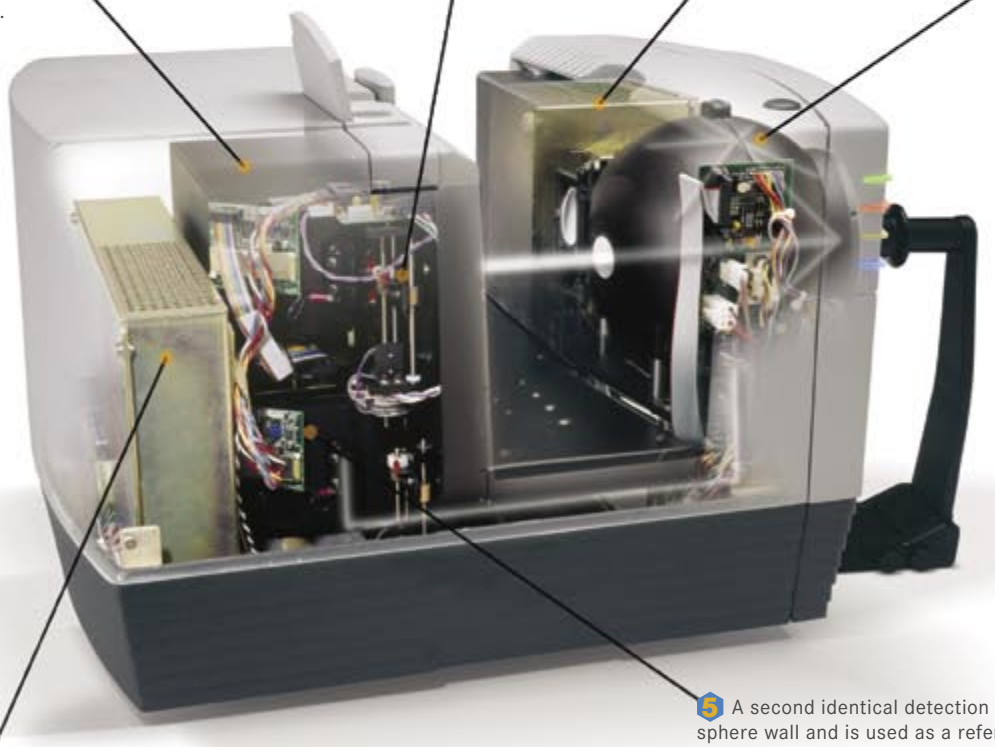
An Inside Look

1 Three long life xenon flash lamps mounted in a reflective lamp housing are used for illumination. The housing provides high reflectance and spatial mixing of the light before it is input to the integrating sphere. Filters are used to attenuate the xenon "spikes" and to balance ultraviolet to visible energy. A computer controlled UV attenuation filter is partially inserted into the light path to properly simulate D65 daylight. This filter can also be fully inserted to totally exclude UV energy.

2 The mixed and balanced source energy is now diffused by the 15.2cm (6inch) integrating sphere and is reflected by a sample at the reflectance port or transmitted through a sample in the transmission compartment. When measuring reflectance, a computer controlled port door at the integrating sphere is closed for Reflectance Specular-Included (RSIN) measurement and opened for Reflectance Specular-Excluded (RSEX) measurement.

3 The light reflected or transmitted by the sample passes through a lens system. For reflectance, these lenses are computer controlled for three measurement areas of 19mm (0.75inch), 9mm (0.35inch) and 4mm (0.16inch).

4 The light then passes into the polychromator where an aberration-corrected holographic concave grating disperses the light into its constituent wavelengths. After appropriate order sorting, light diffracted by the grating is detected by a High IR sensitivity, 512 element, linear array. The optical resolution of the system is 5nm and data taken every 2nm and is reported at 5nm increments over a range of 350nm to 1050nm.



5 A second identical detection system monitors the sphere wall and is used as a reference channel to remove flash photometric variations. To assure wavelength stability, both polychromators are automatically checked and adjusted to the centroid of a xenon emission line. To maintain the highest signal level, no fiber optics are used in either the sample or reference light path.

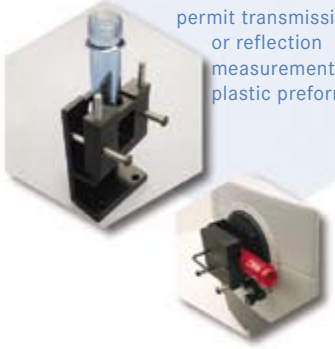
6 An internal processor controls sensor calibration and data processing. Communication is via USB and RS-232C ports. The UltraScan PRO outputs calibrated spectral data which is used by HunterLab software for data manipulation and presentation. Sensor drivers are available for use with other software.

Sample Handling Devices

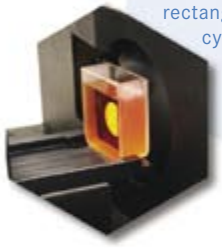
Numerous specialized sample handling devices are available to enable optimum sample presentation for a wide range of samples. Many of these devices are shown below. Contact your HunterLab representative for information on other devices or to have a custom device designed for your unique application.

- Reflectance Shelf to measure the color of nonsolid materials such as powders, pellets, granules and pastes

- Plastic Preform Holders permit transmission or reflection measurement of plastic preforms



- Transmission cell holders for rectangular, cylindrical, tall, and flow cells



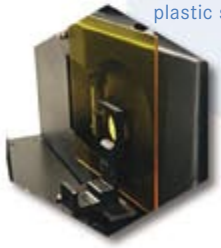
- Transmission Lens Holders for the measurement of ophthalmic lenses and blanks

- Semi-Micro transmission and reflection holders for measurement of small sample volumes

- Skein Holder for measuring yarn and string skeins

- Tablet and Capsule Port Inserts for reflectance measurement of tablets and capsules

- Transmission Clamp for transmission measurement of glass, plastic sheet and film



- Compression Cell Holder for compressing fibers for repeatable measurements

Dedicated to worldwide support through local representation, HunterLab provides over 50 years of experience to meet the color measurement needs of customers around the world. We offer the industry's most comprehensive set of end-to-end solutions – an integrated package of resources, from the complete array of instrumentation, software, and support services to training, education and decades of application knowledge.

HunterLab
Measure Color...Measure Quality

ISO 9001:2000 Certified

Hunter Associates Laboratory Inc., 11491 Sunset Hills Road, Reston, VA 20190-5280
Tel 703-471-6870 Fax 703-471-4237 sales@hunterlab.com • www.hunterlab.com

05/06