



TECH BRIEF

Platinum Cobalt (Pt-Co) / APHA / Hazen Color Scale

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What is the Platinum Cobalt (Pt-Co) / APHA / Hazen Color Scale?

The Platinum-Cobalt color scale, also known as the Pt-Co scale, is a colorimetric scale used to measure the depth of yellow color in liquids. This scale is based on a visual comparison to a standard solution of potassium hexachloroplatinate and cobalt chloride in water, providing a score or value ranging from 0 (clear) to 500 (deep yellow hue). Each increment on this linear scale represents a consistent change in color intensity, making it a widely used tool in various industries for monitoring and controlling the quality of products and water supplies.

Introduction

The Pt-Co scale is often referred to interchangeably with the Hazen scale and the APHA (American Public Health Association) scale. The term “Hazen” honors Allen Hazen, who originally devised the method, while “APHA” references the organization that adopted and standardized the method for broader public health applications. All three terms describe the same measurement system and are incorporated into national and international standards (ASTM D 1209, BS 5339:76 (1993), DIN 53409, ISO 6271-1:2004(E)) to ensure consistency in color quality assessments across many different fields.

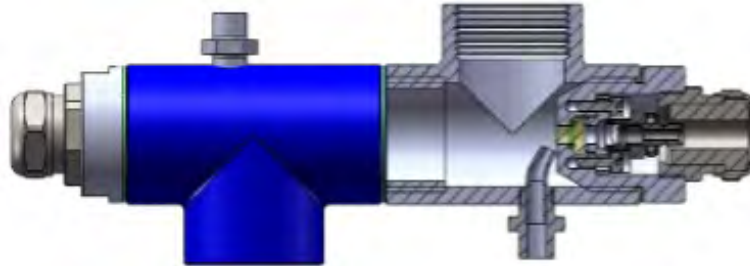


HOW IT WORKS

The Platinum-Cobalt color scale measures the “yellowness” of a liquid and this makes it well-suited for quality control and contamination detection. It is extensively used to evaluate pollution levels in wastewater and for drinking water quality control and regulation. While the Pt-Co scale was originally designed for visual comparison, modern applications often use instrumental methods such as absorbance photometry for greater accuracy and repeatability. Visual methods can be subjective, whereas instruments provide precise measurements. Abridged wavelength absorbance photometers, such as the Kemtrak DCP007, are online instruments that can accurately measure both highly colored and trace color levels with excellent repeatability. The Kemtrak DCP007 uses high-performance, long-life LED light sources channeled via robust industrial fiber optics through an inline optical measurement cell to provide highly precise measurements. The dual-wavelength, four-channel measurement technique allows accurate measurement of both highly colored and trace color levels with the same instrument. The use of absorbance photometry has extended the measurement range beyond the original 500 Pt-Co visual score limits, increasing the scale’s usefulness considerably. In the instrument, a primary “absorbing” VIS wavelength measures the overall liquid color, while a second NIR wavelength, which is not influenced by the liquid color, compensates for any entrained turbidity and/or fouling of the optical windows. The absorbance at these two wavelengths is combined to provide a true color result.

APPLICATION

Platinum-Cobalt color scores are used across a wide range of applications in many different industries. Here are some key applications:



Kemtrak stainless steel long path (OPL = 100mm) 1" pipe thread measurement cell with optional in-situ sapphire window cleaning nozzles

- **Water Treatment and Environmental Monitoring:** The Pt-Co scale is extensively used to assess the color of raw water, treated effluents, and wastewater, helping to detect pollution levels and ensure compliance with environmental regulations.
- **Pharmaceuticals:** The Pt-Co scale ensures the quality of liquid formulations such as intravenous solutions and medicines.
- **Beverage Industry:** The Pt-Co scale monitors the color consistency of various drinks to maintain brand quality and consumer acceptance.
- **Chemical Manufacturing:** A Pt-Co score is used to evaluate the purity and quality of solvents, reagents, and other chemical solutions.
- **Cosmetics and Personal Care:** Monitoring with the Pt-Co scale ensures the color quality of products like lotions and gels, helping to meet both consumer expectations and regulatory requirements.



Kemtrak DCP007 photometer system complete with long path (OPL = 200mm) measurement cell.

The Platinum-Cobalt color scale, encompassing the Pt-Co, Hazen, and APHA scales, is an essential tool for ensuring the quality and consistency of liquids across multiple industries. With the advent of advanced photometric technologies, the scale's application range has been significantly extended, allowing for more precise and reliable measurements. This advancement ensures that industries can monitor and maintain product quality, environmental compliance, and consumer safety to a high standard.

Learn More

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