

Wine Color Analysis

1. What is CIE ?

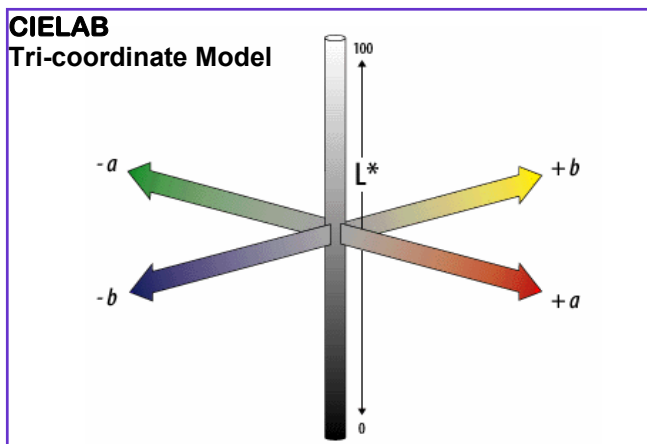
CIE is an abbreviation for the of the International Commission on Illumination based on the French title – Commission Internationale de l'Eclairage. The CIE is accepted as the best authority on the subject colorimetry and is recognized by ISO as an international body of standardization. The CIE color measurement systems are recognized as the ultimate standards for color communication.

2. What is CIELab ?

CIELab is a color measurement system adopted by the CIE in 1976. It is based on a three-dimensional color space. The system was developed to represent color in a manner that is consistent with human vision and proportional to perceived color differences. The CIELab system has been proposed as the new OIV standard for wine color determination.

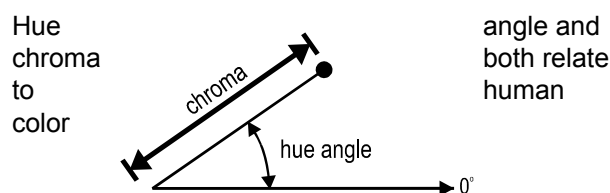
3. CIELab color system is sometimes referred to as a tri-coordinate system and sometimes as a tri-stimulus method. How are these related?

CIELab values describes the coordinates of a specific color in a three dimensional space. There are three axes: **L*** describing light to dark, **b*** for blue to yellow, and **a*** for red to green. The three coordinates were developed to mimic human color perception. Color information received by the human eye are translated into three distinct stimuli between the optical nerve and the brain. The three signals are light and dark, red and green, and blue and yellow.

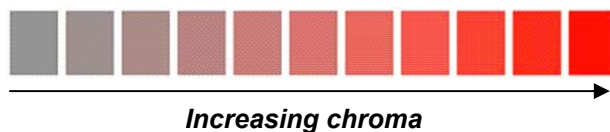


4. What are hue and chroma?

Any point in the three dimensional CIELab color space can be described by its **L*** **a*** and **b*** coordinates. The same point can also be described by **L***, hue angle and chroma. Hue angle is the angle of the line starting from the point to the zero origin. Chroma is the length of the same line.



perception. **Hue** is the attribute of color that is related to the perceived colors: red, yellow, green and blue or a combination of two of them. When you are talking about a named color you are usually referring to its hue. **Chroma** is defined as the chromatic intensity of a surface judged in comparison to a pure white. It is colorfulness. The colors below are all the same lightness (**L***) and the same hue angle. They vary in chroma from gray (chroma = 0) to brilliant red (chroma = 104).



An interesting interactive demonstration of hue angle, chroma and lightness can be found on a link from the ETS website page on Color Analysis.

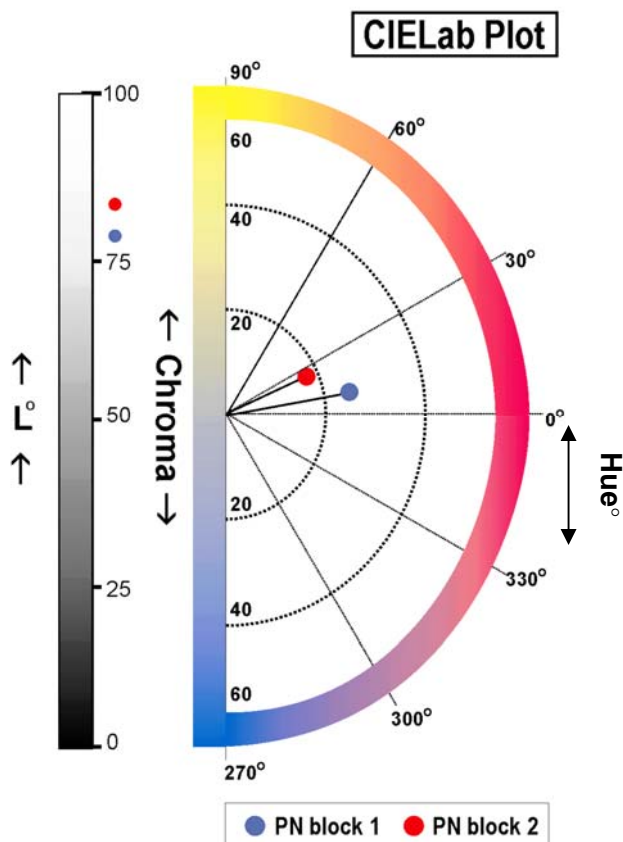
5. What is ΔE*?

The difference between two colors can be described by the total distance between those two colors in the three dimensional CIELab color space (**ΔE***). The units of **ΔE*** were designed so that a value of 1 would be equal to the least difference likely to have commercial importance. It is a commonly used value in quality control programs as it encompasses differences in hue, chroma and lightness. Differences in individual CIELab components are also shown on the report as **ΔL***, **Δa*** and **Δb***.

Wine Color Analysis

ETS Color Chart

Shows how we combine three dimensions: Lightness, Chroma, and Hue into a two dimensional display.



6. What does "Illuminant D650" mean?

The color of an observed object is influenced by the observation conditions. Just as the color of a paint chip would appear different under fluorescent lighting, incandescent lights, full sunlight or a cloudy sky, so the color of wine is affected by the viewing conditions. The CIELab coordinates represent color under precisely defined illumination conditions. D650 is one of the illumination choices. It represents the perceived color under a neutral gray sky. It has been chosen by the OIV as the standard illuminant for wine color description.

7. What does "std obs 10°" mean?

Our eyes do not see color uniformly across our entire field of vision. The very center of our eyes have a greater concentration light-dark receptors than color receptors. As a result, the size and/or distance of an object can influence its perceived color. The CIELab color system describes colors for a standard observer with a 10° field of view (std obs 10°).

8. What is the difference between the 420:520 ratio measurement of hue and CIE hue angle?

The 420:520 hue ratio is based on two wavelengths: the 420 nm indicating yellow and the 520 nm for red. In contrast, the CIE hue angle is based on the entire wine spectra. Hue angle is more descriptive of color nuance. As a result, it is more sensitive to subtle changes in wine chemistry and is a more accurate representation of color present. What's more, the CIE hue angle can describe any color. The 420:520 ratio is only appropriate for red wines.

9. Can you compare the same wine at two different dates?

Yes, wine color information can be databased at ETS and retrieved for comparison against itself at different points in the wine's life cycle. The key lies in the timing of the initial sample. Wines should be analyzed when they go to barrel to track color development during aging. Analysis performed at bottling provides a reference point for tracking changes in color after shipment.

10. Can you analyze turbid or cloudy wines?

Turbidity scatters light and can interfere with accurate measurement. Turbid samples- such as fermenting wines- should be centrifuged prior to analysis to remove particulates. Some very turbid samples-juices, for instance- may require filtration after centrifugation. Turbidity issues and any resulting treatments are always flagged and detailed in the comments section of the report.

11. Does this report work for white wines?

Yes, the report is extremely valuable for white wines. The CIE coordinates, hue angle, and chroma data provide very accurate descriptions of white wine colors, making up for the fact that 520 nm information has little relevance to white wines.

This document is a compilation of information and views from various sources provided for the convenience of our clients. Information provided in this document is provided "as is" without warranty of any kind, either expressed or implied, including but not limited to the warranties of merchantability, fitness for a particular purpose and freedom from infringement. User assumes the entire risk as to the accuracy and the use of this document. This document may be copied and distributed subject to the following conditions: 1) All text must be copied without modification and all pages must be included 2) All copies must contain ETS' copyright notice and any other notices provided therein 3) This document may not be distributed for profit. All trademarks are acknowledged. Copyright © ETS Laboratories 2001-2008.