

Applications Note

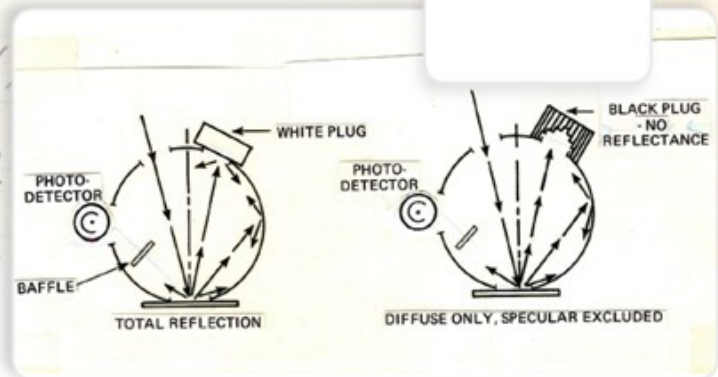
$\Delta = 2t + \frac{\lambda}{2}$ (must equal a whole number of λ for a bright fringe or

$$n\lambda = 2t + \frac{\lambda}{2}$$

$$t = \frac{n\lambda - \frac{\lambda}{2}}{2} = \frac{\lambda}{2} \left(n - \frac{1}{2} \right)$$

substituting
 $D^2 = 2s \left[\frac{\lambda}{2} \left(n - \frac{1}{2} \right) \right]$

AN 1107



Concentration Terms in Color Formulation

... To create a color recipe that matches the standard efficiently (i.e. with minimal waste of time and material).

Abstract

Percent Concentration, Percent Loading, and other concentration terms have different meanings depending on the type of product you are formulating—coatings, plastics, or textiles. The descriptions and examples in this Application Note are designed to help you understand these calculations.

Coatings

Percent Concentration: The amount of colored pigment being calibrated in a masstone, white letdown, or black letdown.

Masstones: Percent concentration is always 100%, since masstones are a single pigment dispersed in vehicle/resin.

White Letdowns: Percentage of entire mixture that is colored pigment. A white letdown is a small amount of colored pigment mixed with the white pigment. For example, a typical mixture would be a 10% letdown, where 10% is pigment and 90% is white. By weight for a 100 gram mixture, 10 grams would be pigment and 90 grams would be white.

Black Letdowns: Percentage of entire mixture that is colored pigment. A black letdown is a small amount of black pigment mixed with the colored pigment. For example, a typical mixture would be a 99% letdown, where 99% would be colored pigment and 1% would be black pigment. By weight for a 100 gram mixture, 99 grams would be colored pigment and 1 gram would be black. Black letdowns are used for bright yellows, oranges, and reds, and for chromatic colors where an opaque masstone cannot be achieved.

Specific Weight Weight of pigment per unit volume (pounds per gallon or pounds per liter). For example, 0.3 pound of pigment per gallon of paint has a specific weight of 0.30.

Plastics

Percent Concentration: The amount of pigment being calibrated in a masstone, white letdown, or black letdown. This is calculated based on total pigment and does not include resin.

Masstones: Percent concentration is always 100%, since masstones are a single pigment only.

White Letdowns: Percentage of entire mixture that is pigment. For example, 3 parts pigment in a total mixture of 100 parts is 3% pigment or "Pigment WLD 3%." The remainder of the pigment would be white.

Black Letdowns: Percentage of entire mixture that is pigment. For example, 97 parts pigment in a total mixture of 100 parts is 97% pigment or "Pigment BLD 97%." The remainder of the mixture would be black.

Percent Loading: The total amount of pigment in the total amount of resin. For example, 3 parts pigment in 100 parts resin is 3% loading.

In a formulation of 10% pigment A and 90% white at a 2% pigment loading in 1000 pounds of resin, the 2% load means that 20 pounds of pigment are to be used in 1000 pounds of resin. Of the 20 pounds of pigment, the percent concentration of pigment A is 10% (2 pounds) and percent concentration of white is 90% (18 pounds).

Textiles

The concentration terms used in textile applications depend on whether a batch or a continuous dying process is used.

Batch Process

Percent Concentration: The ratio of the weight of the dyestuff to the total weight of the substrate. For example, 3 pounds of dyestuff in a dye bath with 100 pounds of substrate has a concentration of 3%. The total percent in a textile dye formula does not add up to 100 as in coatings or plastics applications.

Liquor Ratio: The ratio of the amount of dye liquor to the amount of goods. A liquor ratio of 20:1 would be 20 mL (or grams) of liquor to 1 gram of substrate.

Continuous Process

Weight per Volume: The ratio of the weight of the dyestuff to the total volume of the dye liquor. For example, 3 grams of dyestuff in a dye bath with 1 liter of water would be a 3 g/L dye liquor.

About HunterLab

HunterLab is the technology leader in color measurement solutions, providing instruments, software, knowledge and service to a wide variety of industries. With over 5 decades of experience in more than 65 countries, HunterLab applies our leading edge technology to your products helping you measure and communicate color simply and effectively.

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12/2023

