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REAL-TIME OPTICAL ABSORPTION ANALYZERS

APPLICATION NOTE

APHA Color (ASTM D1209) Using 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.

Measurement 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 500 ppm 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 our GUIDED WAVE™ ClearView® db Dual-Beam 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.

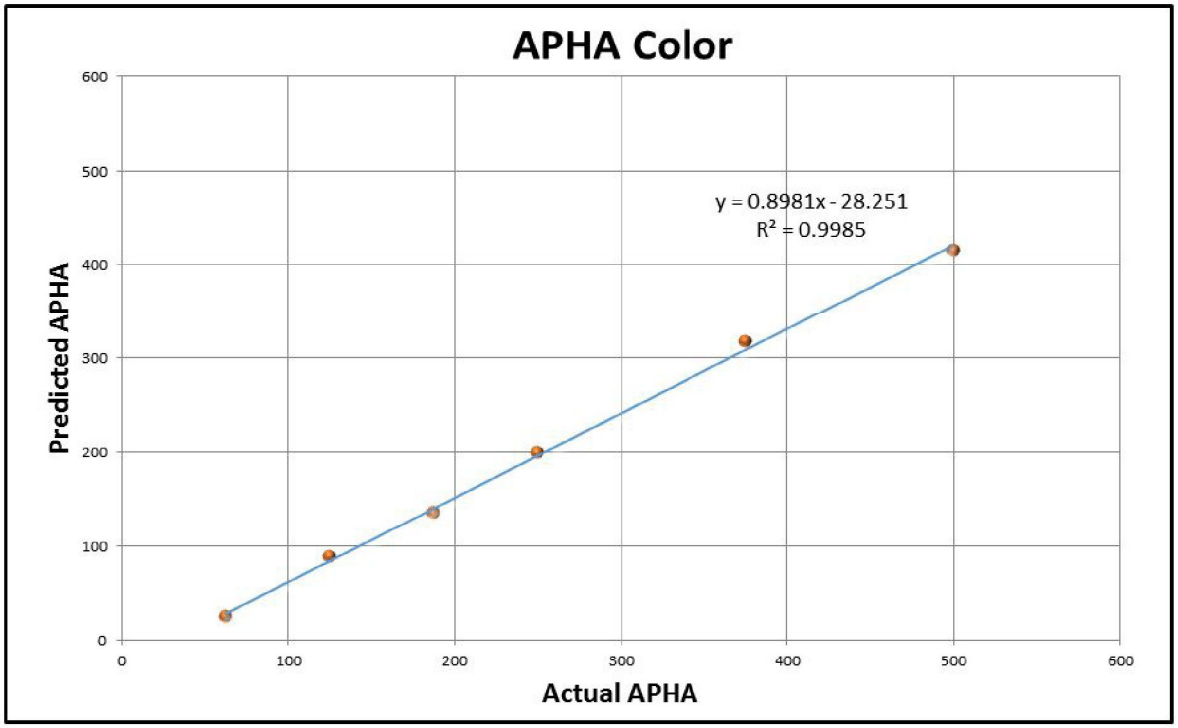

Figure 1

Results

A simple linear regression was performed between the absorbance at 456 nm and the APHA color values of the standards. This is shown in Figure 1 with an R2 value of 0.999. (An R2 value of 1 indicates a perfect correlation between the model and reference method). The ClearView db has long-term photometric drift of <500 µAU 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

Our 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. For more system specifications and information visit the Process Insights website.

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4140 World Houston Parkway Suite 180, Houston, TX 77032, USA +1 713 947 9591

Process Insights – EMEA

ATRICOM, Lyoner Strasse 15, 60528 Frankfurt, Germany +49 69 20436910

Process Insights – APAC

Wujiang Economic and Technology, Development Zone, No. 258 Yi He Road, 215200 Suzhou, Jiangsu Province, China +86 400 086 0106

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