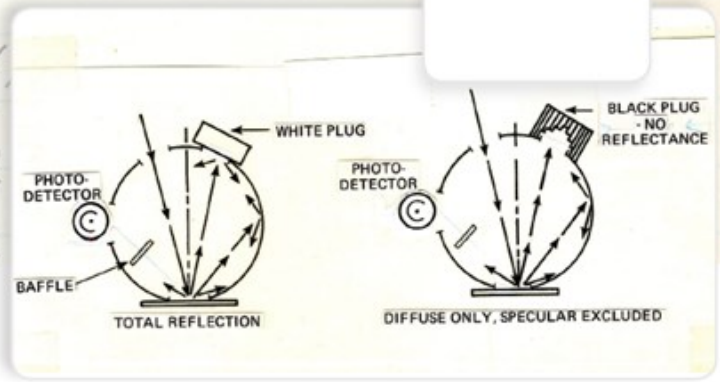
Applications Note

AN 1106



Comparing Analytical Spectrophotometers to HunterLab Instruments

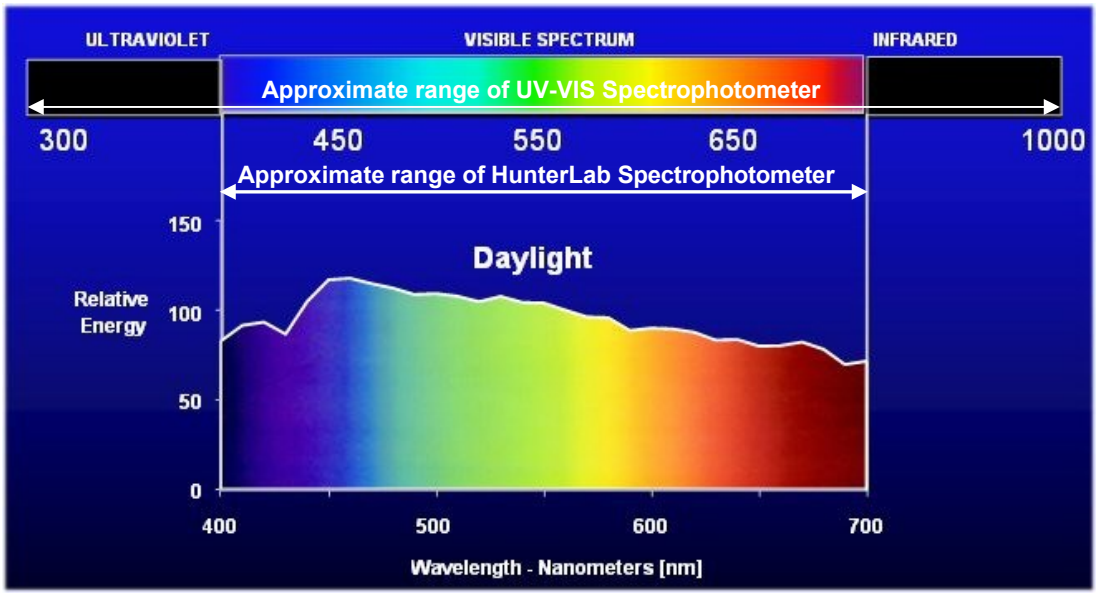
HunterLab spectrophotometers quantify the human perception of an item's color, a psychophysical phenomenon . . .

Abstract

Often workers in analytical laboratories ask what the difference is between their UV-VIS spectrophotometer and their HunterLab colorimetric spectrophotometer. This *Applications Note* details the differences between them and why both types might be needed in a single laboratory.

The world's true measure of color
HunterLab

A HunterLab spectrophotometer is a visible spectrophotometer, meaning that it measures light in the visible range of the electromagnetic spectrum (approximately 400-700 nm). As designed, its purpose is to quantify color as humans see it, and we can only see within this visible area. A UV- VIS spectrophotometer measures over a larger wavelength span, which includes the visible region of the spectrum and the ultraviolet region, and sometimes extends into the ultraviolet.

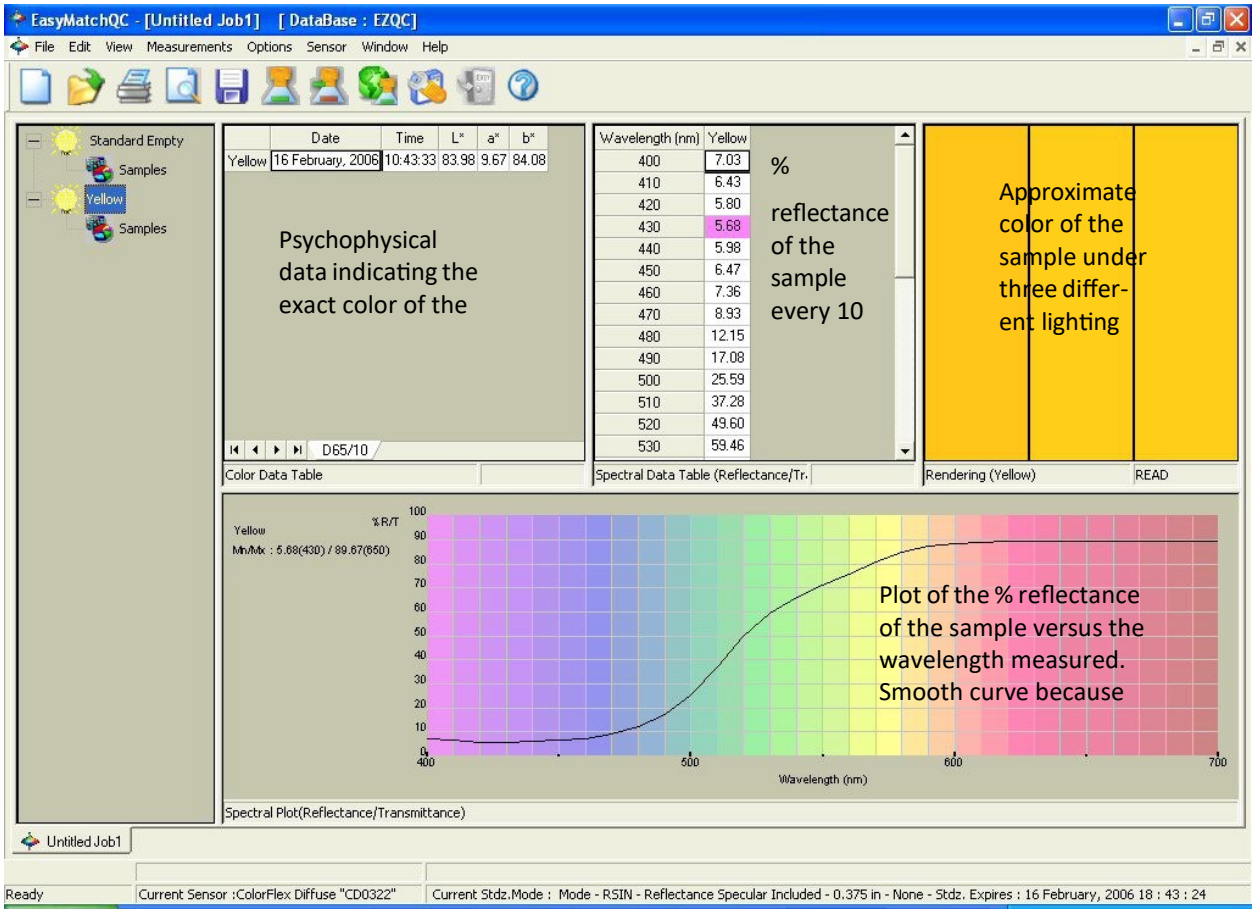


HunterLab spectrophotometers quantify the human perception of an item's color, a psychophysical phenomenon, while the focus of UV-VIS measurements is correlation to spectral data, a purely physical property.

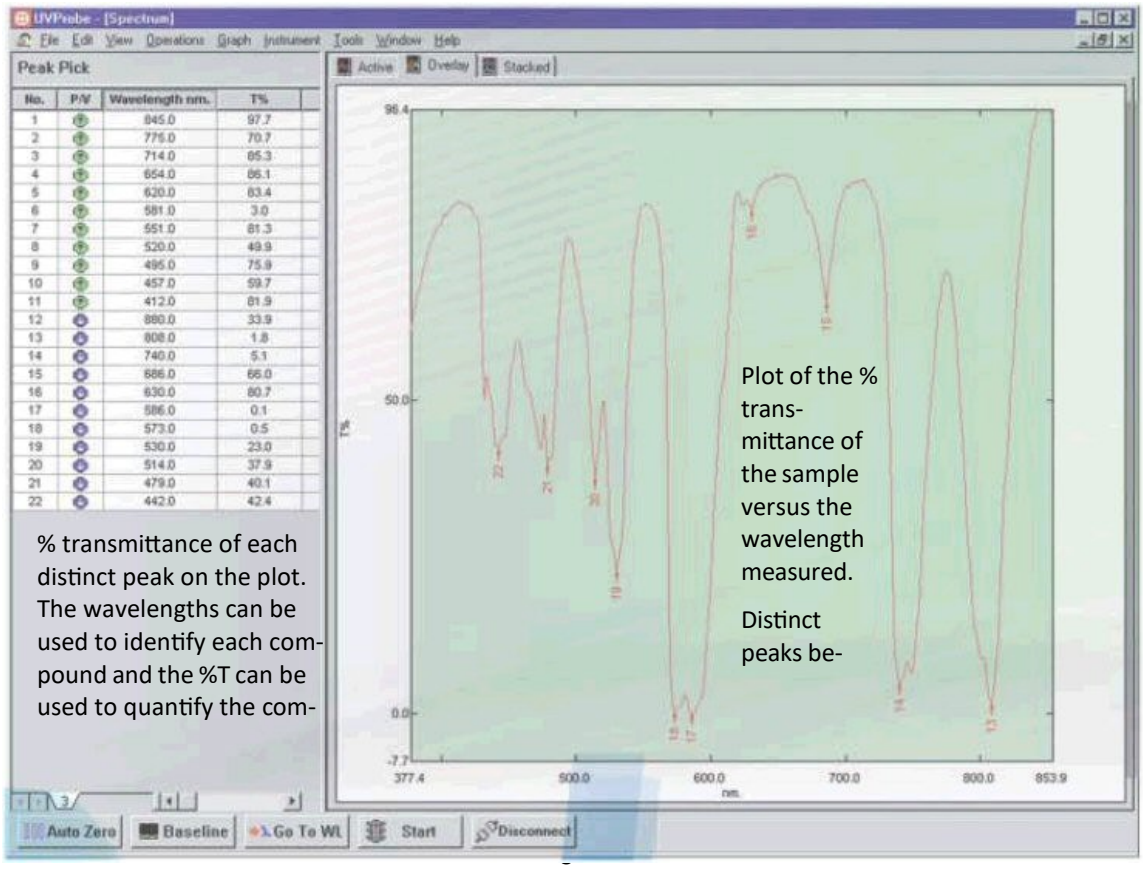
A HunterLab spectrophotometer attempts to answer the question "What color is it?" It only needs to measure every 5-10 nm to answer this question. A UV-VIS spectrophotometer normally answers a question like "How much of my chemical of interest is in it?" Because of this purpose, it will normally measure every 2 nm or less.

While the intended purpose of a HunterLab spectrophotometer is to quantify color, it can also report spectral reflectance and/or transmittance data at 5 or 10 nm intervals. An example of data obtained from a HunterLab spectrophotometer is shown on the next page.

Criteria	HunterLab Color Spectrophotometers	Analytical Spectrophotometers
Range	Limited to Visible Range	Ultraviolet, Visible, Infrared
Purpose	Measure Color	Chemical Characterization
Measurement	Spectral Data	Transmittance Data
Sample Type	Opaque, Translucent and Transparent	Transparent
Measurement Time	≤ 5 seconds	1 minute typically
Resolution	5—10nm	2nm or less



Here is an example of data obtained from a UV-VIS spectrophotometer.



HunterLab benchtop sphere spectrophotometers (Vista, UltraScan PRO, UltraScan VIS) can measure the transmittance of clear liquids and solids. Except for the Vista, they can also measure as the reflectance of translucent and opaque samples. HunterLab's other spectrophotometers (ColorFlex EZ, Agera, MiniScan EZ and Aeros) can measure the reflectance of translucent and opaque samples.

Analytical spectrophotometers typically measure only clear liquids in transmittance, and their 0°/0° measurement geometry makes them very sensitive to scattering when measuring hazy samples that scatter light. HunterLab's benchtop sphere instruments are more robust at measuring samples that scatter, and can quantify the degree of scattering (haze %.)

The measurement time for HunterLab spectrophotometers is under 5 seconds. The measurement time for most analytical spectrophotometers is much longer, typically about a minute, due to the extended scanning range and smaller scanning interval.

About HunterLab

HunterLab is the technology leader in color measurement solutions, providing instruments, software, knowledge and service to a wide variety of industries.
With over 5 decades of experience in more than 65 countries, HunterLab applies our leading edge technology to your products helping you measure and communicate color simply and effectively.

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