

## APPLICATION NOTE

### 6.04 FOOD & BEVERAGE

## EBC BEER COLOR

The chemical reactions between amino acids and reducing sugars impart the characteristic brown and amber hues to beers. The color of beer influences the consumer's sensory anticipation of its taste. Monitoring beer color is essential for detecting any issues in the brewing process.

### APPLICATIONS

Color measurements are made with the Kemtrak beer color analyzer at various stages of the brewing process, including water preparation, wort preparation, post-filtration, and color dosing control during blending. At the blending stage, color measurements allow for precise control of color dosing using ingredients such as malt extract or rye malt beer. The color can be measured before dosing and then verified with a secondary Kemtrak beer color analyzer immediately afterward.

The separation of beer, water, and lye is a crucial application. During each CIP cycle, it is essential to remove product or lye from the production pipes using clear water to prevent the beer in storage tanks from being diluted. If this procedure ends too early, significant product losses can occur as beer may be discarded as wastewater. Conversely, if the purge continues too long, the beer will become diluted and undrinkable. After the CIP cycle, water is used to remove lye from the pipe system. Given that lye is an expensive chemical, a color/turbidity monitor can optimize these separation procedures, minimizing both material and product losses.

The absorption is measured in a 10mm cuvette, and if necessary, the sample is diluted until the absorption is below 2 extinction units (E430). The EBC color is then calculated as follows:

$$\text{EBC color} = \text{E430} \times 25 \times \text{dilution factor}$$

The EBC color system is predominantly used in Europe, while North and South America use the Standard Reference Method (SRM) to measure beer color. These two systems are closely related and can be converted using the following equations:

$$\text{SRM} = \text{EBC} \times 0.508$$

$$\text{EBC} = \text{SRM} \times 1.97$$

### INSTALLATION

Color is a crucial parameter in breweries, serving as a final quality control measure and at various stages of the brewing process. According to EBC standards, the color of beer, wort, and liquid malt is determined by measuring absorption at 430 nm, with compensation for potential errors from turbidity and fouling using a reference wavelength of 700 nm.



The Kemtrak DCP007 photometer uses fiber optic cables to transmit light to and from the measurement point, ensuring that the measurement cell contains no electronics, moving parts, or heat sources. Standard measurement cells are made from robust, sanitary-grade stainless steel and feature sapphire windows for long, maintenance-free operation.

Both dark and bright beers, as well as high gravity beer after blending, can be monitored and controlled by using different optical path lengths (OPL) with the Kemtrak beer color analyzer.



*Kemtrak beer color analyzer with a DN50 TriClamp measurement cell*

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