kt.COLOR
the paint manufactory

kt.COLORSYSTEM: a pigment based color system

Introduction

The kt.COLORSYSTEM is based on the fundamental notion that the pigments used in colors are significant for their effects on space, whereas the location on a color sphere is an abstract communication aid that is of little practical value for color design. We order colors according to pigments and their properties. This distinguishes our method of defining color from other color systems.

The best known color systems, more precisely, color ordering systems, differentiate color according to distances, measured in percentages, from standardized pure colors. Six pure colors define the endpoints of 3 axes in a color space. The surface of the color space, which may be a double cone (NCS), an irregular cylinder (Munsell) or another shape, is called the color sphere. Every color system defines a sphere of a certain shape, a parameter for locating specific colors within it, and a measure of distance between neighboring colors. Some color ordering systems measure distance by spectrophotometric methods, other use perceived visual differences to order colors along the axes. NCS, CIE-Lab, Munsell and Pantone are the most widely used color order systems today. Colors produced by kt.COLOR cannot be matched to locations in these color spaces.

Color system logic

Every color system seeks to order the innumerable variety of colors. Also, every color system establishes a nomenclature for communicating differences between colors. Thirdly, these systems quantify colors according to the amounts of standardized pure colors they are made of. Thus, vast numbers of colors can be reduced to sums with three numbers, corresponding to the location of the color along the three axes of the sphere. A color is located on the color wheel, then it is located according to its saturation (or degree of whiteness), and finally, it is located according to the amount of gray it contains (blackness).

Software turns these three numbers, corresponding, in most systems, to the three values hue (or chroma), whiteness (or lightness) and blackness (or purity), into recipes. Few pigments (14 on average) are required to mix all of the colors that can be located within or on the color sphere; inexpensive paint production and small pigment stocks are the benefit.

Since each color is defined according to three values, complementary colors are left out of the equation systematically. Complementary colors are the colors that absorb the light frequencies opposite to those absorbed by the color in question. Mixing a color with its complementary color generates a grayed or darkened color (tint). Magenta is tinted with emerald green, red with a bluish green, orange with turquoise, yellow with purple, and so on. Thus, a color can be darkened or tinted either by adding black, or by mixing a color with its complement. When mixing complementary colors, magenta (red with blue) would need to be mixed with a bright, yellowish green (green with yellow). Color systems cannot do this since they can assess only a red with a blue component, or a red with a yellow component, but not both. Tints made with complementary colors are livelier though, since the opposing color is used to balance the main color. When tinting with black, the entire spectrum is dulled. This lends colors a superficially grayed, flat appearance. Artists avoided tinting with black for this reason.

The color systems thus cannot account for a red with a green component, only a red with a blue or a yellow component. Colors in nature, however, are always complex mixtures containing all other colored components. The color wheel accounts for pure colors, and for colors easy to match, but not for the colors in nature, which are never pure, and never grayed with black. The reds in nature are mingled with many different greens, sky blue is mingled with every conceivable color, and so one. Thus, colors as defined by color order systems do not have the complexity, or the depth, of colors in nature.

The kt.COLORSYSTEM®

To overcome the limitations of the three parameters of hue, whiteness and blackness, and to be able to work with the complexity of natural pigments, kt.COLOR sought a different mixing logic. Natural colors, like the tender spring green shown by young grass in spring, generally contain ta complementary color. The young grass grows out a pale, warmly colored center. This not being possible with conventional mixing equipment, we searched for a way to order and produce a large variety of colors as they are found in such an astonishing quality in nature according to physically real aspects.

Physical reality, for color, is the pigment, and the modifications it undergoes in mixes with other pigments and paint components. Using this as the basis for color definition, we were able to define colors that could be produced and reproduced reliably. A pure chrome green with certain measured characteristics will, in any comparable formulation, be the same chrome green with the same measured characteristics. This is not the case with other color order systems, since the means of making the color that corresponds to the three variables locating it in the color space will be different from one produced to the next.

The kt.COLORSYSTEM currently includes 225 pigment colors. We used some 120 different pigments to mix them. Their depth cannot be matched using the simplified "chroma + white + black" color logic. All of our pigment colors are selected according to their pigments and their effects on architectural space. Efforts to match them using color systems such as Pantone, Hexachrome 6-pigment systems, or color ordering systems such as NCS or Munsell will subtract out the harmony, depth and profound beauty carried into each of our colors by our unique pigments

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Katrin Trautwein, 2013