Applications Note

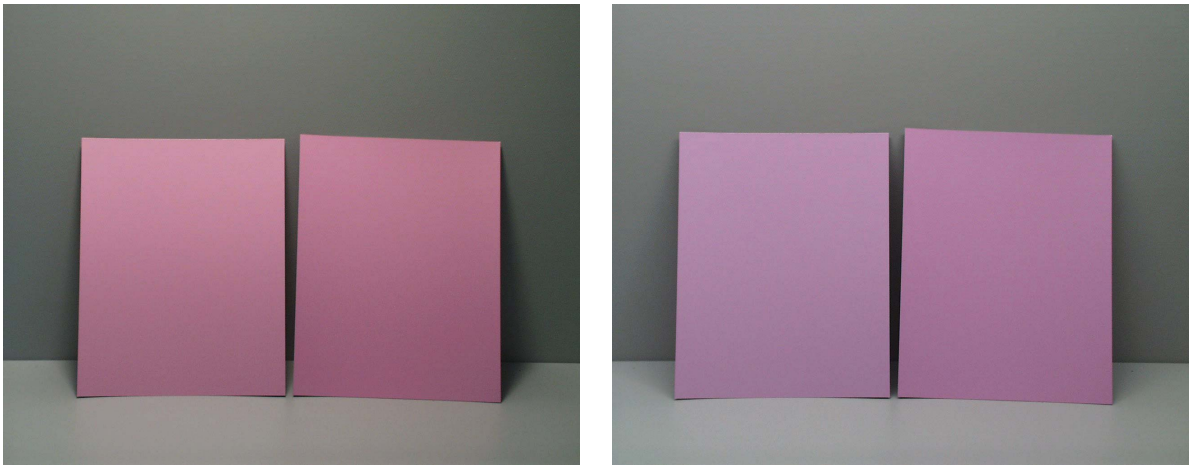
Insight on Color **Vol. 12, No. 11**

Color Inconstancy

Before we examine color inconstancy, let's review a bit about Metamerism Index, which is a very similar, but more commonly used, descriptor. For more information about Metamerism Index than what is given here, refer to the November 1995 and March 1997 *Applications Notes*.

Metamerism is the phenomenon by which the colors of two materials match under some lighting conditions (illuminants), but not under other lighting conditions. This was witnessed, for example, at a wedding, where a bridesmaid's dyed shoes appeared to perfectly match her yellow dress under the subdued incandescent lighting inside the church, but they looked too pink in the bright sunlight outdoors. The shoes and the dress compared differently depending on the light under which they were viewed.

Visual examination of metamerism



Incandescent light versus Fluorescent light

The Metamerism Index was established to help quantify that difference using instrumental measurements and a simple mathematical calculation. The larger the Metamerism Index calculated for two items, the bigger the color difference between them under the two illuminants of interest.

Whereas Metamerism Index is calculated to show the difference between two items under two different lighting conditions, color inconstancy index is determined for *one single item*.

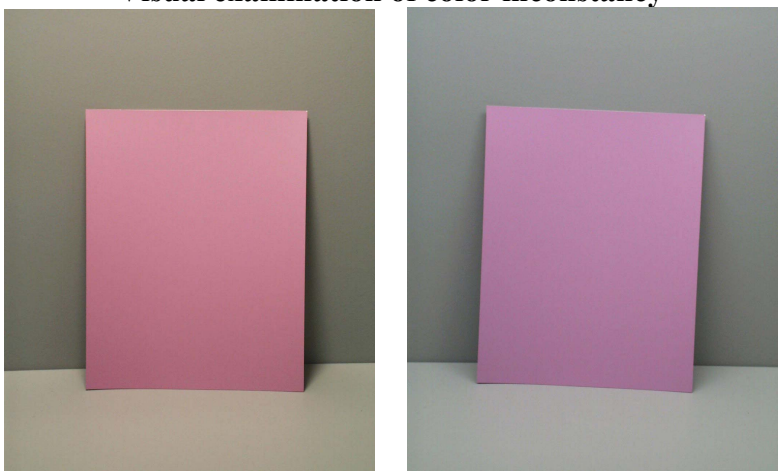
Color inconstancy (sometimes called flare) indicates the degree to which the appearance of a sample's color changes when the light source (illuminant) is changed. Like Metamerism Index, color inconstancy

may be determined by measuring the sample with an instrument under a test illuminant and then performing mathematical calculations. In this case, a complex chromatic adaptation transformation is used to predict the color values for a corresponding color that looks the same under a second illuminant. Then, if the color values under the two different illuminants are different, the total color difference (ΔE) between them can be used as a measure of the color inconstancy for that sample under the two selected illuminants.

The transform used to calculate the Color Inconstancy index can be found in *Measuring Color*, by R.W.G. Hunt, 3rd edition, Fountain Press, England, 1998.

Color inconstancy can also be checked by eye, of course, but if enough time is allowed for the eyes to properly adjust after the change in light source, it can be difficult to remember the appearance of the sample under the previous light source. Objective, instrumental determination of inconstancy is therefore preferred.

Visual examination of color inconstancy



Incandescent light versus Fluorescent light

Color inconstancy is available for display in EasyMatch Textiles.

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