



Optibin

Where color consistency begins

Technical Overview

a Signify brand



Photography: digitalimage.at

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Why consistency matters—and how Optibin makes it happen

Consistency is critical to any white or color LED lighting installation. By delivering lighting unmarred by distracting variation, consistency helps fulfill the lighting designer's vision. And by achieving a uniformity that pleases the viewer's eye, consistency makes lighting installations more compelling, impactful, and attention-getting. Large surfaces washed with precise color. Tall structures lit by white light with precisely the same color temperature. That's consistency.

Selecting the correct LEDs at the heart of Color Kinetics luminaires requires a process called binning. The goal? To maximize the consistency of white or color output by reducing LED variations. Color Kinetics pioneered advanced binning with Optibin®, our proprietary binning optimization process, introduced more than a decade ago. And we continue to lead the way, evolving and expanding the capabilities of Optibin so you can achieve new levels of consistency with our white and dynamic color luminaires.

No matter how many luminaires an installation requires, you can be confident that they will provide exceptional uniformity and consistency of hue and color temperature. All thanks to Optibin—and our relentless, ongoing commitment to color consistency.

How Optibin achieves exceptional consistency

When LEDs are manufactured, they inherently vary in color, luminous flux, and forward voltage. Since these differences can be significant, LED producers measure their LEDs and deliver them to the market in subclasses, or *bins*. Optibin enables Color Kinetics to select LEDs that conform to our stringent specifications, to manufacture exceptionally consistent luminaires—and to meet the demanding needs of our customers.

Each LED luminaire manufacturer devises a method of selecting bins of LEDs to minimize visible differences in color. While these methods vary, the overall goal of binning is the same—to select a supply of LEDs that are readily available in high volume—helping guarantee color uniformity across luminaires and production runs over time.

Like any process, binning can be tightly or loosely controlled. Because our customers rely on us for high-performance, premier-quality LED lighting solutions, we apply an extremely stringent binning process to ensure uniformity and consistency of hue and color temperature—Optibin.

Optibin uses proprietary algorithms to ensure color consistency from luminaire to luminaire, as well as between manufacturing runs. We also apply our Optibin process to determine the correct placement of LED sources within our luminaires. Think of it as a precise database, directory, or recipe of LEDs created to maintain optimal color and flux consistency.

Thanks to our obsession with precise LED selection and placement, you get the highest levels of consistency—no matter what Color Kinetics luminaires you choose. You can also be confident of color consistency over time. This quality is especially important for phased installations, for situations when luminaires are purchased and installed at different times, for expansion and multi-site installations—and when color-matching replacement luminaires.

Note that due to the nature of tri-LED luminaires, our direct-view luminaire families—including Flex and Accent Compact—do not use Optibin technology. However, like all Color Kinetics luminaires, they are meticulously designed and manufactured to achieve high levels of consistency.





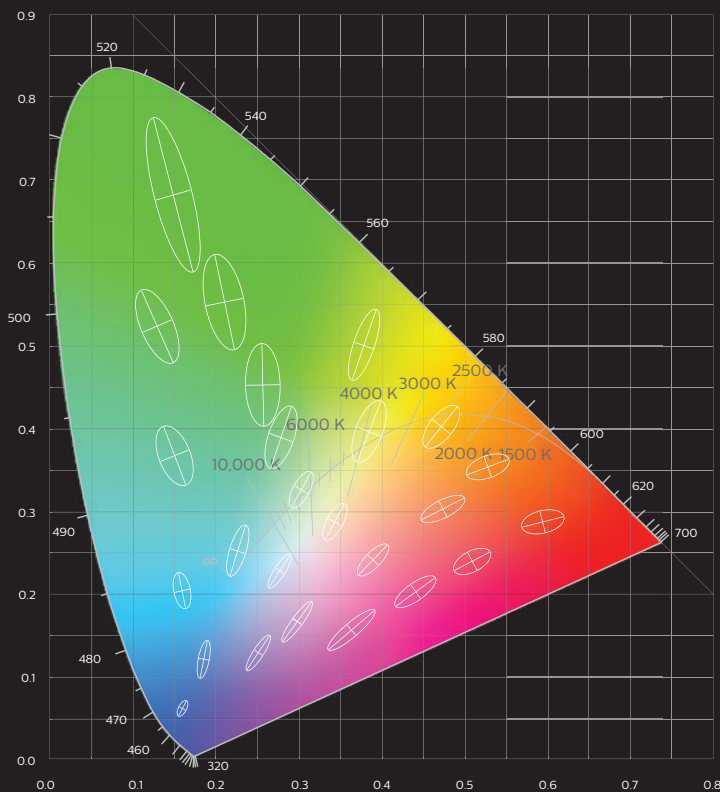
Photography:

Your eye doesn't lie

Visible variations in color diminish the impact of a lighting installation, no matter how small or extensive. A viewer might see a slight change in hue, detect differences in brightness, or notice that the lighting just doesn't look right. That's the informal way of describing inconsistent color. Now let's take a look at the science behind that perception.

The threshold where a color difference becomes perceptible to the human eye is defined by a MacAdam ellipse, which is the accepted industry standard method of evaluating range of variance in LEDs. The vast majority of Color Kinetics LEDs are within a variation of a 2-step MacAdam ellipse, which yields a very small level of variation, unnoticeable by the untrained eye.

We hold LED suppliers to our strict standards and use Optibin to optimize LED selection and placement during every luminaire manufacturing run. The result? Color Kinetics luminaires show remarkable consistency. Even the most ambitious lighting designs become a day-to-day reality. And viewers see nothing but beautiful, bright, flawless light.



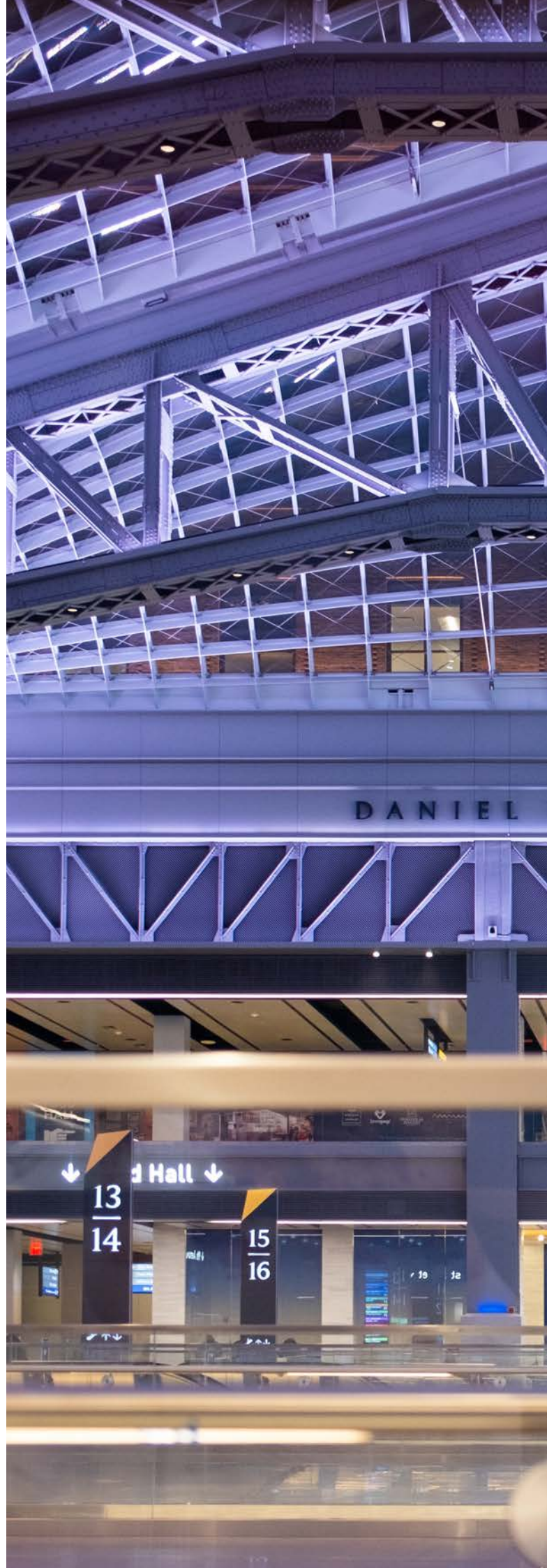
For clarity, the MacAdam ellipses shown in this diagram are 10 times larger than actual size.

Taking color consistency even further

Optibin begins the process of ensuring color consistency of Color Kinetics luminaires. But we keep going.

Beyond Optibin, Color Kinetics also developed Chromasync, an advanced algorithm that delivers improved color consistency within luminaires—node to node, as well as luminaire to luminaire—by adjusting the node's color point.

With Chromasync, colors are more consistent, regardless of the specific LEDs used, date of manufacture, and other variables. Chromasync allows Color Kinetics luminaires to achieve high color precision—for example, those within the IntelliHue family—with a color variation of less than 2 MacAdam ellipses (2 SDCM) across multiple luminaires.





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Photography: Stephen McFadden

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Explore the Color Kinetics technology portfolio

We continually explore your challenges, invest in research and development, and make the significant commitment required to develop and perfect breakthrough technologies. The result of decades of work, our unequaled portfolio of proprietary, quality-enhancing technologies helps you achieve the best possible results.

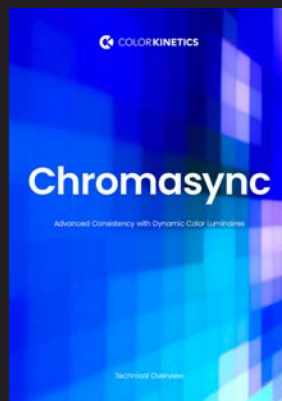
These technologies increase quality by ensuring sustainability and consistency, raising uniformity, providing precision control, and more.



Optibin

Where consistency begins.

Our LED optimization technology begins the color consistency process by grouping (or binning) LEDs by flux as well as center wavelength. This proprietary binning optimization process uses an advanced bin selection formula that exceeds industry standards for chromaticity. The result? Higher uniformity and consistency of hue and color temperature for all our luminaires.



Chromasync

Optimize output & color consistency.

Our advanced output optimization technology controls and boosts output while ensuring color consistency. When enabled, Chromasync ensures excellent color consistency between luminaires, without manually adjusting color points on each luminaire.



IntelliHue

The smart way to deliver white & color light.

Our advanced approach to color mixing produces high-quality white light, subtle pastels, and fully saturated colors in the same precisely controllable luminaire. All with unrivaled color accuracy across the entire range of color temperatures.



OptiField

Uniformity never looked this good.

OptiField's freeform optic creates a breakthrough rectangular beam that covers large surfaces with full, bright, even light. And OptiField can cover more surface area with fewer luminaires — simplifying installation while lowering energy use.



Powercore

Power made simple.

Our patented approach to power output proves that simple is better. As well as faster, more efficient, and accurate. Powercore® controls power output to luminaires directly from line voltage. It merges line voltage with control data and delivers both over a single standard cable—dramatically simplifying installation and lowering total system cost.



FluxBoost

Unlock the full power of your luminaires.

FluxBoost is a breakthrough technology that optimizes power and quality. With FluxBoost, an installation can use more of the power budget allocated to the project, enabling significantly higher output, creating more saturated colors, reducing waste and increasing efficiency.

What matters in professional lighting?

Our series of guides explores key topics in professional lighting—color science, light, quality, optics, and more.

It's part of our commitment to passing on our deep technical knowledge and decades of expertise to help you achieve your vision.



Color Science

Color science serves as an underlying technical foundation for the entire lighting industry. It establishes a consistent way of thinking about light—how it is created, controlled, and delivered in real-world implementations. A core understanding of the science of color is critical to lighting professionals, who must be able to specify the right light—color, technology, luminaire, and more—clearly and accurately.



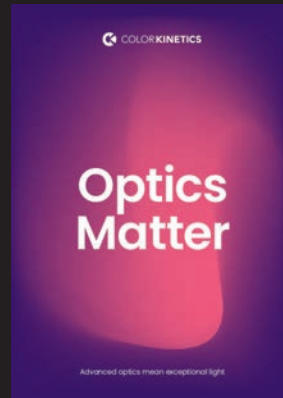
Light Matters

Traditional methods of evaluating light focused on lumen output, which was defined by the output capabilities of a light source, such as an incandescent lamp. The advent of LED lighting changed all that, since lumens were no longer the best measurement of a luminaire's capabilities. We explore some of the new ways lighting can be evaluated in the age of LEDs.



Quality Matters

What does quality mean to you? The answer depends on what you do within the lighting industry. Quality has different meanings for building and site owners/managers, lighting designers, and installers. We delve into the needs of each of these groups as we take a holistic approach to quality, one that begins and ends with the customer.



Optics Matter

It's safe to say that few lighting designers, building owners/managers, or other lighting professionals have ever seen the optical system housed inside an LED luminaire. But the optical system, or optics, play a vital, but often hidden role in performance, efficiency, and more. The right optics within a luminaire make a big difference in the final results—for both interior and exterior applications.



Control Matters

Controlling light used to be simple. It was on or off. Then came dimming, which raised or lowered the intensity of light. The invention of LED luminaires added another dimension, color—and new capabilities, such as the digitalization of lighting, including the ability to zone dimming and control the spectral content of color-changing light.



Sustainability Matters

By raising efficiency to new heights, our solutions help our customers do more with less energy. And since we design our solutions for long, useful lives, they create less waste. So, our customers get great results, year after year. All with less impact on the planet.

Choose the luminaire that meets your needs

Optibin is just part of the ongoing effort by Color Kinetics to set new standards for consistency. Our technologies work together to deliver the accuracy required by innovative and ambitious dynamic color applications.

To find out more about how to make Color Kinetics luminaires part of your next lighting design, visit www.colorkinetics.com



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