COLOR KINETICS

Optics Matter

Advanced optics mean exceptional light

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The hidden heroes of LED luminaires

It's safe to say that few lighting professionals have ever seen the optical system housed inside an LED luminaire. But the optical system, or optics, make a big difference for interior and exterior applications. Innovative optics help meet the needs of today's challenging applications—from more flexible cove lighting for offices and homes to brighter, more consistent light for illuminating taller buildings and iconic landmarks.

At Color Kinetics, we've made a significant commitment to optimized optical systems and innovative optical design for many years. Why? Because we know that optics matter. And deliver major benefits, along with great light.

Exceptional Performance
Delivering consistent, high-punch illuminance.

Impressive Results
Helping designers achieve a wide range of effects.

High Efficiency
Lowering power consumption, reducing installation costs.

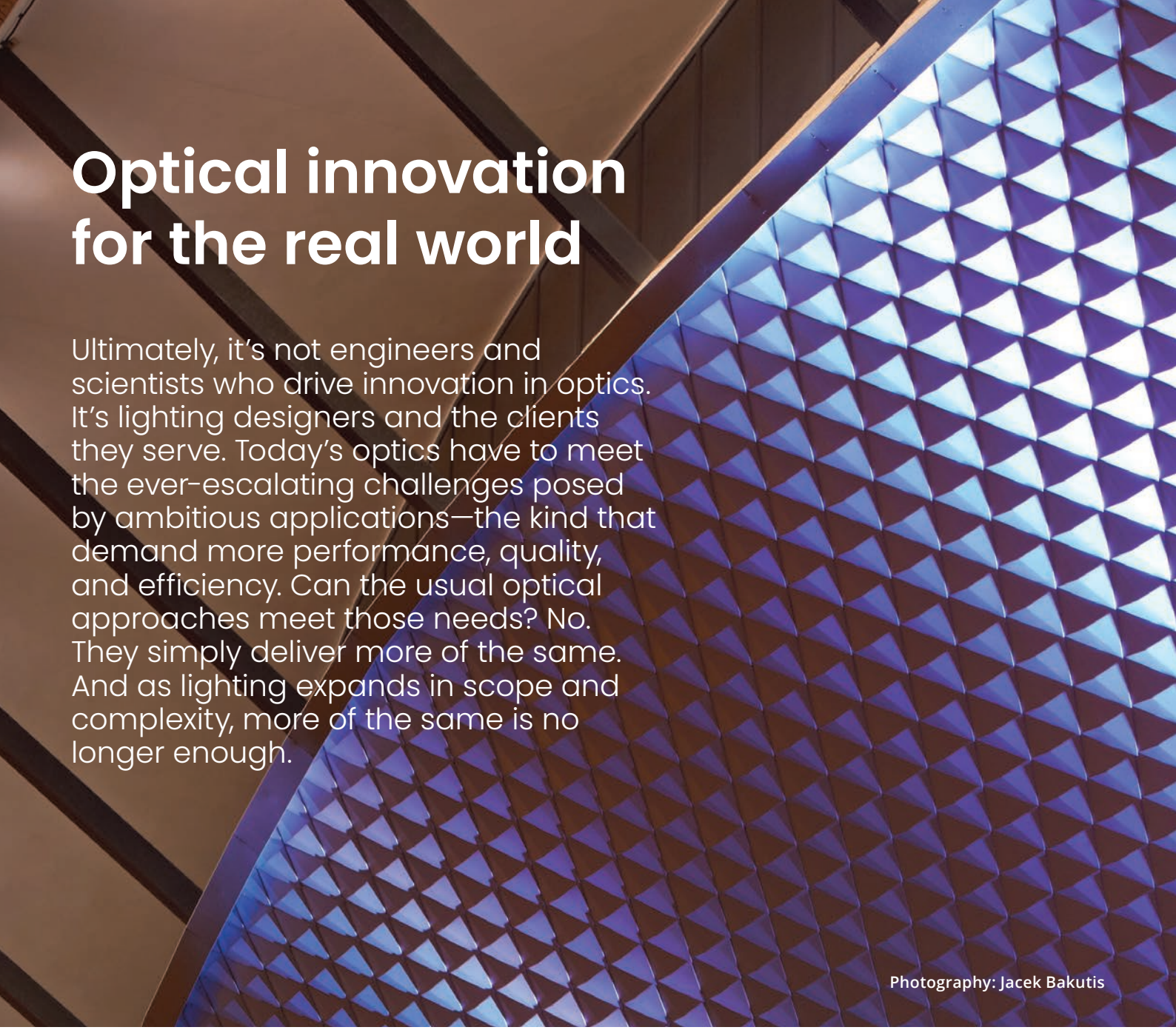
Flexibility
Enabling simple, easy changes in the field.

Reliability
Delivering even, high-impact light, year after year.

Photography: Nagle Hartray and WCT Construction

Optical innovation for the real world

Ultimately, it's not engineers and scientists who drive innovation in optics. It's lighting designers and the clients they serve. Today's optics have to meet the ever-escalating challenges posed by ambitious applications—the kind that demand more performance, quality, and efficiency. Can the usual optical approaches meet those needs? No. They simply deliver more of the same. And as lighting expands in scope and complexity, more of the same is no longer enough.



Photography: Jacek Bakutis

Asking the right questions:

When evaluating luminaires, here are some of the key questions:

- How does the optical system maximize performance?
- Why is this luminaire right for my specific installation?
- Was the optical system designed for this luminaire?
- How does the luminaire reduce spill light?
- How does this luminaire reduce energy use for my projects?
- How consistent are the luminaires compared to each other? For example, is the beam shape, color, and throw of each luminaire similar?
- How can I be sure that I'm getting the most lumen output?
- Does the beam shape and effective uniformity of the luminaire meet my lighting design needs and vision?

How do you evaluate optics? Not on the specifications of the optics alone, but on the results that they achieve. There is no one perfect optical design that delivers the best possible results—or that you should look for in a luminaire. Bigger does not mean better. The perfect optical system for your application needs to deliver the characteristics that match your needs and that enable you to achieve your vision. So there is no one-size-fits-all optical solution—just a range of needs that optics can fulfill, including:

Uniform Illuminance
If you want to illuminate a very large façade, you need to know that your luminaire can reach even the highest point of the building with the same illuminance, without hot spots or fading. Optics can make that happen by delivering maximum punch/throw and uniform light across an entire surface, with extremely low variation in white or color light.

Consistent Color
Consistency is one of the most important criteria for judging the quality of LED lighting, from white-light to dynamic color luminaires. Lighting professionals want consistent light, without banding, fading, or other issues. Optics play a key role in consistency by ensuring steady, uniform performance over time, without opacity or other issues. Related technologies also need to work in tandem with the optical system to help ensure consistency.

Short Setbacks
Larger setbacks require more visible luminaires, taking some of the mystery out of wall washing applications and other designs. Shorter setbacks let designers hide their luminaires more effectively—but they require specialized optics.

Lower Costs
Building owners and other clients are very conscious of energy costs, and want to lower their energy use wherever possible—not just for cost reasons, but to achieve sustainability and reduce environmental impact. Advanced optics use LED light more efficiently, reducing spill light and other energy-sapping issues—and getting the most out of every lumen.

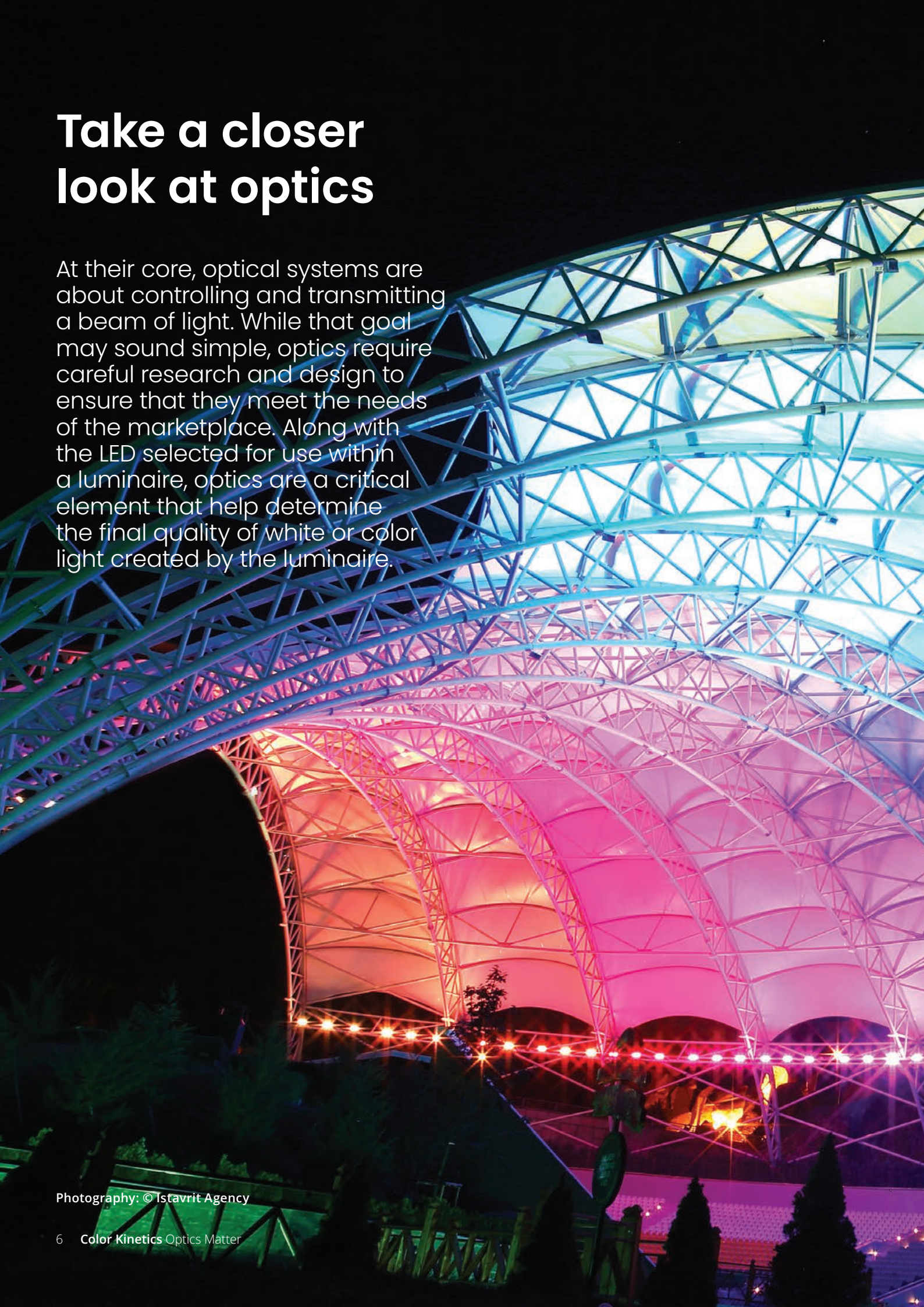
Greater Simplicity
No one wants complicated installations. Advanced optics can let you achieve more—more performance and illuminance—with fewer luminaires. And in the long run, fewer luminaires reduce maintenance, as well as costs.

Flexibility
No one can anticipate every facet of a lighting installation. Between design and implementation, a lot can change. Inflexible optics provide a one-size-fits-all luminaire solution. But flexibility in the optical design, as well as in the field installation, enables designers to make adjustments when necessary—without having to start over, add luminaires, or incur other expenses.

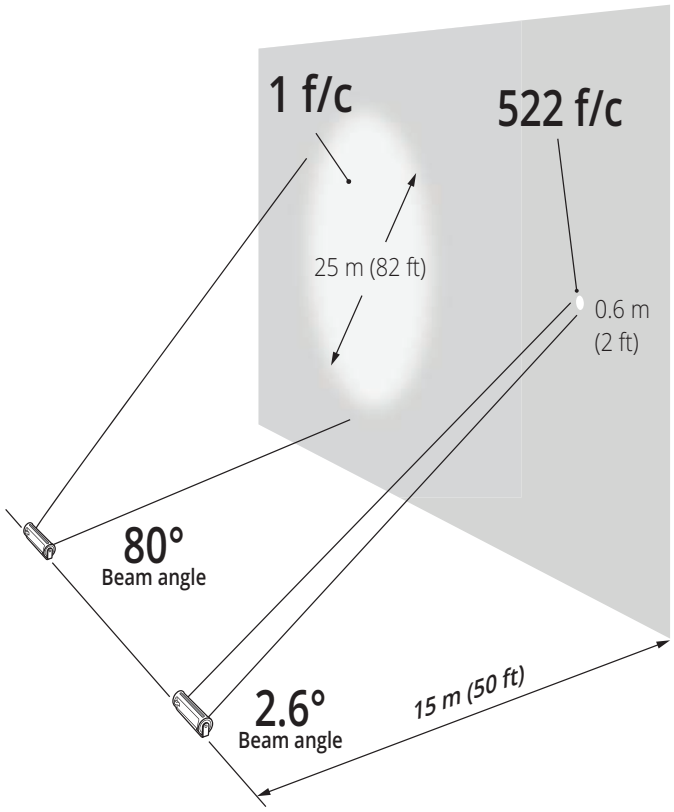
Longevity
One of the promises of LED lighting is that it lowers maintenance because of the inherently long lifespan of the LEDs. Optics can yellow and become opaque over time, reducing performance. But an advanced optical system doesn't change over years of use. This capability is particularly important for high-visibility, long-term installations, such as bridges, where accessing luminaires can be challenging.

Take a closer look at optics

At their core, optical systems are about controlling and transmitting a beam of light. While that goal may sound simple, optics require careful research and design to ensure that they meet the needs of the marketplace. Along with the LED selected for use within a luminaire, optics are a critical element that help determine the final quality of white or color light created by the luminaire.



Photography: © Istavrit Agency



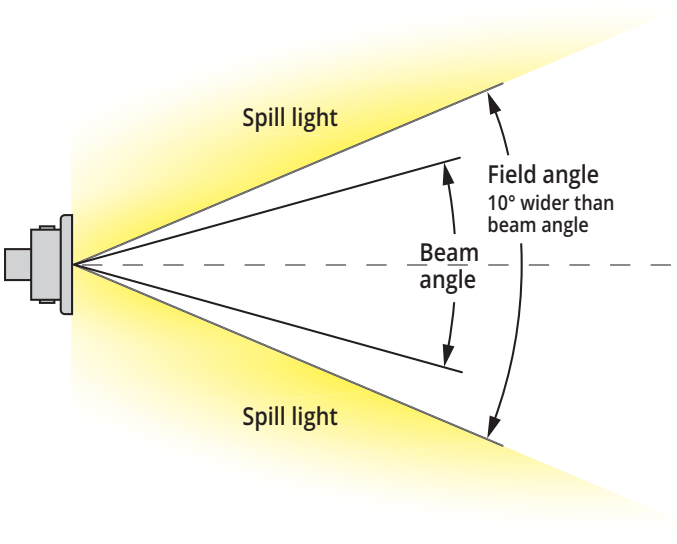
Punch (or throw) is more of a function of a luminaire's optics than its LEDs.

	Center beam	Beam width	
4 ft	45,135.82 fc	0.2ft	**0.2ft**
8 ft	11,283.83 fc	0.4ft	**0.4ft**
12 ft	5,0151.04 fc	0.5ft	**0.6ft**
16 ft	2,820.96 fc	0.7ft	**0.8ft**
20 ft	1,805.41 fc	0.9ft	**0.9ft**
24 ft	1,253.76 fc	1.1ft	**1.1ft**

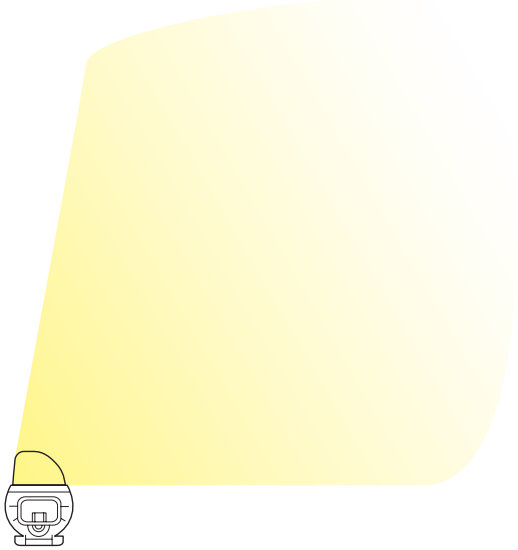
850 ft (259 m) Vert. Spread: 2.6°

1 fc maximum distance Horiz. Spread: 2.7°

Center beam candle power (CBCP) is a measurement of luminous intensity expressed in candelas. It represents the intensity of a beam of light in the brightest part of that beam, the center. CBCP is measured in footcandles, which is a more accurate measurement of delivered light than lumens.



Optics can adjust the beam/field angle, controlling the beam and reducing spill light.



Optics can control the beam to achieve specific beam angles and shapes.

We're committed to designing advanced LED optics

Color Kinetics takes a flexible, application-first approach to optics. We examine the real-world requirements of the specific application first, then determine and develop the right optics. It's a very different approach than simply choosing the easiest or least expensive option available—or just using the same optical system in luminaire after luminaire.

Innovative optics start with commitment. For decades, Color Kinetics has made a significant investment in research and development, staffing our labs with expert optical engineers and equipment. This dedication to innovation enables us to design and manufacture industry-leading optical systems. Here are some of the reasons why our approach to optics is different—and better able to meet your needs.

We take control
Our in-house design capabilities enable creation of better, more innovative optics that are optimized for key applications—all driven by customer need.

We deliver expertise
Our dedicated team of optics designers have the skills and experience necessary to envision the best possible optical system for a specific need—then deliver it in an innovative, fully integrated luminaire.

We help achieve your vision
We focus on the applications and light effects our customers are trying to achieve—then work to create an optical system that meets the requirements of even the most challenging design vision.

Better optics mean better beam quality
Intelligent, customized optics require fewer optical losses, delivering maximum illuminance, color uniformity, and more punch.

We strive for efficiency
Our optics deliver light where you need it, with less waste. Efficiency reduces total costs and the amount of power required.

We ensure consistency at all levels
Our **OptiBin** technology begins the color consistency process by grouping (or binning) LEDs by flux as well as center wavelength. This proprietary binning optimization process ensures the uniformity and consistency of hue and color temperature for our luminaires. Our **Chromasync** advanced color consistency technology improves consistency from luminaire to luminaire. Colors are more consistent, regardless of the specific LEDs used, date of manufacture, and other variables. The result? High color precision.

We keep it flexible
The extensive breadth and depth of our offerings includes luminaires that have integrated optics that require no adjustment, as well as field-changeable lenses. These options ensure that you get the luminaire—and beam spread—that you need to achieve your vision.

We aim to please
Aiming and adjusting are simple to complete in the field, without requiring accessories. Luminaire rotation and other features give you the flexibility you need.

We can meet special requirements
We can design specialized optics that match the requirements of site-specific, large-scale applications.

Photography: Courtesy of Hard Rock Hotel & Casino Las Vegas

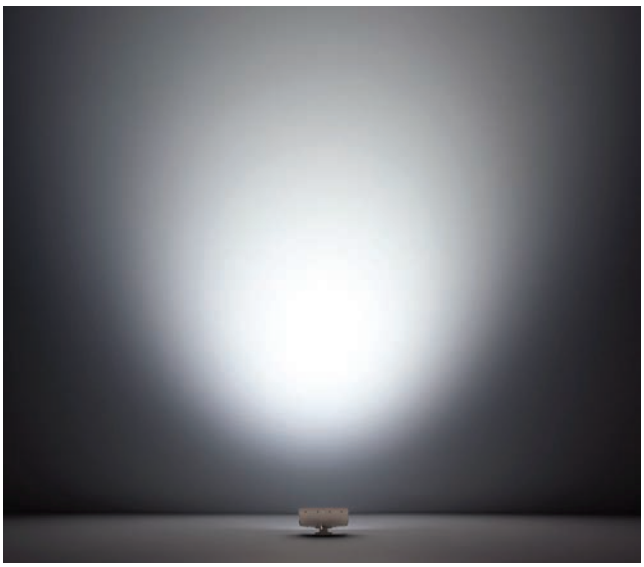
Uniformity never looked this good

Lighting professionals want beautifully even light. But the cone-shaped beams output by traditional optical systems make uniformity a real challenge. Our breakthrough **OptiField** optical technology lets you illuminate surfaces evenly—making interiors more inviting and large building façades more impressive. All with high delivered lumens and energy efficiency.

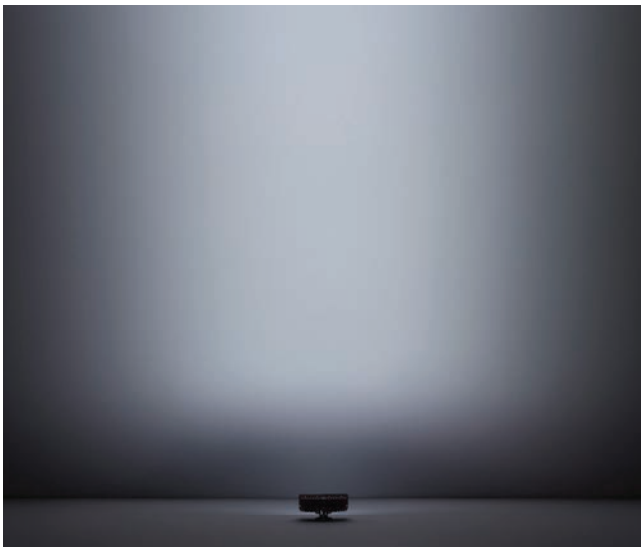
Our innovative free-form optic—the result of years of extensive research—creates an unconventional beam shape. A bright, even rectangular field of light instead of a familiar cone. Luminaires integrating OptiField deliver the same brightness at all points, without banding or hotspots. Just bright, even white or dynamic color light. The kind that makes lighting designers—and their clients—very, very happy.

Thanks to carefully controlled fading at the edges, OptiField makes it easier to integrate multiple luminaires. No more complicated overlapping cones of light. No time-consuming on-site aiming. So while OptiField makes uniform illumination easier to achieve, it also lowers cost and complexity, since projects often require fewer luminaires. It's a combination our customers really appreciate.

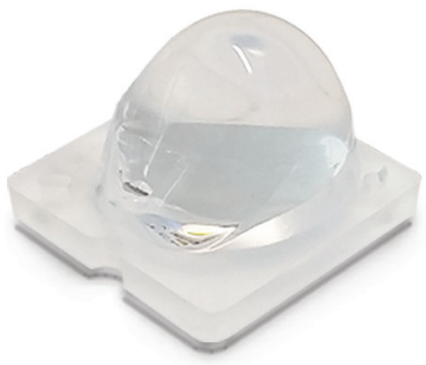
OptiField is available exclusively on select Color Kinetics luminaires.



A traditional cone-shaped beam illuminates a wall unevenly.



Color Kinetics OptiField, our breakthrough innovative optic, creates a radically different beam shape that covers the wall in bright, uniform light.



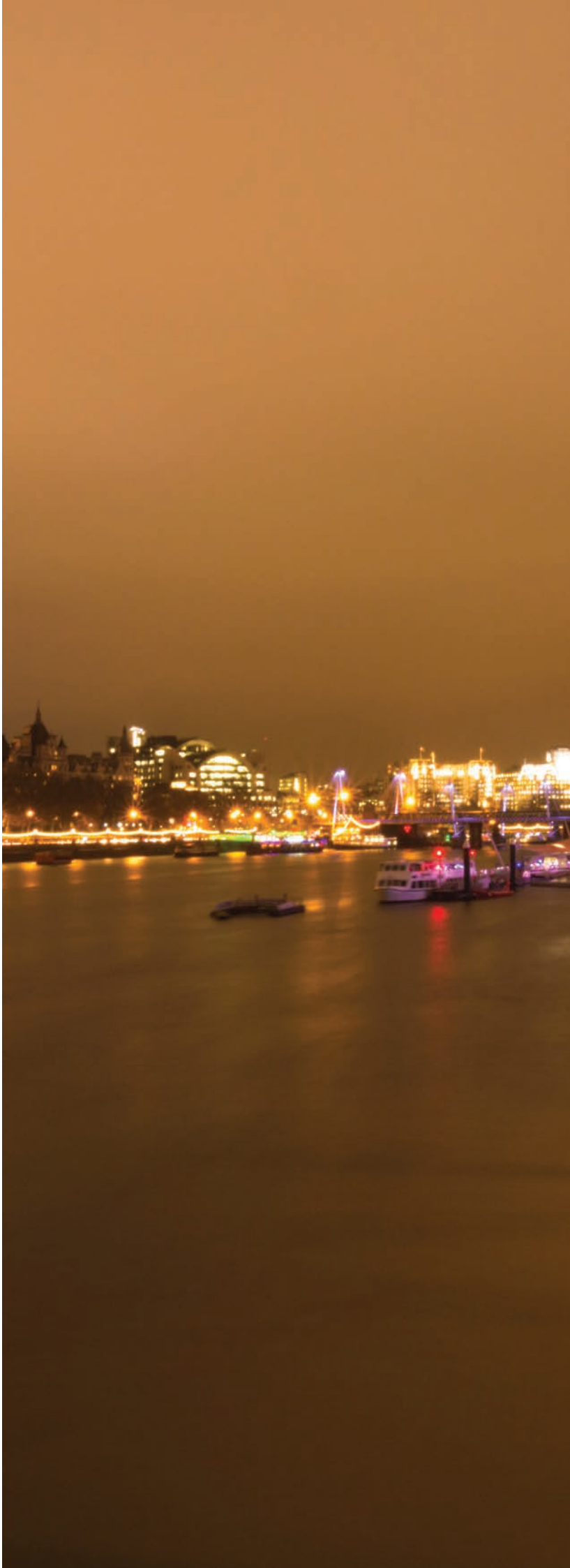
We take a flexible approach to optics

Yes, OptiField is a major breakthrough, but it's just one of our optical innovations.

We're flexible, designing optics to meet the specific needs of our customers' key lighting applications. Narrow beams of extremely bright light with remarkable punch? Even light that can be used with very short setbacks? With our optical expertise, we can deliver it all.

See how optics affect popular applications

While you may never see an optical system, its impact is clear in every installation, interior or exterior. Here we take a look at how the optics inside a luminaire help meet the specific challenges faced by today's lighting professionals.



Photography: David Morrell, courtesy Lighting Technology Projects

Wall-washing with eW Blast Powercore gen4, OptiField

The advanced optics within eW Blast Powercore gen4, OptiField deliver powerful punch with no hotspots—making this innovative luminaire an ideal choice for interior and exterior applications requiring exceptional white light. eW Blast Powercore gen4 leverages our revolutionary OptiField optic, which creates an exceptionally uniform, bright beam of light like no other.

Photography: Timmerman Photography

Cove lighting with PureStyle

PureStyle's optical system enables extremely short mixing distances, so it excels in cove lighting applications where traditional linear luminaires can't compete.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Floodlighting with ColorBlast IntelliHue Powercore gen4

ColorBlast IntelliHue Powercore gen4 f features an innovative, redesigned optical system that improves the quality of light from each LED, enhancing color uniformity and color mixing. This high-output, exterior-rated LED luminaire delivers full-color light output necessary to support a range of dynamic uplighting, floodlighting, and decorative lighting applications.

Photography: Juan Ceballos and Debra Fox

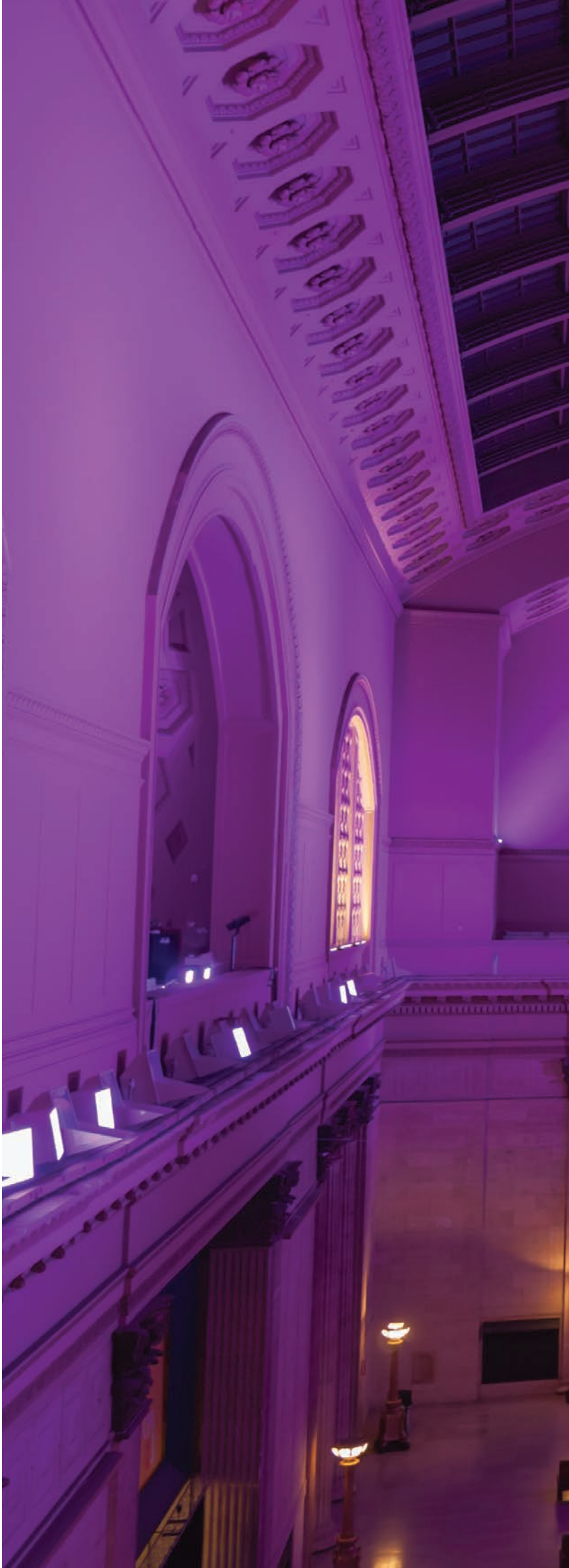
Grazing with iW Graze Powercore

Bright, consistent white light from the Graze family of LED luminaires highlights façades, architectural details, and other elements of historic buildings, as well as new construction. Advanced optics enable the luminaires to stay concealed, keeping the focus on the light, not the luminaire.

Photography: Partrick Reynolds Photography Ltd

Creating ambiance with ColorReach Powercore gen2, RGBW

Flexibility is the hallmark of advanced LED lighting solutions, which can change from beautiful white light to dynamic color-changing light effects with the touch of a button. Lighting from existing ledges can highlight the upper reaches of an interior space, drawing attention to details that might have gone unnoticed.



Photography: Joby Benoit

Illuminating landmarks with dynamic color lighting

Dynamic color lighting draws new attention to bridges and other landmarks, transforming them from functional to phenomenal. Floodlighting, grazing, and spotlighting help create luminous structures that can change color quickly, inspiring different emotional responses. All with remarkable consistency across all Color Kinetics luminaires.

Photography: Paul Barrows and Rick Friedman

Hospitality lighting with ReachElite

ReachElite and other exterior luminaires bring impressive dynamic color lighting to façades, landscape features, and other exterior details, creating a unique look and impressing guests. Beyond beauty, LED lighting from Color Kinetics also delivers new efficiency and energy savings, while reducing maintenance.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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.

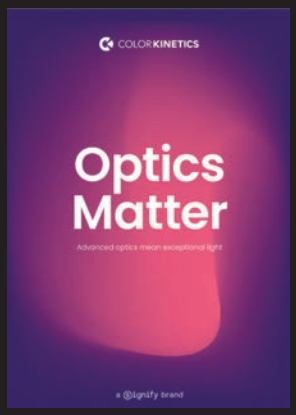
Light Matters

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.

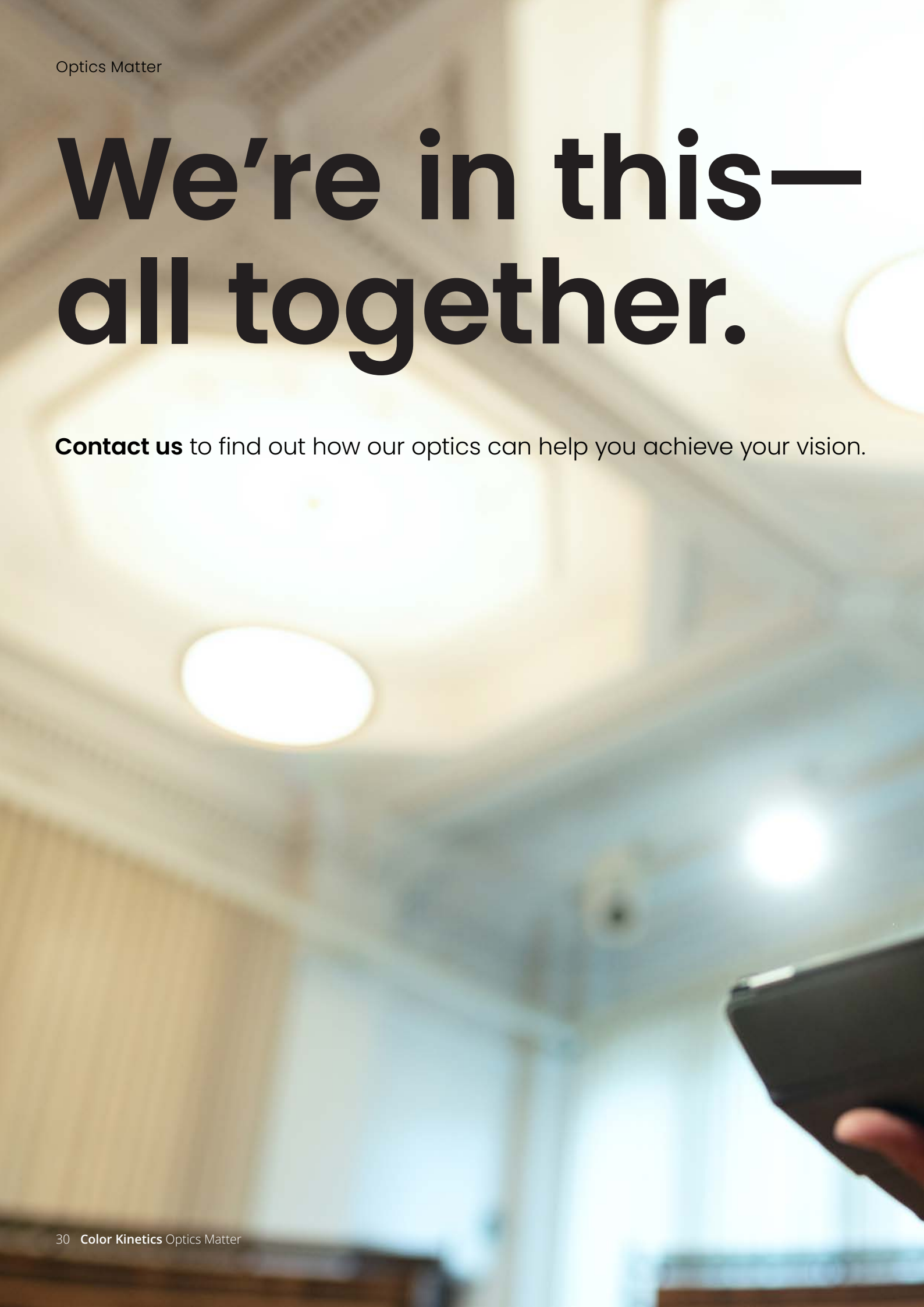
Then came dimming, which raised or lowered the intensity of light. The invention of LED luminaires added another dimension, color—and new capabilities, such as the digitalization of lighting, including the ability to zone dimming and control the spectral content of color-changing light.

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.

We're in this—all together.

Contact us to find out how our optics can help you achieve your vision.



Photography: ThisisEngineering

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BRO-000115-00 R03 6 September 2024