

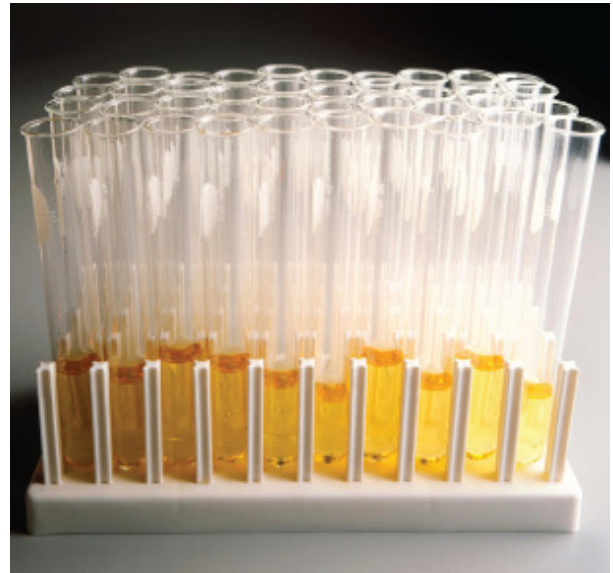
Application Note:

On-Line Monitoring of APHA Color (ASTM D1209) with a ClearView® db Photometer

Purpose: Measurement of APHA color (sometimes referred to as Hazen) either on-line or in a laboratory setting using a photometer.

Background: APHA is sometimes referred to as the Platinum-Cobalt (Pt/Co) or Hazen scale. Also referred to as a “yellowness index”, the APHA color scale is a common method of comparison of the intensity of yellow-tinted samples to assess the quality of liquids that are clear to yellowish in color. Originally developed to determine the purity of municipal water supplies, it is now used as a metric for purity in the water, chemical, oil, plastics, and pharmaceutical industries. APHA color quantifies the appearance of trace amounts of yellowness, which is a visual indicator of product degradation due to exposure to light or heat; the presence of impurities and negative effects of processing. As such APHA color is often used as a product release specification. APHA is a single number yellowness index. The units are based on a dilution of a 500ppm solution of PtCo. Distilled water has an APHA value of zero. The stock solution has an APHA value of 500. The APHA methodology is described in ASTM D1209 – “Standard Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)”.

Experimental: A series of standards for APHA color (100 to 500) were used to calibrate a ClearView db dual beam filter photometer. The ClearView db provides the ability to measure two separate sample locations on-line, in real time. The APHA color configured ClearView db has one analytical wavelength and one reference wavelength. The photometer is connected via fiber optics to a sample cell (flow cell or inline probe) with a 30 mm pathlength.



APHA - an index of “Yellowness”

ClearView db Photometer Enclosure Options



Zpurge Unit
Class I, Division 2

ExProof Unit
Class I, Division 1

General Purpose Unit

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Results: A simple linear regression was performed between the absorbance at 456nm and the APHA color values of the standards. This is shown in Figure 1 with an R^2 value of 0.999. (An R^2 value of 1 indicates a perfect correlation between the model and reference method). The ClearView db has long-term photometric drift of $<500 \mu\text{AU rms}$, which provides for excellent long term measurement stability.

In cases where a lower range of APHA values is required, a longer pathlength cell would provide the needed sensitivity.

Summary: The ClearView db can provide both on-line and laboratory measurement of APHA color over a wide range of values. The dual beam ClearView db filter photometer offers a high precision measurement and is an excellent choice, due to its linearity and repeatability. In addition, the ClearView db offers the option to connect to two different probe locations, thus minimizing the cost per sample point. The ClearView db can be configured for a variety of measurements and offers stable, long term performance.

