

Strength Options in Datacolor TOOLS 2.x

Maximum Absorption Peak

The strength evaluation is based on the spectral data for a single wavelength, the wavelength of maximum absorption. It is the wavelength with the lowest %R value (the highest K/S value). This is the area of the spectrum where the colorant absorbs the most light and is a valid indicator of strength. This is one of the most common methods used for strength comparisons. The wavelength selection is made by the program, and is based on the reflectance or transmittance curve of the standard.

User Selected Wavelength

The strength evaluation is based on the spectral data for a single wavelength, the wavelength of maximum absorption. It is typically the wavelength with the lowest %R value (the highest K/S value). This is the area of the spectrum where the colorant absorbs the most light and is a valid indicator of strength. This is a common method used for strength comparisons. This method is similar to the wavelength of maximum absorption, except that the user determines the wavelength to be used for evaluation.

Sum K/S

This method calculates strength based on the sum of the K/S values across the visible spectrum.

CIE X, Y, and Z

This method calculates the strength by using a single tristimulus value (X, Y or Z) for the standard and batch. This method is often used when trying to compare the strength of similar, but not identical, materials. Colorimeters can only report tristimulus values, and this method is used when a history of strength evaluations generated from colorimeters has been collected for a colorant. The tristimulus value used in the evaluation should correspond to the band of the spectrum where the colorant has the greatest absorption. Typically, you would use X to evaluate blues and greens, Y to evaluate reds, and Z to evaluate yellows and some oranges. The tristimulus value used should correspond to a wavelength band where the colorant exhibits the greatest absorption.

NOTE: Colorimetric data is specific to an Illuminant/Observer condition. You should verify that the Illuminant/Observer condition you are using matches the conditions used to collect comparable data from a colorimeter.

Integral Strength

This strength method uses K/S weighted at each wavelength by the *standard observer* x , y , and z bar function.

Residual Color Difference

Residual color difference is the adjusted color difference using the integral strength value and is independent of concentration changes. By weighting the K/S values by the Standard Observer functions, the results may better correlate with your visual evaluation of the sample than does *Sum K/S*.

2

Integ Strength

Similar to *Integral Strength*, this method uses K/S, weighted at each wavelength by the *Illuminant/Observer* data. Separate Integ values are calculated for the standard and batch. By weighting the K/S values by the Standard Observer functions and the Illuminant, the results may better correlate with your visual evaluation of the sample than does either Sum K/S or Integral Strength methods.

Datamaster (ICS)

Uses the same Integ Strength calculation used by the Datamaster program offered by ICS. This option is provided to ensure consistency with legacy products.

B Depth (DIN Specification 53235/1)

Color depth is a measure of the intensity of a color sensation that increases with increasing saturation, and decreases generally with increasing brightness. This approach assumes that samples made at the same color depth appear to the observer as though they were made with the same concentrations of colorant of the same color intensity. There are two adjustment methods available for this option. The Kubelka-Munk method calculates strength by adjusting concentrations until the individual B values reach 0. The Schmelzter method calculates strength by adjusting concentrations until the Delta B reaches close to zero. Each of these B-Depth methods has a menu choice for the degree of adjustment.

Use System Strength Defaults

Only displayed for Std Menu, Strength Defaults. Rather than inputting a set of strength values to be applied to the standard, system defaults are used.

Specular Ref

This is a correction factor used to adjust the spectral data for index of refraction differences. The specular reflectance value represents the amount of light that is refracted at the sample surface and never penetrates the sample. For resin systems most commonly used in paint and plastics applications, and for translucent plastics applications measured in transmission mode, a value of 4.0 may be used. This is true for both opaque systems using reflectance measurements, and for translucent plastics measured using transmittance. For evaluating dyes in solution (transmittance mode), or dyes on a substrate (reflectance mode), a value of 0 is recommended.

Internal Ref

A second correction factor is included in the equation that adjusts for index of refraction differences. The internal reflectance value represents the amount of light that is scattered inside the sample and never emerges. For paint and plastics applications using reflectance measurements, a value of 60.0 may be used. For translucent plastics using measurements, a value of 0 is recommended. For dyes in solution or dyes on a substrate, a value of 0 is recommended.

Fixed Adj. Strength

This option is used to determine the effect of adjusting the strength of the batch to a value other than 100% strength of the standard. This is useful in cases where it is not physically possible or practical to adjust the strength of the batch to 100% of the standard. Often physical properties of the samples or the processing technique impose this limitation. Enter a number representing the target strength you want to use as the basis for comparison.

Wavelengths to Omit

This option allows you to omit specified wavelengths³ for use in the strength calculation. For example, in pigment applications in which the samples are mixtures of colorant and white, the maximum absorption wavelength may occur at 400 nm. In this case, the absorption is due to the white pigment, not the colorant. For this situation, the evaluation of the strength of this colorant at 400nm is not valid. Enter the first 2 digits of the wavelength—e.g., for 400 nm you enter 40.

Substrate *Only displayed for System Menu, Strength Defaults.*

When measuring translucent samples, the substrate shows through the colored layer, and contributes to the measurement. To get an accurate evaluation of the colorant strength, the measurement should be corrected for the substrate contribution. This option allows you to identify a stored measurement of the substrate being used. This measurement data can be used to correct the strength evaluation so that the evaluation is limited to the influence of the colorant only, and not the substrate. When this option is selected, a dialog box opens requesting the name of the sample to be used as the substrate measurement.