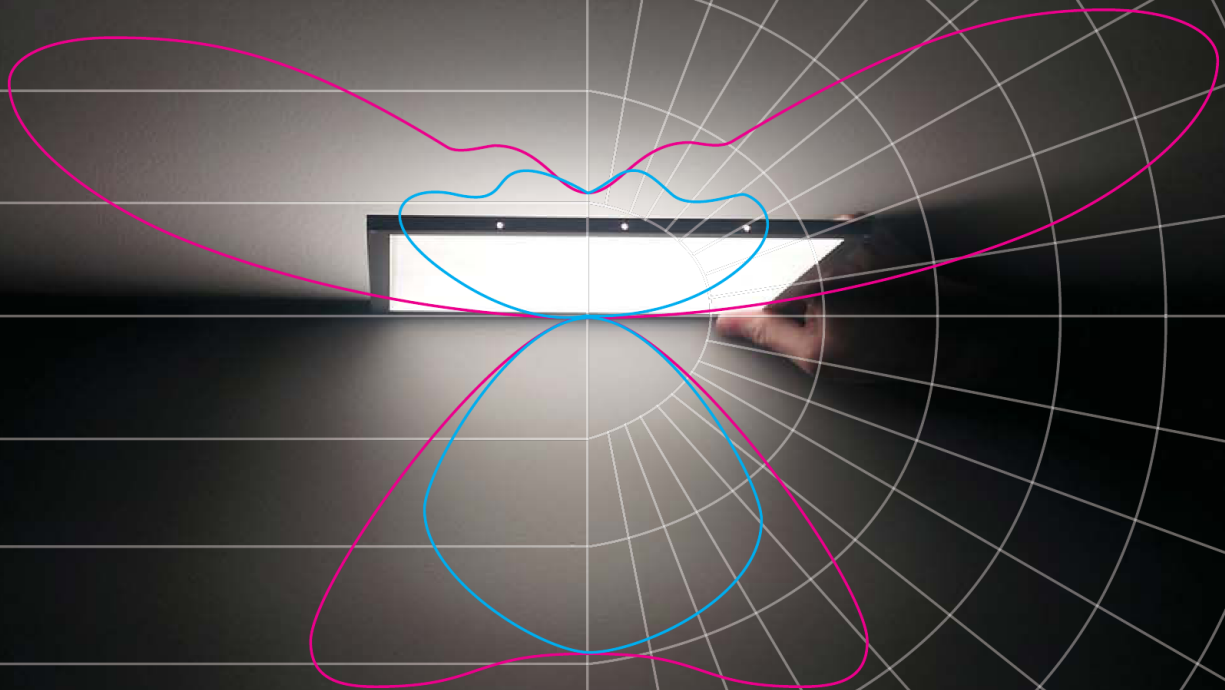


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3500K	2225	1900	59	Mid Morning/Mid Afternoon	Compact Fluorescent
4000K	2325	1975	62	Morning/Afternoon	Metal Halide
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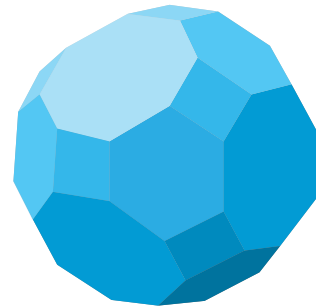
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On the Cover:

Global Lighting Technologies' Bi-Directional LED Light Guides. Photo courtesy Global Lighting Technologies.

Top right: Messe Frankfurt

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BUSINESS AS USUAL?

“A few years ago, a lighting industry veteran said to me, ‘Lighting is no longer about bending sheet metal around a source.’ Never has that statement been more true.”

As lighting technology and fixtures evolve, do the business models of lighting companies need to evolve with them? This is something I’ve been thinking about as we have been preparing this issue, our annual mega-look at the latest industry product offerings. The maturation of light sources and luminaires is evident, particularly over the past several years, as manufacturers and designers have grown more comfortable with solid-state lighting.

This year, we received more than 450 product submissions. As we reviewed all of them, there seemed to be a greater awareness on the part of manufacturers about the technical information that is now needed for LED-related lighting products, as evidenced in the more-detailed product literature that we saw this year. Ongoing communication with specifiers has certainly aided in recognition of the need for better coordination between sources, drivers, and control systems. And while there’s still much more to do, it does appear that manufacturers are remembering all of the ingredients that need to be considered as part of luminaire design—including optics and component compatibility along with resolution of technical issues such as flicker, dimming, and color rendering. New product offerings are once again being put forth as a complete package.

And yet, I can’t help but wonder if an analogous progress is occurring on the business side. It seems as though there is a substantial gap between the methods by which a fixture operates and the methods by which fixtures are introduced to market. Long supply chains and multiple vendors still appear to be the norm in the lighting market, and this multilayered procurement process has long been a hot topic in the industry because of the role that it plays in adding time and cost to the specification process.

Does the shift to solid-state lighting offer a possibility for streamlining the industry’s old-school methods? What are the new ways of developing, launching, and bringing products to market that the lighting industry should be considering? Are there examples from other industries that the lighting community

should be looking at? How have the mergers and acquisitions that have reshaped the landscape over the past decade changed how the industry works, and what effect has this had on the overall lighting market? Is differentiation between large and small markets still relevant? How has the role of the lighting representative—independent and manufacturer specific—changed?

It doesn’t seem, as yet, that the business side of the lighting industry has evolved to a state where it is reflective of the current technological level of the goods that it produces and sells. Old models of R+D, purchasing, and delivery appear to be the norm. So, how can the business of lighting catch up?

There are signs that companies are challenging the status quo. Borrowing ideas from the semiconductor and electronics industries—markets that have served as a healthy, albeit painful at times, disruptor to lighting—companies are starting to take advantage of new ways of raising capital. One of these ways is by utilizing crowdfunding, which we discuss on page 48. Changes in strategies such as this might offer a glimpse of what future business models could be.

A few years ago, a lighting industry veteran said to me, “Lighting is no longer about bending sheet metal around a source.” Never has that statement been more true. The industry has done an amazing job adjusting to solid-state lighting over the past decade. What remains to be seen is how other aspects of the industry will evolve and adapt. The starting point will be in answering this question: How will the business of lighting evolve, or will it just remain business as usual?

Elizabeth Donoff, Editor-in-Chief
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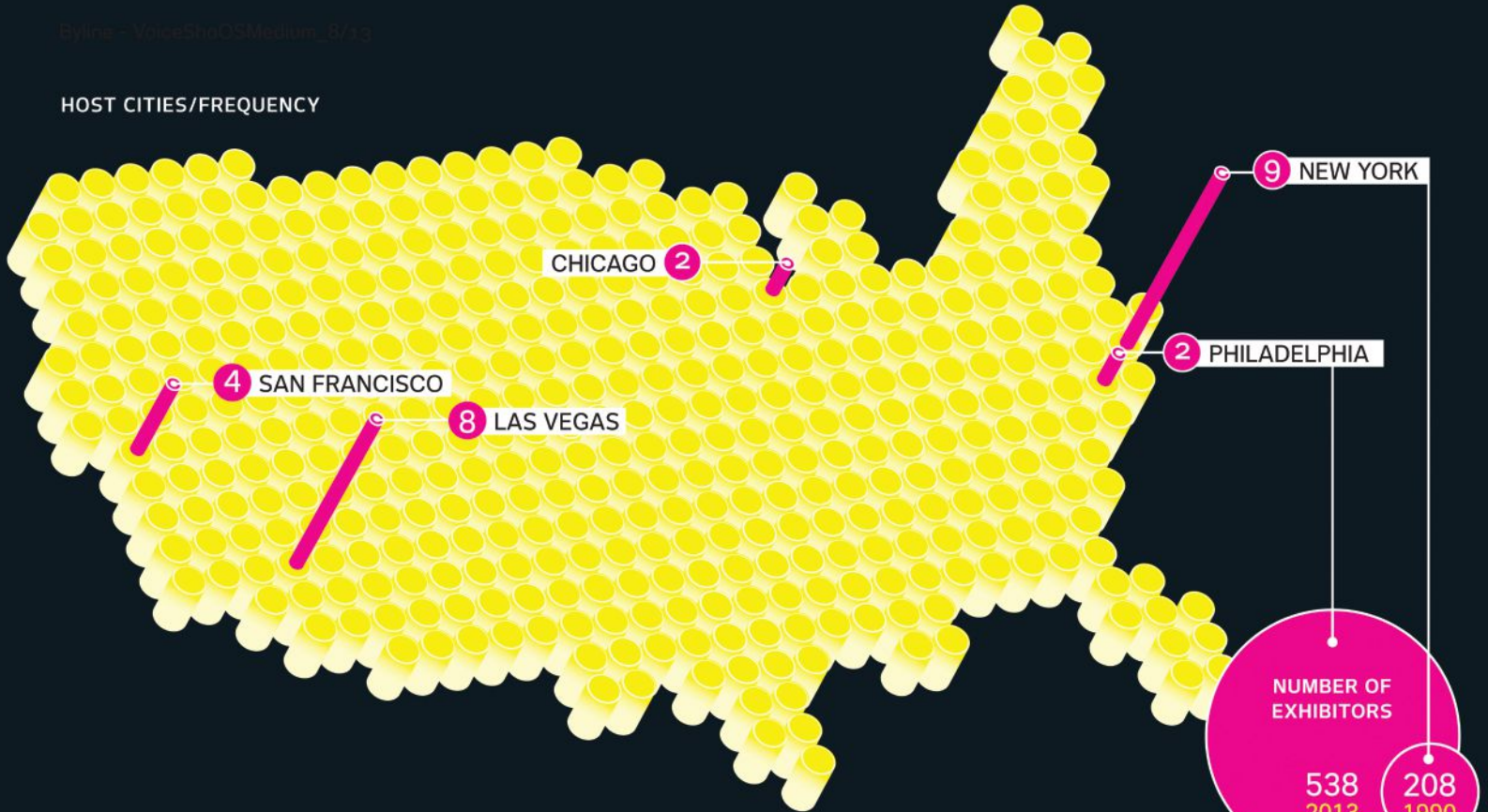
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LIGHTFAIR BY THE NUMBERS

Launched in 1990, the trade show celebrates 25 years.

Byline: Voice of the Medium, 9/13

HOST CITIES/FREQUENCY



NUMBER OF EDUCATIONAL OFFERINGS



NUMBER OF PRODUCT CATEGORIES ON DISPLAY



*Published preview

Sources: "Celebrating 35 Years of Lighting Design Excellence," IALD 35th Anniversary publication (2005); Lightfair press releases (2010–2014); and Official Lightfair Directories (2004–2013)

NUMBER OF EXHIBITORS


538
2013

208
1990

NUMBER OF REGISTERED ATTENDEES

26,026
2013

7,500
1990



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LIGHT+BUILDING 2014

This biennial international trade show once again proved it is the place to be for the latest in lighting products and technologies.

text by Elizabeth Donoff

For anyone who has ever attended Light+Building in Frankfurt, Germany—the biennial trade show devoted to lighting and building-service technology—the scale of the event is impressive, and this year was no exception. According to Messe Frankfurt, the fair’s organizer, 211,500 visitors from 161 countries passed through the fairgrounds during the six-day event. International attendance was also up, with Messe Frankfurt reporting an increase in this group by three percentage points, to a total of 47 percent of overall attendees. After Germany, the best represented countries were Italy, the Netherlands, France, China, and Austria. The number of North American attendees has yet to be officially reported, but if anecdotal evidence can be believed, the number of U.S. lighting designers attending Light+Building also went up.

The increase in activity at this year’s fair is also reflected in the number of exhibitors—2,458—which is an increase of 7 percent from 2012, as well as an increase in the show’s physical size—245,000 square meters (2.6 million square feet)—which is an increase of 10,000 square meters over 2012.

1: Courtesy Messe Frankfurt



2: Courtesy Reggiani; 3: Elizabeth Donoff; 4: Courtesy iGuzzini

Another aspect that makes Light+Building an interesting venue in which to track lighting developments is its two-year cycle. Enough change occurs during this time frame to observe a true maturation of light sources and luminaires, as well as the evolution of lighting technologies. As is the case with the industry as a whole, solid-state lighting is at the forefront of every manufacturer's product offerings. Even legacy companies have completely retooled their product lines.

But it is not just products themselves that have changed; it's also the way that lighting is being discussed. The luminaire is no longer seen as a stand-alone object, but rather as part of a comprehensive system. Often, it is even the vehicle for facilitating coordination with other building-wide systems, such as energy management and security. This revelation is due, in large part, to advances in lighting controls and user interfaces.

Also of interest is to observe how companies that first launched products in North America then transition to reaching a global audience. Companies such as Xicato, Soraa, and Cooledge Lighting all debuted their LED modules, lamps,

and light sheets in Frankfurt this year. These introductions seem to have been met with just as much success abroad as they did at home. This isn't altogether surprising, as designers and manufacturers admit that the U.S. market is one of the more difficult ones to break into, owing to the number of established companies and supply chains, along with the UL process.

Social media also played a significant role at the show. Long a staple of global brands such as Philips, this year other companies such as Erco, iGuzzini, and Zumtobel excelled in using this platform. All of them have launched sophisticated ways of communicating with customers far beyond individual product promotion. For example, each sported new video campaigns that promoted their brand identity.

At Erco's Twitter wall, visitors were given custom Post-it notes and asked: "What inspires you?" Their answers were then displayed on the outside wall of the stand, creating a dynamic presentation of ideas and emotions which were also posted to the company's Twitter feed. The result was truly a global celebration of design and light, matching the experience that is Light+Building. •

1. Erco's Twitter wall garnered a lot of attention at this year's Light+Building. Visitors were asked "What inspires you?" and posted their thoughts on custom Post-it notes, then displayed at the stand and shared on the company's Twitter feed.
2. Reggiani advertised its new tag line "We Speak Light" at its stand, along with its new product offerings including Splyt, a wallwasher, and Trybeca, a recessed ceiling-mounted luminaire.
3. The invention and artistry of Ingo Maurer was on display at his company's stand in Hall 1.
4. Trick, a new 4-inch-diameter circular LED fixture designed by Dean Skira for iGuzzini was a real standout, with its extraordinary technical capability of a radial optic that can cast light in a 360-degree line.



1

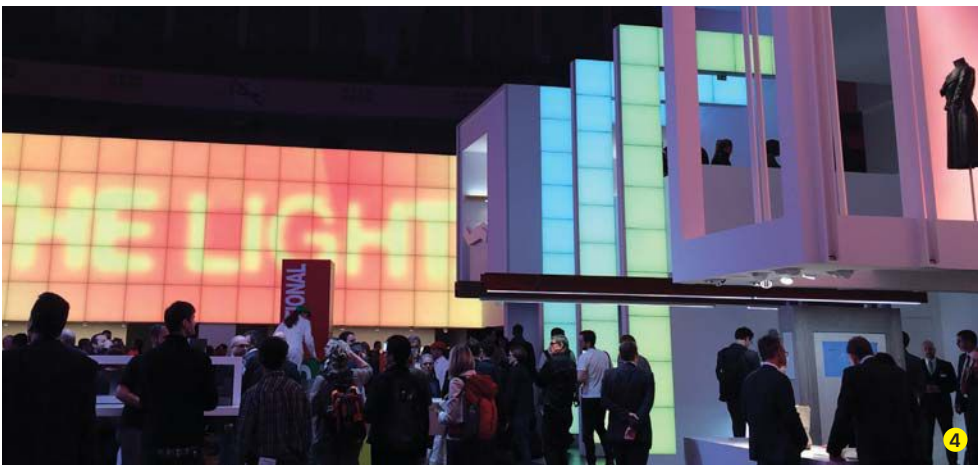


2



3

1. The dynamic form of LZF's Candelabro luminaire was on display at its stand.
 2. A detail of the water-filled colored test tube installation designed by U.K.-based Light Collective for Xicato's tent.
 3. Jake Dyson Products launched Ariel, a direct/indirect fixture.
 4. Zumtobel's stand used groupings of architectural forms and color to set off its product displays.
 5. Selux introduced a modular LED luminaire family called Kju.
 6. Osram exhibited new advancements in OLEDs with this automotive tail light.
 7. Mærset's new outdoor luminaire, Santorini, a colorful play of light and form, is inspired by the lanterns found on fishing boats.



4



5



6



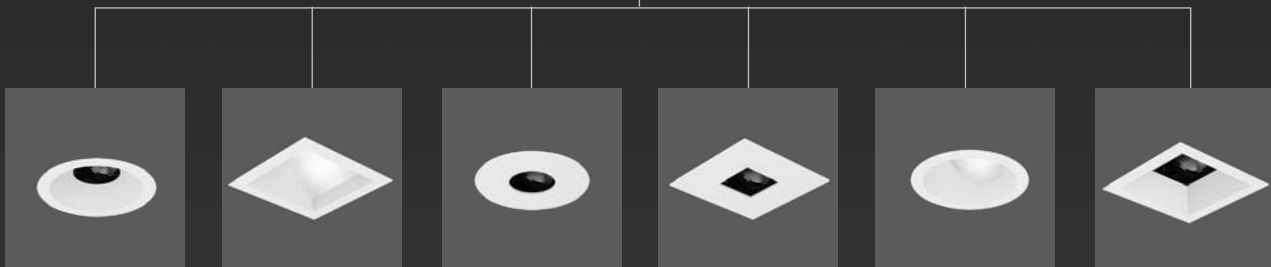
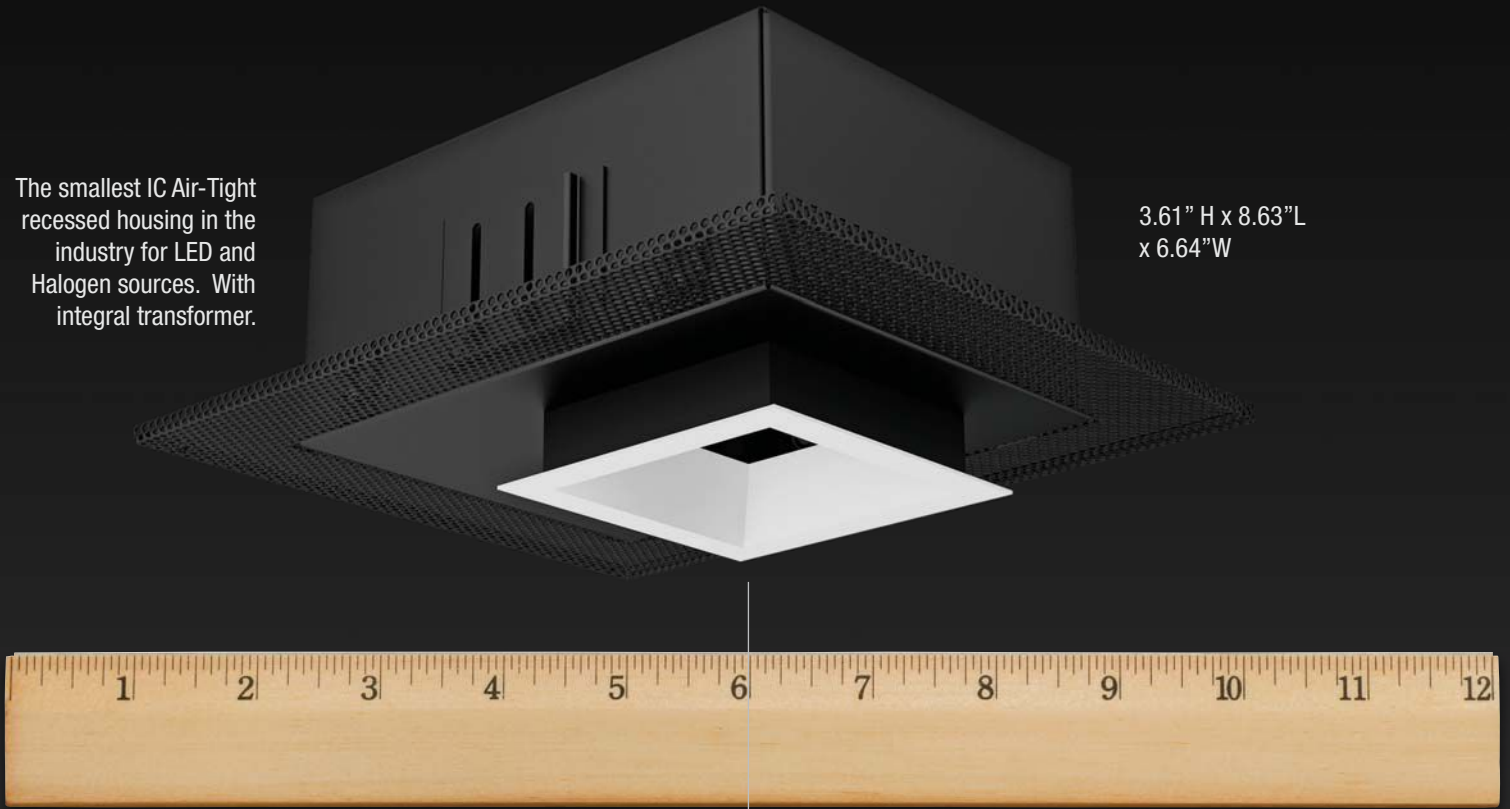
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1: Courtesy LZF; 2: Courtesy Xicato; 3: Courtesy Jake Dyson; 4: Elizabeth Donoff; 5: Courtesy Selux; 6 and 7: Courtesy Messe Frankfurt

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• TECHNOLOGY

LEDs

TECHNOLOGY

A DEEP DIVE IN DIMMING

By its nature, solid-state lighting can dim smoothly, but when paired with legacy technology, some outstanding issues may reappear.

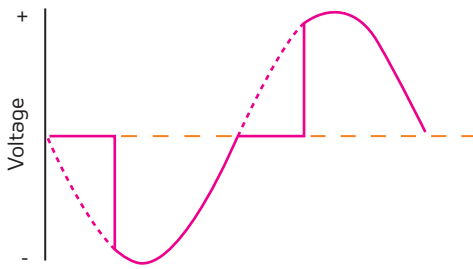
This is the second article in AL's multi-part series examining the critical issues in solid-state lighting. Visit archlighting.com for the previous article in the series, which discussed flicker.

text by Alice Liao

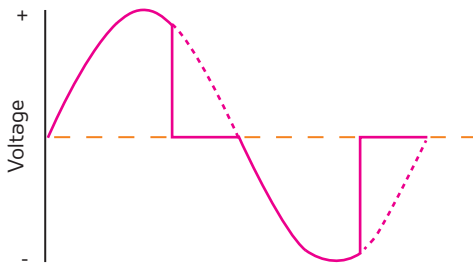
Restaurants and theaters have long employed dimming as a way to create atmosphere, foster a sense of intimacy, and transport diners and audiences alike. Dimming can reduce energy consumption and enhance a space's function, as in the case of a seminar room or lecture hall. But despite their ubiquity, dimmers used with conventional sources can still have problems, including a reduction in efficacy for incandescent lamps, and a reduction in longevity for fluorescent lamps.

The majority of dimming systems installed today are phase control devices. Designed originally for incandescent lamps, they reduce light output by "interrupting the current during each AC [alternating current] half-cycle," says Nadarajah Narendran, director of research at the Lighting Research Center (LRC), in Troy, N.Y., and program organizer of the Alliance for Solid-State Illumination Systems and Technologies (ASSIST) program. Essentially, phase control devices temporarily shut off power to the light source

Forward-phase control dimmer (TRIAC)



Reverse-phase control dimmer



TRIACs cut power to the source in the forward phase, just as the current changes polarity and the voltage in the circuit is zero. Reverse-phase control dimmers cut from the trailing edges of the AC waveform.

and dim voltage. In fact, they're also called phase cut dimmers because the interruptions in current create cuts in the AC sine wave.

The interruptions occur at a rate of 120 times per second, or the frequency at which alternating current delivers electricity over power lines. But because the tungsten filament in incandescent lamps is slow to heat up and cool down, the human eye sees the output as a constant level of decreased brightness. The longer the interruptions, the dimmer the light.

Not all phase control devices cut from the same part of the AC sine wave. A triode semiconductor for alternating current (TRIAC), which is used to dim incandescent and halogen lamps, cuts from the forward phase, which begins just as the current changes polarity and the voltage running through the circuit is zero. Also referred to as forward-phase control dimmers, TRIACs can produce spikes in current that cause dimmed lamps to buzz and add stress to electronic drivers.

Reverse-phase control dimmers avoid these problems by cutting from the latter portions, or trailing edges, of the AC waveform. By switching the light circuit on just as the current changes direction, they allow the voltage to rise gradually before turning it off later in the half-cycle. Also called electronic low-voltage (ELV) dimmers, reverse-phase control dimmers were developed to enhance the performance of halogens that use electronic transformers.

HOW LEDS DIM

As a constant-current source, an LED is inherently dimmable. "The amount of current flowing through an LED device determines the light output," Narendran says. Their level of brightness is adjusted simply by controlling the current passing through the stacked layers of semiconductor material mounted on a substrate.

Unlike conventional sources, dimming does not affect the efficacy or longevity of LEDs, says James Brodrick, lighting program manager in the Building Technologies Office at the U.S. Department of Energy (DOE). In fact, dimming can extend the lifespan of LEDs by lowering their operating temperature.

Moreover, the dimming range of LEDs is broader than that of compact fluorescent and high-intensity discharge lamps. They can turn down to less than 1 percent of full output, compared to 10 to 30 percent of measured light output for compact fluorescents, according to the National Electrical Manufacturers Association (NEMA), and 30 to 60 percent of lamp power for high-intensity discharge lamps, according to the National Lighting Product Information Program.

All LED devices, be they replacement lamps or LED luminaires, require a driver in order to dim. Because they're low-voltage, direct current (DC)

sources, LEDs need drive electronics to convert the alternating current that flows through power lines into a usable and regulated direct current form. These drivers dim LEDs in one of two ways. In pulse-width modulation (PWM), the current sent through an LED is switched on and off at a high frequency—"often several thousand times per second," Narendran says. "The current flow through the LED is the time-averaged value of the current when the LED is on and when it is off." Reducing the amount of time that the LED is on decreases the time-averaged current, or the effective current, delivered to the device and, as a result, its brightness.

LEDs, as well as conventional sources, can also be dimmed through constant current reduction (CCR), or analog dimming. CCR maintains a continuous current to the source, but it reduces its amplitude to achieve dimming. "The light output is proportional to the amount of current flowing through the device," Narendran says.

Both PWM and CCR strategies have their advantages and drawbacks. The more widely used PWM offers a broad dimming range, can decrease light output to values of "less than 1 percent," Narendran says, and avoids color shift by operating the LED at its rated current level—or its maximum light output—and at zero current. However, because PWM dimming involves rapid switching, it requires sophisticated and expensive drive electronics to produce the current pulses at a frequency high enough to prevent perceptible flicker.

CCR dimming is more efficient and simple to implement because of its less complex and less expensive electronic requirements. Unlike PWM, it does not have the potential to generate electromagnetic interference, which can result from high-frequency switching. CCR dimming also allows drivers to be located remotely from the light source, which is helpful in the case of LED replacement lamps or in smaller fixtures where space is an issue. However, CCR is not suitable for applications where dimming light levels below 10 percent is desired. "At very low currents, LEDs do not perform as well and the light output can be erratic," Narendran says.

COMPATIBILITY ISSUES

Although the driver dictates whether an LED product will dim, the driver's performance largely depends on its compatibility with the dimming device, such as a phase control device. The driver must be designed to understand and interpret the signaling by the dimming device in order for dimming to occur.

Many of the dimming technologies used for conventional sources can also work with LEDs. These include zero-to-10V analog, DALI (Digital Addressable Lighting Interface), DMX (Digital Multiplex), and "other techniques that separate

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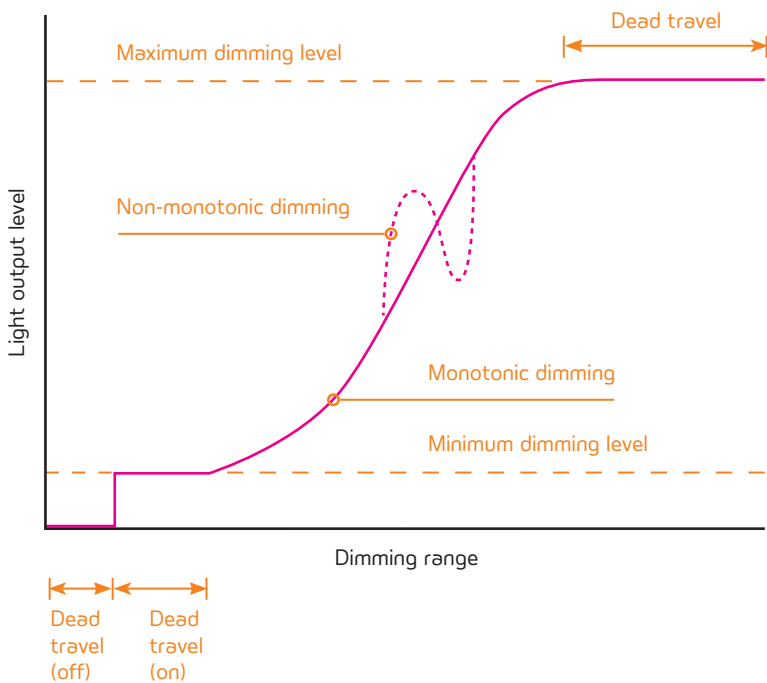
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Dimming Curve



This example dimming profile shows the rate of change in light output as a function of the dimmer range. Not all of these elements may occur in a product's dimming profile.

the dimming signal from AC Mains voltage," Brodrick says.

Installing dedicated wiring that relays dimming information to the dimming device can alleviate compatibility issues because it enables the dimmer and source to operate with little or no interference from each other. However, these types of dimming systems also tend to be more complex and expensive, which may explain why they are more common in commercial applications than in residential.

The most common phase control device is the TRIAC dimmer. NEMA estimates that there are 150 million of these installed in U.S. homes, and that these legacy devices will represent the bulk of dimming devices for replacement LED fixtures as incandescent sources are phased out. Unfortunately, the compatibility of LEDs with TRIAC dimmers is problematic.

One reason for this stems from the difference in how incandescent lamps and LEDs are powered. Incandescents produce light through simple resistive loads that draw electricity directly from the AC grid. The relationship between current, voltage, and brightness is linear and straightforward. A change in the voltage affects the current proportionally.

Not so for LEDs. Because the diodes rely on drive circuitry to ensure constant current and to adapt power and voltage for their use,

their interactions with TRIAC dimmers are less predictable. At low dimming levels, for example, an LED driver designed to supply constant current or constant voltage may try to compensate for the phase cut portions—or interruptions in the AC sine wave—by drawing in more current, causing the LED to stay bright or to flicker.

Moreover, not all drivers are built alike. Different circuitry means different ways of drawing power, converting it, and outputting it. Consequently, pairing a TRIAC with an LED product can be "hit or miss," Narendran says. Also, "one lamp on a single dimmer might work but when several lamps are added in parallel—like in a chandelier—it may not dim well."

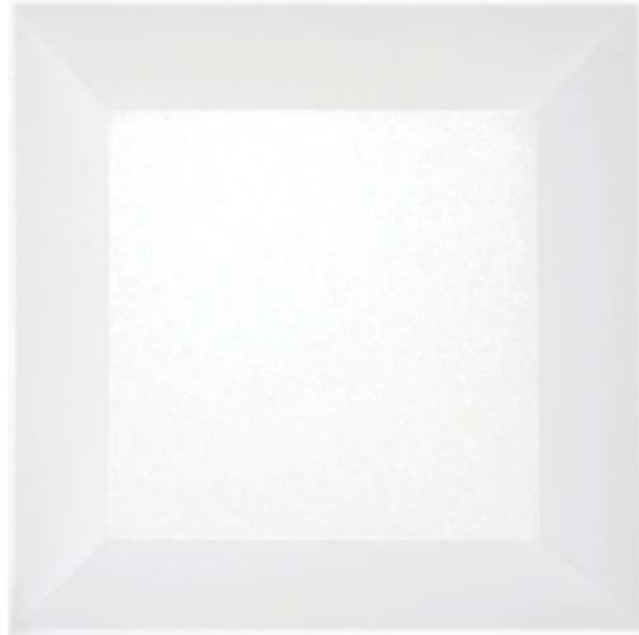
The opposite can be true, says Jan Kemeling, founder and chief sales and marketing officer for Ledzworld, a Dutch manufacturer of LED lighting products. He advises against mixing different LED lamps on the same dimmer because of the variety of driver designs.

The wiring for a TRIAC dimmer further exacerbates matters. Many existing and installed dimmers are two-wire devices; that is, the same wire that provides power to the light source also conveys the dimmed voltage, or dimming signal. This can interfere with the functioning of both the LED device and the dimmer, Brodrick says. Dimmers, particularly those with additional features such as nightlights and light level indicators, have internal circuitry that require constant, albeit minimal, power even when the light source is turned off. With incandescents, this can be done without triggering illumination of the lamps. Because LEDs don't require much to power up, this is a little trickier for those devices, which may also flicker, says Michael Skurla, senior product and market manager, Americas, Indoor Global Systems, Philips Lighting Systems.

The incompatibility between LED drivers and TRIAC dimmers can cause a host of problems. Six such problems are: pop-on, in which the LED source suddenly turns completely on as the dimmer switch is raised from fully off; drop-out, in which the light source shuts off completely as it is dimmed; dead travel, which occurs when changing the dimmer setting produces no visible shift in the light level; ghosting, where light is still visible when the dimmer switch is fully off; audible noise; and flicker.

Flicker, dimming, and color shift are some of the outstanding performance issues that may prompt professional and consumer wariness toward solid-state technology. However, the lighting industry is addressing the issue of dimming on multiple fronts. Released last year, *NEMA SSL 7A-2013 Phase Cut Dimming for Solid State Lighting: Basic Compatibility* seeks to minimize compatibility issues relating to LED

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phase cut dimming by providing design and testing guidelines for both dimmers and LED products. However, the standard only addresses future technologies and does not attempt to regulate past dimming and lighting devices.

DIMMING THE RIGHT WAY

The lighting industry has also developed protocols to bring uniformity to the marketplace. Ledotron is an open digital standard launched in Europe that aims to stabilize dimming performance in systems designed for CFL and LED lamps. The nascent standard results from collaborations between several European manufacturers, including Osram and Schneider Electric.

In North America, the ZigBee Alliance's ZigBee Light Link is a standard for wireless dimming and control of LED products. Created for consumer convenience, Light Link certification ensures that lighting and light control products have plug-and-play functionality and interoperability; those that qualify bear the Zigbee Certified seal.

LRC's 2013 publication *ASSIST Recommends ... Dimming: A Technology-Neutral Definition* suggests performance criteria for dimming, regardless of lamp type, to ensure end-user visual comfort and satisfaction. It sets minimum and maximum light levels (5 percent and 90 percent, respectively), evaluates dimming profiles, and covers issues such as dead travel, flicker, and system efficacy.

In practice, LED dimming problems can be minimized by taking certain precautions. First and foremost, designers should specify dimming control devices that are designed for LEDs. Look for LED source and dimmer combinations that are recommended by the manufacturer of either product, or both.

For wall-box installations, Brodrick advises selecting a NEMA SSL-7A-compliant dimmer and LED sources.

Designers should also perform a full mock-up of all lighting circuits, "including all LED sources and dimming controls, and test over the full dimming range." If a mock-up is not possible, specify a proven LED source and dimmer combination, but make sure the information is no more than six months old.

When using LEDs with phase control dimmers, designers should decrease the maximum load rating of the dimmer, usually given in watts, to minimize stress to dimmer electronics. Although LEDs are considerably more efficient than their incandescent counterparts, determining the number of LED sources that can be connected to a dimmer is not as simple as dividing its maximum load rating by watts per source.

Instead, a decrease is needed to accommodate small spikes in power caused by driver functioning. "Typical de-rating percentages should be in the range of 25 to 30 percent of the dimmer-rated power," Ledzworld's Kemeling says. A dimmer with a maximum load rating of 1,000W would, therefore, be de-rated to 250W. This could then be used to calculate the maximum number of sources that the dimmer could accommodate.

Narendran says that manufacturers are also working to enhance circuitry in both LED drivers and dimming devices for better compatibility with TRIACs. Some drivers incorporate adaptive control processing, Kemeling says. This allows drivers to synchronize with any type of dimmer, but they do cost more. So while advancements in dimming have been made, optimal performance still requires a little more time and energy. •

RESOURCES

A list of introductory articles that discuss the process and common issues related to dimming in LEDs.

"Controlling LEDs," by Lutron Electronics Co., 2011. Available at bit.ly/1kFPBIt.

"The Subtle Circuitry Behind LED Lighting," by Bernie Weir, IEEE Spectrum, Feb. 27, 2012. Available at bit.ly/1nZxsEs.

"Dimming LEDs with Phase-Cut Dimmers: The Specifier's Process for Maximizing Success," by Naomi Miller and Michael Poplawski, Pacific Northwest National Laboratory, 2013. Available at 1.usa.gov/1g3cGfs.

ASSIST Recommends ... Dimming: A Technology-Neutral Definition, by the Alliance for Solid-State Illumination Systems and Technologies and the Lighting Research Center, April 2013. Available at bit.ly/1fMM8EA.

LED Lighting Facts, by the U.S. Department of Energy, 2014. Available at lightingfacts.com.

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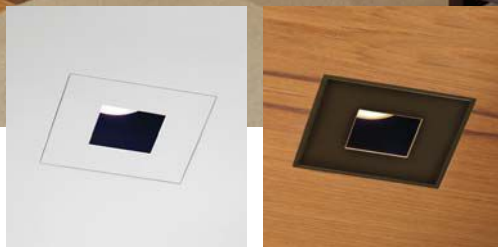
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• PRODUCTS

text by Elizabeth Donoff

This year, more than 450 products were submitted to ARCHITECTURAL LIGHTING for consideration in our annual product issue. While product coverage has always been, and continues to be, an integral part of our editorial lineup, this issue in particular gives us the opportunity to take stock of the state of product development and technological advancements in the industry. And, we have to say, the future looks particularly bright. To start, the number of product submissions this year is a good indicator that the economy is on the rebound and that manufacturers have the resources to expand their R+D efforts. It's also a sign that manufacturers have a greater level of comfort with the transformation from analog to digital and the solid-state products that are associated with that change than they did just a few years ago when LEDs emerged as a game-changer.

On the pages that follow, you'll find more than 150 lighting products, and as you look through them, keep in mind that this is all original-prepared content. We have scoured the spec sheets in search of the best and most pertinent information (and even stumbled upon some interesting typos along the way), all in order to cull out the salient features and technical items applicable to a particular category.

But product launches don't occur in a vacuum. To provide a broader context for this latest class of light sources, luminaires, and control systems, we're including a series of "Technology Trends" throughout this package that examines some of the latest issues affecting product development as a whole. The four topics explored in this issue are 3D printing, alternative avenues of funding, changing form factors, and greater control and automation. It's all part of our continued commitment to provide you with the most informed snapshot of the latest product offerings. •

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TECHNOLOGY TRENDS

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DECORATIVE

Dynamic forms add visual interest for the illumination of residential, retail, and hospitality spaces.

1. Flux Light, Tom Røfffield • The flow of the ocean's tides and the form of its waves informed the design of Tom Røfffield's Flux Light. Fourteen strips of laminated wood conceal the single source, extend outward, and undulate. A pale ash wood veneer on the strips' underside creates a golden glow and complements each one's oak-laminated exterior. Offered with satin nickel, white, and black wiring sets. • tomrofffield.com • Circle 250

2. Monocle, Rich Brilliant Willing • This bedside wall sconce from Brooklyn, N.Y., studio Rich Brilliant Willing features a milled aluminum housing, a braided cord, and a tempered glass lens. Available in finishes including natural aluminum, gold, and black, the fixture is outfitted with a 4.3W line voltage LED that offers 280 lumens at 2700K and with a CRI of 80. It is also available with a high-output 8.7W LED providing 550 lumens. It measures 5¼" in diameter and 4" deep. • richbrilliantwilling.com • Circle 251

3. Rocket LED Pendant, WAC Lighting • This retro-inspired pendant comes in three metallic finishes: brushed nickel, bronze, and chrome. The Rocket LED Pendant's light source emits 2700K at 90 CRI and can be dimmed down to 10%. It meets California's Title 24 requirements. • wacighting.com • Circle 252

4. Rhythm, Modern Forms • Hand-crafted using a wax-casting technique known as "cire perdue," which dates back to the third century B.C., this wall sconce is designed to be a visual representation of sound. An organic ring shape augmented by a step detail encircles a replaceable LED module that produces a high lumen output with a high CRI. Equipped with an electronic low voltage dimmer, the fixture is suitable for use indoors and outdoors. • modernforms.com • Circle 253





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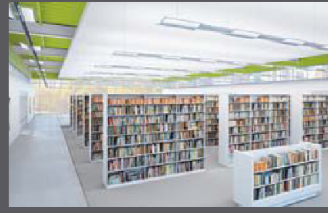
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East River, LBL Lighting • Inspired by San Francisco's iconic Golden Gate Bridge, this linear suspension fixture is equipped with LEDs that shine up—and down—through a diffuser, throwing soft light across its bridge-like trusses. Available in brushed aluminum with an optional orange underside, the luminaire measures 47.2" long, 6.5" tall, and 7.2" wide. It comes with an 8W up/22W down 3000K LED module. • lblighting.com • Circle 254



IC Lights, Flos • The movements of a juggler inspired the form of designer Michael Anastassiades's IC Lights. Offered as a floor (shown), wall-mounted, table, and pendant fixture, the collection features an opalescent blown-glass globe balanced on a slim, metal baton with a painted anthracite or brushed brass finish. It is available with either a 7.87" diffuser that takes a 60W halogen source or with an 11.8" diffuser that takes a 105W halogen source. • flosusa.com • Circle 255



Bizu, d'ac Lighting • Designer Mary Helen Pratte created the Bizu LED pendant exclusively for d'ac Lighting. Its sleek spun-metal shade comes in a variety of colors, making the fixture suitable for interior applications including commercial, institutional, and high-end residential. Offered with either a white or black conductor cable or a rigid stem suspension, the luminaire takes 6W and 8W LED modules in 3000K. • daclighting.com • Circle 256



Optic Pendant, Boyd Lighting • Fashioned by the company's director of design, Doyle Crosby, the Optic Pendant's 5" diameter and 21" frame makes it suitable for a variety of uses including lining a counter or workspace, grouped on a ceiling plate, or singly, accenting the corner of a room. Available in four brass finishes as well as polished or satin nickel, the luminaire can be used with either MR16 halogen (50W max) or dimmable LED (12W max) sources. • boydlighting.com • Circle 257



Kant, Estiluz • Kant is a metallic LED wall sconce with a swing arm and adjustable head. The fixture can be folded flat to the wall when not in use, and an on-off switch can be installed to either the right or left of the luminaire. Its 8W LED source provides 3000K at a CRI of 80. Available in white, red (shown), and black finishes. • estiluz.com • Circle 258



Rockstar, Corbett Lighting • As its name suggests, no two Rockstar luminaires are the same. Fashioned from agate slices arranged in a tiered, V-shaped pattern on a gold leaf-finished metal frame, the luminaire emits sunset hues well-suited to dining rooms and baths. The collection comes in single- and two-source sconces, a four-source ceiling flush mount, and six-, 10-, and 16-source pendants. • corbettlighting.com • Circle 259



Oyster Bay, Hudson Valley Lighting • This crystal sconce is inspired by a turn-of-the-20th-century original that can still be found in a historic estate in Long Island, N.Y.'s Oyster Bay community. In aged brass or polished nickel, the fixture's shard of cut crystal and sculpted shade embody the spirit of the Gilded Age. It takes a 60W E12 candelabra lamp. • hudsonvalleylighting.com • Circle 260



Cyla Table Lamp, jGoodDesign • Designed for residential interiors, this hand-crafted table lamp is offered in a variety of sizes and configurations, each signed by its designer, Jeff Goodman. A brushed aluminum or brass post extends from a bamboo base and is topped with a hand-blown glass shade that is available in custom colors from clear to translucent white to dark purple. The luminaire can be lamped with incandescent, LED, halogen, and fluorescent sources. • jgooddesign.com • Circle 261



Circle Pendant Lamp, Kenji Kondo Studio •

This single-source pendant from Kenji Kondo's Albuquerque, N.M., design and fabrication atelier is made from interlocking, 0.125" laser-cut Baltic birch plywood rings. At 12" tall and 22" in diameter, it is suspended from a 12' swag lamp cord, suiting it for use over a small dining table or as an accent for the corner of a room. • kenjikondo.com • Circle 262



Cleo, Bruck Lighting •

Cleo's high-gloss, crystal-clear hand-blown glass shade is internally lacquered to create an opaque white or black exterior. The interior is hand-coated with gold- or silver-leaf flake, which produces either a warm glow or a shimmering cool light from a 6.25" opening. Suspended from either tracks or 2" and 4" canopies, the luminaire is offered with LED, low-voltage halogen, or line-voltage sources. • brucklighting.com • Circle 263



Axel, Leucos •

This circular suspension fixture serves as a source of light and music. Equipped with a 36W LED module, the matte or glossy white lacquered metal disk doubles as a speaker and is fitted with an FM radio and a Bluetooth 2.0 connection. Suspended from a white cord, the luminaire can be installed in single or tandem arrangements over spaces such as a dining table. • leucos.com • Circle 264



La Discrète, Mørset •

Designed by Fabien Dumas, La Discrète is a lamp and shelf all in one. Constructed from a bent frame of lacquered metal and a base of oak, the fixture takes a 60W A19 incandescent or an 18W T2 compact fluorescent. The luminaire comes with a bracket for mounting to a wall, but it also can rest on a table or a ledge. • morset.com • Circle 265



Xacara, Beta-Calco •

This LED pendant from Beta-Calco gets its industrial aesthetic from the cellular ring of powdercoated, die-cast aluminum that serves as its shade. For use in residential and commercial spaces, it can be suspended from either a stainless steel aircraft cable or a steel tube, and it features a clear power cable with silver wiring. A protective lens is also available. It can be lamped with 11W, 15W, and 26W LEDs from 3000K to 5000K and with a CRI of up to 90. • betacalco.com • Circle 266



Perla, Luminosa •

This pendant lamp from Mexican lighting design studio Luminosa is inspired by the iridescence of pearls. Perla's hand-blown glass shade engulfs the source and is available in a variety of colors. During the day, its luster reflects the prevailing light conditions. At night, it emits a soft, warm inner glow. It can be installed solo or as an array in applications requiring intimate lighting. • studioluminosa.mx • Circle 267

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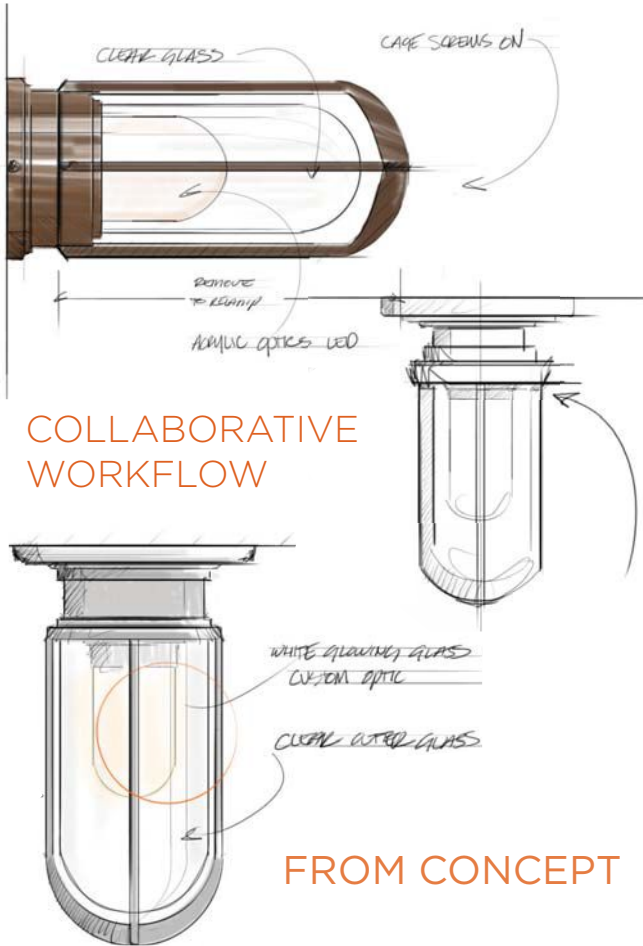
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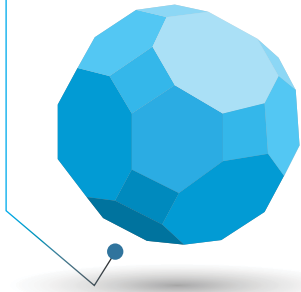


Fenta Standing Lamp, David Weeks Studio • With a name derived from the French word *fente*, meaning "slot," this standing lamp's brushed-brass upright armature is held in a custom-cast concrete base. The studio's Boi shade—in ivory or matte black powdercoated steel—is attached to the armature by a single wooden dowel. The fixture is lamped with G16.5 globes at up to 60W. • davidweeksstudio.com • Circle 268



Chouchin Mini, Foscarini • Foscarini's lacquered glass Chouchin pendant is now available in two smaller versions, each in its own color. N.1 is orange; N.2 is green. For use alone or in multiple configurations to create horizontal or vertical compositions, the fixture emits a warm indirect glow as well as direct light. It takes 35W halogen or 4W LED sources. • foscarini.com • Circle 269

TECHNOLOGY TRENDS



POWER TO THE PRINTER

Additive manufacturing technology is yielding both high-design and high-tech lamps, luminaires, and lighting systems.

Text by Hallie Busta

Three-dimensional printing is among a burgeoning suite of manufacturing technology that's bringing a greater level of complexity to product design. For lighting, its proliferation in research labs and design studios is yielding new products ranging from luminaires to more efficient optics.

In March, Philips released two decorative luminaires that combine a 3D-printed form with the integrated controls of its Hue platform and are informed by geometries found in nature. German studio WertelOberfell collaborated on Entity, a table lamp and pendant that feature repeated circular perforations, while Danish studio Strand + Hvas designed Tempest, a table lamp with a bird's-nest-like shade of 3,000-plus white plastic sticks. "This was translated into a complex design, only possible when 3D printing is combined with Philips Hue," said Christina Strand of Strand + Hvas.

Optics also are getting a boost in efficiency. Dutch firm Luxexcel, which prototypes and manufactures optical components, uses UV-curable ink to print smooth and transparent optics for LEDs. Ink droplets are distributed atop a transparent substrate such as PMMA or polycarbonate, with each droplet flowing into the next, eliminating the stacked layers frequent to most 3D-printing processes. This method aims to lower the cost of printed optics while allowing for customization, says Michiel Cremers, Luxexcel's online marketing manager. "With 3D printing, the inventory is digital," he says, which allows the number of and variations to the optics to be created on a per-job basis.

Researchers at Disney and at Carnegie Mellon University's Computational Design Lab and Human-Computer Interaction Institute are working on a way to develop 3D-printed optical systems for interactive devices. That would allow the devices to be printed in full, rather than assembled as a system of components, by integrating sensors, display interfaces, and illumination elements. •



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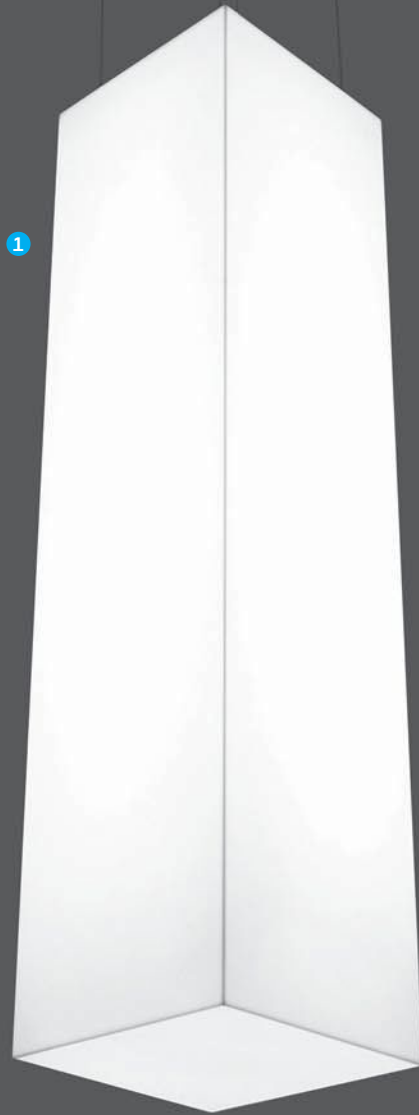
1. Kubo Collection, 3G Lighting • Kubo is a family of linear, square pendants with sandblasted acrylic diffusers fabricated with mitered corners. Offered with either white LEDs or RGB color-changing LEDs, the luminaire consumes 80W of power. White is offered in either 3000K or 3500K with an integral electronic driver and optional dimming. The color-changing LEDs must be connected to a remote 3G power supply and controller. • 3glighting.com • Circle 270

2. Suspended Double Box 107, Vode Lighting • This suspended linear LED luminaire has a modular snap-fit assembly. Its rectangular profile measures 2.48" tall by 1.14" wide and it is made of extruded and machined aluminum. It mounts via field-adjustable suspension cables to a ceiling-mounted J-box or driver housing. This system can be specified in lengths from 1' to 8', continuous runs, as well as non-standard configurations. • vode.com • Circle 271

3. Tangent, VoksLyte • This customizable, 2"-wide contoured luminaire is available in suspended uplight-downlight formations, as well as surface-mounted, pendant, and recessed downlights. Light engine options include standard 6W per linear foot or high-output 12W per linear foot in 2700K, 3000K, 3500K, and 4000K in addition to factory-made T6 cold cathode lamps. Lenses are high transmission translucent acrylic. • vokslite.com • Circle 272

4. Tecton LED, Zumtobel • This linear system provides lines of light in an individual unit or in continuous rows and is suitable for commercial applications. Available in wide-, shelf-, narrow-, and asymmetric-beam distributions, the fixtures come in 4', 8', and 12' lengths. Consuming 48W per 4' length, the light engines deliver up to 4,380 lumens. LEDs come in 3000K and 4000K with a CRI of 80-plus. An integral dimming driver dims to 10%. • zumtobel.us • Circle 273

1



2



3



4

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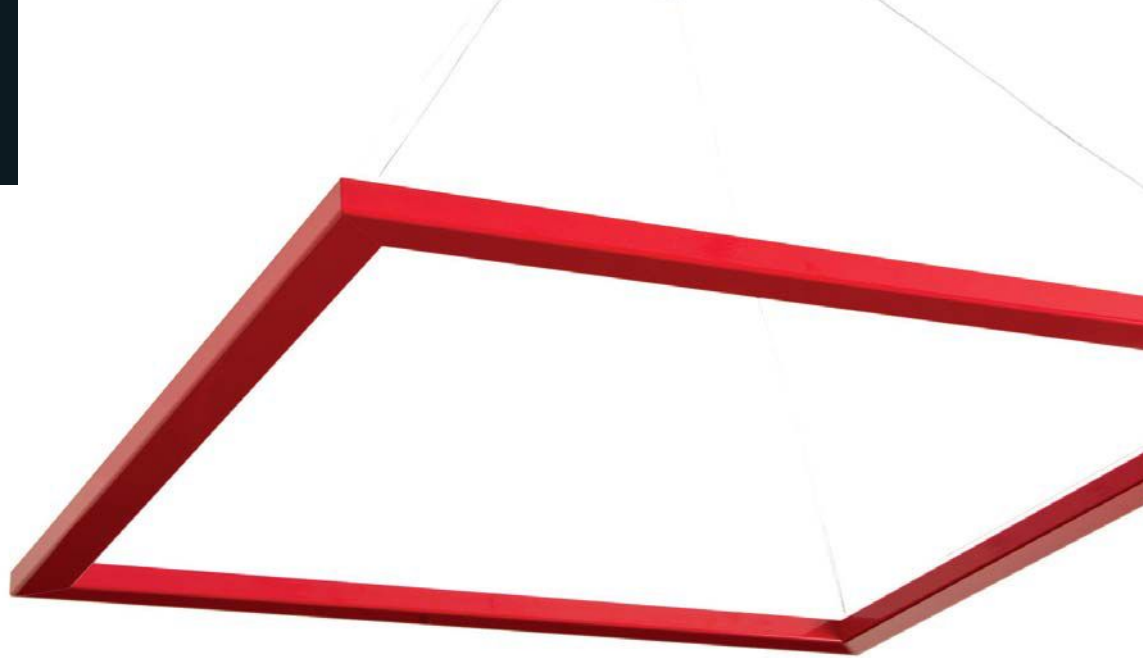
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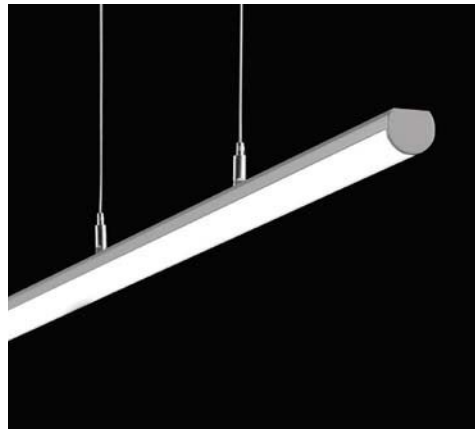
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E1-Indirect LED, Finelite • Suspended from thin cables, this 1.25"-wide-by-0.8"-tall indirect LED series is available in linear, square, or rectangular configurations. Standard 2', 3', 4', and 8' lengths can be combined to achieve longer runs, with a required suspension point every 4'. Its extruded aluminum body has steel end-caps and an 89% transmissive frost-white top diffuser that snaps into place. The fixture maintains 90% of its initial light output for 100,000 hours, the company says. Its standard output uses 2.3W per linear foot and delivers 210 lumens per foot; its high-output version consumes 4.9W per linear foot and delivers 380 lumens per foot. The LEDs come in 3000K, 3500K, and 4000K with a CRI of 87 and an R9 value of 36. The constant-current electronic driver accepts 120V or 277V and is mounted in a canopy box. Dimmable via zero-to-10V controls down to 10%. A white powdercoat finish is standard. ETL listed. • fineliteled.com • Circle 274



Erika LED 125, Birchwood Lighting • Erika is a 1.25"-square LED luminaire with a frosted white or frosted clear bottom lens that can be configured in squares or rectangles. Available in 2700K, 3000K, 3500K, and 4000K, the fixture uses either 10W per lumen foot at 790 lumens or 5W per lumen foot at 410 lumens. A remote electronic driver accepts 120V or 277V with dimming options down to 1%. The housing comes in either a white or a black powdercoat. • birchwoodlighting.com • Circle 275



Pilot, Insight Lighting • This linear LED luminaire is suitable for task or cove applications. Manufactured from aluminum extrusions with a one-piece extruded acrylic lens, beam distributions range from 7 degrees up to 120 degrees in addition to an asymmetric option. Wattages from 3.5W per linear foot to 10W per linear foot are offered at 2700K, 3500K, and 4000K. An RGB LED option is available in 6W per linear foot in 120-degree distribution only. • insightlighting.com • Circle 276



Zenith, Prudential Lighting • This aircraft-cable-suspended LED pendant is available in 2'-, 3'-, and 4'-squares. It is offered in low-, standard-, and high-lumen outputs that range from 2,800 lumens at 35W to 11,200 lumens at 120W. With a CRI of 88, color temperatures are 3000K, 3500K, and 4000K. Distribution is approximately 120 degrees with a round or square satin acrylic lens. Universal 120V to 277V constant-current drivers are single-circuit and dimmable via zero-to-10V dimming controls. • prulite.com • Circle 277



Glide, Edge Lighting • These I-beam-shaped, 2"-tall-by-1.4"-wide linear, suspended, lensed luminaires are offered in glass and wood (shown) for indoor applications. Using 7.5W per linear foot, it is offered with warm-white (3000K) or very warm-white (2700K) LEDs at a CRI of 82-plus. The flat lens produces a 100-degree beam spread. Power is delivered via a 26"-long rectangular center canopy that feeds 24V power with a Class II electronic transformer. The included transformer fits inside a standard 4" plaster ring electrical box. Cables and hardware have a satin nickel finish and glass finish options are black, white, and mirrored. Wood finish options include maple, walnut, cherry, white oak, and espresso with a choice of bronze or satin nickel accents. Horizontal widths range from 36" to 72" depending on finish selection. • edgelighting.com • Circle 278

Nivo, Focal Point • This frameless, 2' by 2' luminaire features a decorative diffuser that can extend between 1" and 7" below the ceiling. The LED panels evenly backlight the 0.125"-thick formed, frosted acrylic lens which also can be specified flush. Available in four light outputs ranging from 2,260 lumens to 3,871 lumens and consuming 28W to 49W of power. Standard color temperatures include 3000K, 3500K, and 4000K at a CRI of 80. Dimmable 120V or 277V driver is standard and dims down to 10% with zero-to-10V controls. Its single-piece steel housing allows access to a steel driver compartment; both the LED modules and drivers are replaceable from below. Factory options include emergency battery pack, drywall frame kit, or flex whip. UL and cUL listed. Finish is a matte satin white powdercoat. • focalpointlights.com • Circle 279



Lumination IS Series LED Luminaires, GE Lighting • Designed to light open ceiling commercial applications, this low-bay indirect luminaire can be suspended from existing ceiling supports. With a snap-in feature that allows for continuous lines of fixtures to be installed quickly, the luminaire comes in 1' by 4' and 1' by 8' models. LED color temperatures include 3500K and 4000K with a CRI of 80. System input power is 39W or 48W for a 4' model with an integral zero-to-10V or DALI dimming driver. • gelighting.com • Circle 280



SkyRidge, Eaton's Cooper Lighting/Metalux • SkyRidge is offered as either a 2' by 2' or a 2' by 4' troffer with precision-formed optics, including an optical-grade acrylic lens that uses the company's WaveStream LED technology. LEDs are available in 3000K, 3500K, and 4000K at a CRI of 85. An integral electronic driver is offered for 120V to 277V applications and dimming is standard with zero-to-10V controls or an optional DALI dimming driver. cUL listed for damp locations. • cooperlighting.com • Circle 281



Rubix, WAC Lighting • This surface-mounted, LED luminaire is designed for use indoors and outdoors. Its housing is die-cast aluminum with an etched-glass lens. Mounting directly to a J-box, the 34W 5"-wide-by-5"-deep wall sconce version (shown) provides both upward and downward illumination with an output of 2,004 lumens, while the ceiling-mounted version is offered as a downlight only and is available at 17W and 5" wide by 5" deep as well as at 32.5W and 10" wide by 4" deep. • waclighting.com • Circle 282



Eclipse I and II, Bruck Lighting • This pair of wall-mounted, indirect LED sconces features elliptical apertures and is fabricated from extruded aluminum. Available in two sizes, the 7" version provides 400 lumens at 8.8W, while the 12" version (shown) offers 800 lumens at 15W. The LEDs are offered in 3000K with a CRI of 85. An integral driver is dimmable via reverse-phase electronic-low-voltage or TRIAC controls. The fixture mounts to a standard 3" to 4"-round J-box. ETL and cETL listed. • brucklighting.com • Circle 283



Vellum, Acuity Brands/Peerless Lighting • This suspended 4'- or 8'-long LED luminaire is constructed of extruded aluminum with die-cast aluminum end-caps and no exposed fasteners. Using edge-lit guide technology, its LEDs deliver up to 4,400 lumens per 4' section in 3000K, 3500K, and 4000K at a CRI of 80-plus. Its optical system uses a high-performance acrylic lens with a microstructure film. An integral electronic zero-to-10V dimming driver accepts 120V, 277V, or 347V. • peerlesslighting.com • Circle 284



Index, Eaton's Cooper Lighting/Neo-Ray • Ideal for offices and conference rooms, this pendant-mounted system is comprised of precision optical panels that can be ordered in standard or custom configurations. Each panel is made of die-cast and extruded aluminum and features optical-grade acrylic lenses with the company's WaveStream technology. Several direct and direct/indirect distributions can be achieved by specifying the wing aim. • cooperlighting.com • Circle 285



Producer Linear LED, Amerlux • This 3"-wide-by-3.5"-tall suspended LED pendant is suited for ambient, aisle, and display applications. Offered in 4' or 8' lengths or continuously row-mounted, the housing is a single piece of extruded aluminum with a die-formed, cold-rolled steel internal wiring compartment. A snap-in lens is made of extruded clear acrylic with a custom prismatic pattern. Consuming either 5W per linear foot or 10W per linear foot, the LEDs are offered in 2700K, 3000K, 3500K, and 4000K. • amerlux.com • Circle 286



StreamLine, OptoLum • This surface-mounted luminaire measures 0.56" tall by 0.60" wide, including the mounting clip. Designed as an LED replacement for linear T5 lamps, it consumes 8W per linear foot and delivers 375 lumens per linear foot. With a CRI of 85, the LEDs are offered in 2700K to 5000K. Available in 1' lengths up to 5' long, the fixtures can be connected end-to-end and linked in runs up to 12' long. The polycarbonate lens diffuses any visible LED pixelation. • optolum.com • Circle 287



Verge, Pure Lighting • Verge is a slim, plaster-in LED light channel designed for indoor, ambient lighting in retail, hospitality, and residential spaces. Intended to create the effect of illuminated corners and floating walls, the 24V DC linear LED system mounts directly to the studs and plasters into 5/8"-thick or thicker drywall. Available in 5' increments up to 40' long, the fixture can be field cut. It measures 0.75" wide by 0.87" tall. Its white LEDs are available in 2400K at 80 CRI, and 2700K or 3000K at 85 CRI. • purelighting.com • Circle 288

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Eco2LED Series, Contrast Lighting • The Eco2LED Series of fixed and adjustable 3.5" and 4" aperture LED downlights provides up to 740 lumens at 11W. Its LED modules offer color temperatures of 2700K and 3000K at 80 and 90 CRI and in a 30-degree narrow flood or a 45-degree wide flood. An integral dimmable driver accepts 120V AC. Its reflectors are available in natural anodized, painted white, and matte white finishes. All housing options are insulation-contact rated and airtight. • contrastlighting.com • Circle 289



CSL Eco-Downlight LED 2" Mini, Creative Systems Lighting • This 2" aperture, 14W LED downlight delivers up to 800 lumens in 2700K, 3000K, 3500K, and 4000K and with a CRI of 80 (90 CRI in 2700K only). Round and square die-cast aluminum trims are available with optical distributions of 25, 45, and 65 degrees, as well as an optional 85-degree optic or shower trim. The housing contains an integral driver, and the luminaire is dimmable via incandescent dimmers. • cslighting.com • Circle 290



Diva 2 Spot, Feelux • A slim profile suits this recessed 4W LED spotlight for niche and cabinet displays. Able to be connected to the company's Diva 2 linear LED fixtures, this round luminaire mounts by way of a surface-mount ring or friction-fit slim pocket with optional mounting springs. The Diva 2 Spot operates at 24V DC through a remote constant-voltage driver and is dimmable. A single-diode LED serves as the light source and is available in 3000K, 4000K, and 6000K at a CRI of 80. • feelux.com • Circle 291



4x8 Dual Optic Multisource Directional, Kurt Versen • This dual source single- or dual-circuited 4.5" by 8.5" rectangular aperture downlight is designed with plug-and-play connectors for field conversion to future sources. It comes with two Xicato LED modules in 1,000-lumen and 1,300-lumen packages in 2700K, 3000K, 3500K, and 4000K and at a CRI of 80 or 95 (for the 1,000-lumen model only). Medium beam spread is standard, with narrow and wide distributions also available. • kurtversen.com • Circle 292



Gimbal, Acuity Brands/Lithonia Lighting • The LED Gimbals—4G1, 5G1, and 6G1—are a series of adjustable LED modules in diameters of 4", 5", and 6" that use tension springs and friction clips to mount into most housings. Spun steel gimbal reflectors allow 180 degrees of rotation and a 35-degree tilt in both directions, while a wide-flood 90-degree beam angle provides even illumination. Light output ranges from 435 lumens at 8W to 620 lumens at 11W at 3000K with a CRI of 80-plus. • lithonia.com • Circle 293



4" LED Architectural Recessed Fixture, MaxLite • MaxLite designed a recessed 26W LED downlight rated for direct insulation contact, making it suitable for through-branch circuit wiring. A concealed LED array provides 1,515 lumens with a correlated color temperature of 4000K. An anodized aluminum reflector supplied in a haze finish minimizes glare. The thermally protected housing has an external universal voltage 120V to 277V driver for ease of maintenance. • maxlite.com • Circle 294

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Miro Cube ARC WNC, Rosco • The Miro Cube ARC WNC—a 4" by 4" by 4.25" LED positionable downlight—is offered in two configurations: a 1,200-lumen RGBW color-mixing version that uses Osram Ostar's multichip LEDs, and a 3,100-lumen, 2800K to 6500K, tunable-white one that uses Cree's XM-L LEDs. Standard beam spread is 15 degrees with optical lenses to produce 20-, 40-, and 60-degree distributions for the tunable white version only. • rosco.com • Circle 295



MKS Advanced LED 5" Downlight Series, Sunlite Manufacturing • This series of insulation-contact-rated, baffle-trim LED downlights is offered in round and square 5" apertures. The white baffled trim houses a recessed, convex diffusing lens made of impact-resistant polycarbonate. Consuming only 20W and delivering between 1,000 lumens and 1,780 lumens, the Nichia LED source is available in 3000K, 3500K, and 5000K with a CRI of 80. • sunlite.com • Circle 296



BeveLED Mini with Color Curve Dimming, USAI Lighting • Fitted with interchangeable optics for adjustable accent and wallwash applications, this 3" round- or square-aperture, recessed LED downlight offers 700 lumens at 12W and 950 lumens at 18W. The LED module is available with a CRI of 80-plus and with color-curve dimming that starts at 3500K at full output and dims to 2200K. Reflector options include 25-, 35-, and 50-degree distributions. Various dimming drivers are also available. • usailighting.com • Circle 297



LED Multiple Lighting System, NSpec by Nora Lighting • Nora Lighting's architectural division—NSpec—is now offering one, two, and three adjustable LED sources in a single recessed linear aperture. Uses Cree LMH2 LED modules in 850-, 1,250-, 2,000-, and 3,000-lumen packages at 2700K, 3000K, 3500K, and 4000K, as well as warm-dimming options of 1800K to 2700K in a CRI of 90-plus. Each LED gimbal is vertically adjustable to 35 degrees with 360 degrees of horizontal rotation. • noralighting.com • Circle 298



AC LED 6" Open Trim, Progress Lighting • Designed for use in wet locations in new construction as well as retrofits, the LED module in this 6" downlight insert delivers 825 lumens at 13W and is available in 3000K with a CRI of 80. Its white overlap trim includes a recessed frosted polycarbonate lens to control direct glare, and it installs via three friction spring clips. The AC LED module accepts 120V input and is compatible with many 120V AC phase dimmer controls. California Title 24-compliant. • progresslighting.com • Circle 299



Beyond Halogen Housings, No. Eight Lighting • A series of multiple recessed housings for LED modules in two, three, four, and quad configurations, including insulation-contact-rated options. The housing accepts adjustable, fixed, and wallwash (square and round apertures) LED modules in 3000K at CRIs of 85 and 95, and they can deliver up to 900 lumens at 15W. Module types can be mixed in the same housing and controlled separately or together. • 8lighting.com • Circle 300



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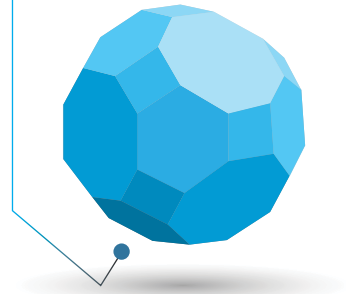
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TECHNOLOGY TRENDS



GROWN FROM THE GRASSROOTS

Crowdfunding is helping startups and research teams gain a competitive edge by securing consumer support before production starts.

Text by Hallie Busta

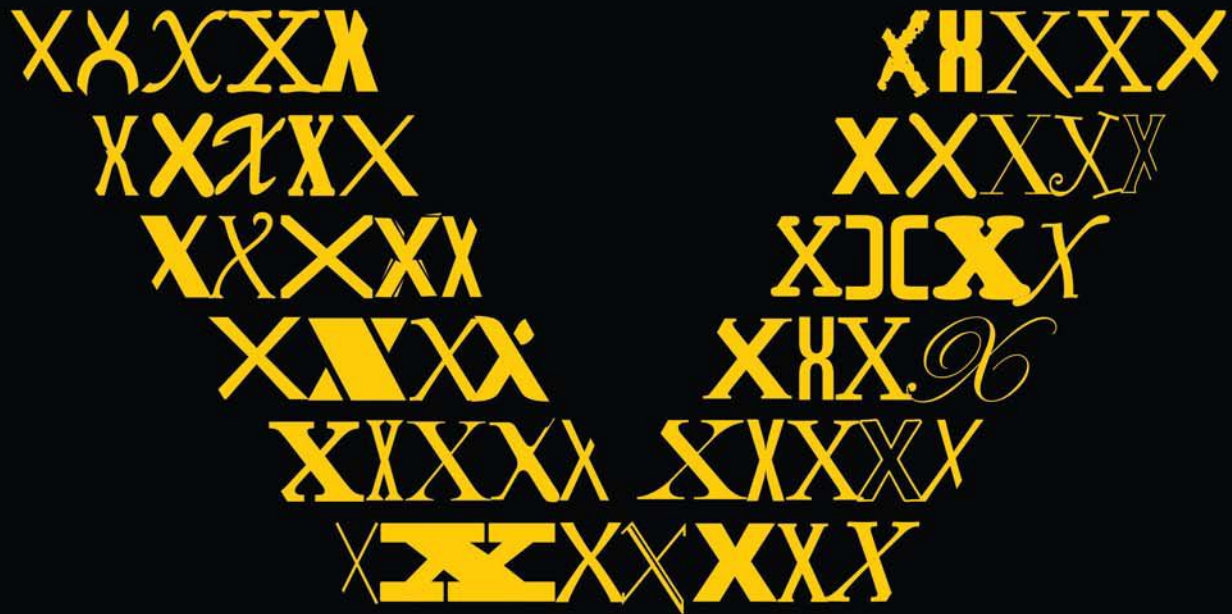
Crowdfunding platforms are the latest disrupters in product development, allowing nascent startups to challenge legacy manufacturers that have traditionally been a primary source of research and development. And lighting is not immune to this development.

The makers of the Nanoleaf LED lamps, for example, surpassed their \$20,000 goal by raising \$273,278 on Kickstarter last year. The series includes a 100W-equivalent 3500K lamp that consumes 12W at 150 lumens per watt. Its circuit board is bent into an A19 form factor with an omni-directional LED display on the surface.

Like a growing number of startups, the Nanoleaf team chose to use crowdfunding to raise the needed cash to fulfill its first manufacturing run. "We didn't have any products that were already on the market, and nobody knew of us," says Gimmy Chu, Nanoleaf's product development manager. "We were able to get enough funding to create a purchase order that was large enough to manufacture in bulk and actually drive down the manufacturing cost."

In January, Nicolas Roope, co-founder of London design studio Hulger, told ARCHITECTURAL LIGHTING—bit.ly/1d8m9zp—that his company chose to crowdfund the launch of its second-generation Plumen CFL lamp to rouse consumer interest. "Otherwise, it's all guesswork and focus groups," he said. "It completely changes the dynamic."

Researchers are also gaining from crowdfunding. Walter Weare, an assistant professor of inorganic chemistry at North Carolina State University, used the research-focused crowdfunding platform Experiment to supplement the funding he received from the university to develop better-performing and eco-friendly OLEDs. "Hopefully," he says, "when we have success with crowdsourcing and with the science, [federal agencies] will pick up the larger portion of the research dollars that are necessary to move this forward." •



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Champion EMW, Barron Lighting Group/Extronix Emergency Lighting • This IP66-rated emergency lighting unit is vandal resistant and stands up to extreme weather conditions (-20 C). The fixture is powered by a NIMH battery and uses the company's self-test/self-diagnostics system that is programmed to run on a 30-day and a six-month cycle. The fully gasketed, powdercoated housing features a polycarbonate shield and can be outfitted with either MR16 lamps or LEDs. • barronltg.com • Circle 301



Firehorse HotSpot2 LED Emergency Lighting System, Fulham Co. • The HotSpot2 converts any constant-current LED fixture into an LED emergency lighting system. It is composed of an LED driver and battery pack, mounted inside or near a fixture, to power the luminaires' modules. HotSpot2 runs on universal voltage (120V to 270V) up to 20W and can be grouped with 10 different battery packs ranging from 900mA to 6,000mA. Both a NiCad and LiFePo4 battery option are available. • fulham.com • Circle 302



Quantum ELMLT, Acuity Brands/Lithonia Lighting • The Quantum ELMLT features track and swivel lamp heads for high-output illumination greater than 90-minute code requirements. For a 3' path of egress, one fixture can be mounted every 60' at a height of 7.5'. The damp-location-listed unit uses self-diagnostics and wireless reporting, has a patented Quick-Mount system and toolless entry for battery (NiCad) maintenance. Four models run at 6V (18W to 54W); 12V model uses 72W. • lithonia.com • Circle 303

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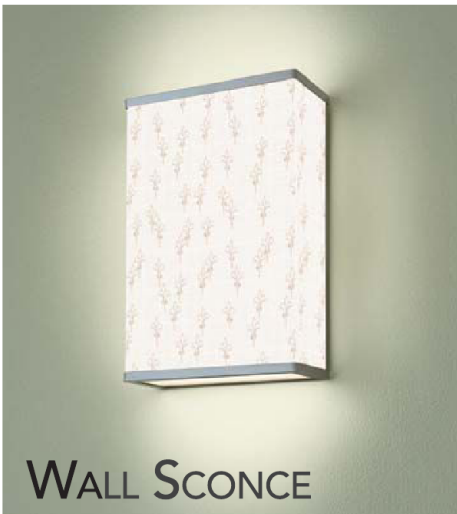
To find out more about Verbatim's full range of LED lamps please visit verbatimlighting.com

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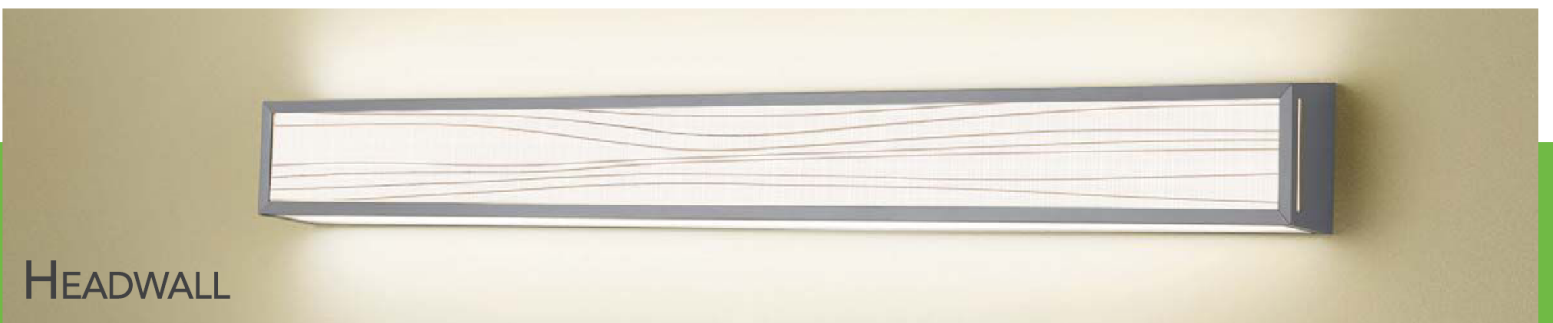
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INDUSTRIAL

From tall ceilings to low-traffic stairwells, these products are designed to amplify illumination.



Cylinder Series 3.0, Meteor LED • This LED surface-mounted or suspended drum-shaped high-bay luminaire is designed for high-ceiling applications. The 195W fixture's aluminum-and-steel housing is finished in black or white and measures 16" in diameter and is 13.5" tall. Twelve LEDs offer 3000K, 4000K, 5000K, and 5700K in CRIs of either 75, 85, or 95. Beam angles include 25-, 40-, or 60-degree distributions delivering 12,550 to 19,040 lumens. • meteor-lighting.com • Circle 304



Dual Sensor LED, LaMar Lighting • Two external infrared motion sensors control this surface-mounted, 3" by 48" bi-level LED luminaire. For use in stairwells, utility rooms, and other areas where full output is not always required, its standby operation is 20% of total output while full output engages upon occupancy. The die-formed steel housing is fitted with 144 LEDs that provide 1,800 lumens at 5000K with a CRI of 70-plus. Dual sensors have a 26' detection range and 360-degree viewing. • lamarlighting.com • Circle 305



Sonar Industrial LED Fixtures, Delray Lighting • This low-bay LED luminaire is available in two spun-anodized aluminum reflector sizes: 13" and 17" in diameter. It provides more than 3,400 lumens, consumes 50W, and comes in 3000K, 3500K, and 4000K at a CRI of 86. The lens is made of frosted, 3/16"-thick, tempered-soda-lime glass with a 2" ventilation opening that is secured with a rubber gasket and held in place with three locking clamps. For dry locations. • delraylighting.com • Circle 306



Aramis AR150, Luminis • Luminis's 6" aperture, high-power AR150 offers a wide, 40-degree distribution for use in high-ceiling applications. The luminaire delivers 8,700 to 13,700 lumens, and its LED array is available in 3000K, 4000K, and 5000K with a CRI of either 70 or 80. A ventilated cast-aluminum heat sink and a multifaceted etched aluminum elliptical reflector are housed within a cast aluminum body that has a removable top for easy maintenance. Surface-mounted or suspended, it consumes 86W to 138W. • luminis.com • Circle 307



Relume Indoor Lighting Systems SpunBay LED High Bay Fixtures, Revolution Lighting Technologies • With a 22.7"-diameter spun-aluminum housing, this large-scale LED high-bay is suitable for tall-ceiling applications such as warehouses and supermarkets. High-powered LEDs deliver 13,820 lumens while consuming 148W and deliver either 5000K or neutral white 4000K light with a CRI of 68. Occupancy sensor and wire-guard options are also available. • relume.com • Circle 308



48,000-Lumen DLE, Digital Lumens • Digital Lumens adds to its DLE line of intelligent LED luminaires a 48,000-lumen fixture for use in high-ceiling applications such as convention centers, arenas, and large factories. The aimable high-bay system is fitted with occupancy, daylight, and temperature sensors as well as wireless networking and fully integrated controls. The 5000K LEDs consume 480W per fixture with a CRI of 70-plus. Narrow and wide light distributions are offered. • digitallumens.com • Circle 309

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LAMPS & BALLASTS

Replacement lamps borrow conventional form factors while pushing enhanced performance.



Hybrid Type LED Bulb, Aamsco • Designed to replace a 40W incandescent, this clear LED A-shape lamp replicates the appearance of a decorative filament Edison bulb. Classified as an A17 shape with a standard medium base and omnidirectional distribution, the lamp produces 310 lumens at 2700K with a CRI of 80-plus while consuming 4W. Instant-on at 120V AC with a built-in driver, it is not dimmable. Expected lifetime is 15,000 hours at operating temperatures from -20 C to 40 C. • aamsco.com • Circle 310



PAR38 LED, Acuity Brands/Acculamp • Acuity Brands has added a retrofit PAR38 LED lamp to its S-Series. The lamp shell is made of cast aluminum with an engineered specular faceted reflector in either a 25-degree or a 45-degree beam spread. Available with an output of either 900 lumens or 1,200 lumens, both at 20W. A 2,000-lumen option uses 25W. Color temperatures are 2700K and 4000K at a CRI of 80-plus with a high R9 value (78); 94 CRI option available in 900 lumens only. • acculamp.acuitybrands.com • Circle 311



375W Cera Arc CMH Lamps, Eye Lighting • Designed to replace up to 1,000W high pressure sodium and metal halide systems, this ceramic metal halide 360W BT37 lamp produces crisp white light—4000K at a CRI of 85—and a mean of 27,000 lumens at a 10-hour start. It operates using a proprietary M155/O ballast, has a rated average life of 20,000 hours, and a max warm-up time of four minutes. It has an EX39 base with a UV-cut coated-borosilicate glass bulb and an internal PCA arc tube. • eyelighting.com • Circle 312



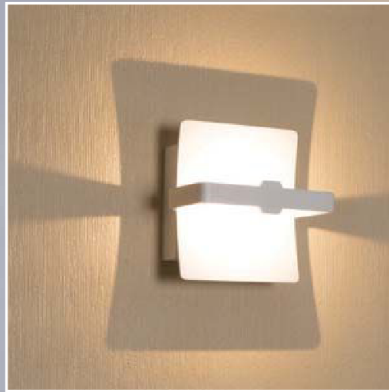
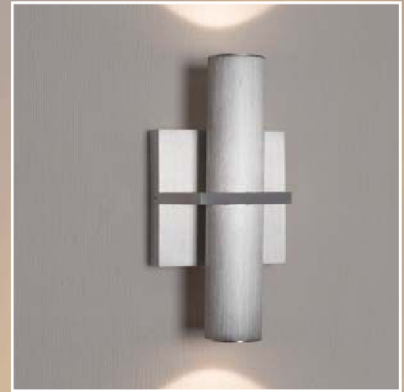
LEDioc, Eye Lighting • This retrofit, screw-in LED lamp and driver are suitable for replacing high intensity discharge sources in post-top and pendant-mount luminaires. The 37W omnidirectional lamp is available in 3000K with a CRI of 85 and 5000K with a CRI of 70. Producing up to 106 lumens per watt, this medium-base lamp can be installed vertically with the base up or down. The accompanying remote, constant-current driver is dimmable and IP66 rated, and it draws 41.4W for the entire system. • eyelighting.com • Circle 313



AR111 16W Platinum Ultra Dimmable, Ledzworld • Ledzworld's AR111 Platinum is a retrofit-sized, 12V single-source LED lamp that produces up to 800 lumens. The lamp consumes 16W and is available in 2700K, 3000K, and 4000K with a CRI of either 80- or 90-plus and with beam angles of 25 degrees and 40 degrees. Constructed with an integral aluminum heat sink and an integral driver, this dimmable lamp requires a 10V to 60V amp electronic transformer to operate. • ledzworld.com • Circle 314



PAR38 19W Gold Dimmable, Ledzworld • This multiple source, 19W PAR38 LED lamp is designed for improved glare control and efficacy. Offered in 2700K, 3000K, and 4000K with a CRI of either 80- or 90-plus, typical output is 1,100 lumens with a 25-degree or 40-degree beam spread. While it features an aluminum heat sink with an integral dimming driver, on recommended dimmers only, the lamp is not suitable for use in enclosed fixtures with any airflow. cUL listed for damp locations. • ledzworld.com • Circle 315



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Good Night, Lighting Science • Part of Lighting Science's Definity Digital Series, Good Night works with the human body's circadian rhythms to support natural melatonin production by emitting less blue light. Equivalent to a 60W A19 lamp, this LED retrofit source is housed in thermal plastic with an E26 base. It produces 800 lumens in a radial pattern using 12W of power, and the correlated color temperature is 2500K. Rated for 25,000 hours of life at 120V AC, it is ETL certified for damp locations. • lsgc.com • Circle 316



Lite PAR Eco Series, Litetronics • This family of halogen PAR lamps improves lumens per watt by an average of 30% over traditional models. Outputs range from 525 lumens to 1,590 lumens depending on wattage and size selected. These 120V PAR lamps are available at 2900K and a 36-degree beam spread. Featuring a medium screw-base, lamp models include a PAR20 in 39W, a PAR30, and a PAR30LN (long neck) in either 39W or 60W. PAR38 lamps can be ordered in 39W, 60W, 70W, and 80W. • litetronics.com • Circle 317



Vivid AR111 LED, Soraa • Soraa's full-visible-spectrum LED AR111 low-voltage lamp—available with a CRI of 95 and an R9 value of 95—is intended for use in indoor and outdoor applications. Available in June, the 8-degree lamp will have a center beam candle power of 27,500 candelas and a total output of 980 lumens. Its narrow spot is compatible with the company's Snap system accessories (bit.ly/1onyFm9) and the aluminum design is suited for use in fully enclosed fixtures. • soraa.com • Circle 318



SKMR 1607LED, MaxLite • This 7W MR16 retrofit lamp features chip-on-board LEDs for a single shadow. Designed for general applications, this 12V non-dimmable lamp has a GU5.3 base and is suitable for damp locations. It delivers up to 500 lumens in a 45-degree beam spread and is available in 2700K with a CRI of either 82 or 95. The lamp comes in white and is cUL listed and RoHS compliant. • maxlite.com • Circle 319



iColor MR Gen3, Philips ColorKinetics • The latest update to the Philips ColorKinetics iColor intelligent color-changing MR16 LED lamp offers up to 151 lumens of RGB light via high-intensity LED sources and with 17-, 30-, and 90-degree beam angles. For use with Philips ColorKinetics and third-party controllers, the lamp consumes up to 5W at full output. The lamp is fitted with a polycarbonate optic and a tempered glass lens, and is offered with a die-cast zinc housing in a silver finish. • colorkinetics.com • Circle 320



Super Pulse Start Long Life, Venture Lighting • These quartz metal halide (MH) lamps contain two quartz arc tubes, extending the life of the lamp to 40,000 hours, twice as long as standard probe-start MH lamps. Available wattages range from 70W to 875W. Typical CRI is 70, with options from 68 up to 90-plus and color temperatures between 3700K and 5000K. A medium screw (E26) or mogul (E39 and EX39) base, in a variety of bulb envelope shapes, are offered. • venturelighting.com • Circle 321



Omni A19 LED Lamp, Litetronics • This LED A19 retrofit lamp consumes 11W and distributes 825 lumens over 270 degrees. Using 120V AC power, it is instant-on and dimmable to 5% using standard incandescent dimming controls. Available in a frosted warm-white 2700K with a CRI of 83 and a medium base, this LED lamp is equivalent to a 60W incandescent. The lamp is RoHS compliant and mercury- and lead-free. • litetronics.com • Circle 322

Ultra B13 LED Lamps, Osram Sylvania • Osram Sylvania is expanding its collection of Ultra LED lamps to include a dimmable replacement for a 40W incandescent B10 lamp. Available in 2500K and 2700K with a CRI of 80, wattages on these blunt-tip lamps range from 4W to 7W for outputs of 200 lumens to 500 lumens. It is offered with either a candelabra base or a medium screw base. These lamps are UV- and infrared-free and are suitable for use in damp locations. Both are ETL and RoHS compliant. • sylvania.com • Circle 323

Vivid PAR30 LN, Soraa • Suitable for use in interior and exterior applications, this 120V PAR30 long neck is available in 3000K with a CRI of 95 and a R9 value of 95. Dimmable down to 20% using trailing-edge and leading-edge cut-phase dimmers, these 18.5W lamps produce 1,000 lumens. Beam spreads include 8, 25, 36, and 60 degrees with center-beam candlepower ranging from 28,260 candelas to 1,160 candelas. With a proprietary aluminum heat sink, this lamp is rated for 35,000 hours of life. • soraa.com • Circle 324

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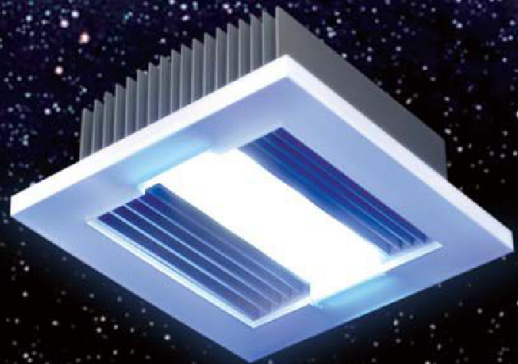
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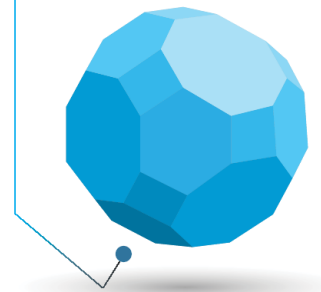
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TECHNOLOGY TRENDS



SHAPE SHIFTERS

Integrated technology is bringing new form factors and roles to solid-state luminaires.

text by Hallie Busta

LEDs are changing luminaires' form and function. But limits imposed by existing lighting infrastructure threaten to stymie their progress. "It boils down to having the luminaires do more," says Eric Haugaard, director of product technology at Cree.

Fixtures stand to evolve in two ways, he says. The first involves integrating their components onto one circuit board around which the housing is constructed. The second adds sensors for tasks such as measuring occupancy, surveillance, and daylighting.

What those luminaires will look like depends in part on how willing consumers are to accept new form factors, Haugaard says. Adoption of LEDs will drive development and decrease production costs. A lower cost per unit allows for fixtures with more LEDs that are each run at lower power to get the same effect. Integrating those components limits the ability to service individual parts in exchange for a higher-performing product. And, run at a lower temperature, the luminaire would need a smaller heat sink, reducing its total bulk and allowing for more cost effective housings, such as the use of plastics.

Those luminaires could also host an array of other technologies. In January, Amerlux partnered with light-sensory-network (LSN) developer Sensity Systems to integrate its NetSense LSN technology with the company's exterior LED luminaires to detect environmental factors such as motion, daylight, energy, and temperature. And in February, Philips debuted a retail lighting system with integrated sensors that connect to a consumer smartphone app to push product coupons based on shoppers' locations in the store.

"It's not the ability to gather this kind of information that's novel; instead it's the ability to leverage a single integrated network infrastructure for multiple field applications," says Gary Harvey, senior product manager at Amerlux. "Overall, it's still early and we don't know the exact balance point." •



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LEDs & DRIVERS

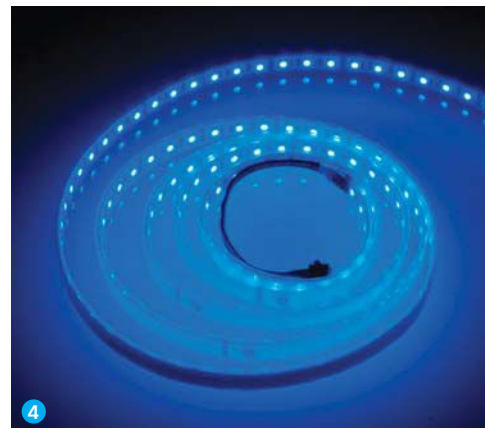
Higher output and efficacy of LEDs are driving more efficient luminaire design.

1. Xlamp XQ-E LED, Cree • This LED is 78% smaller than the company's XP-E2 package, enabling reduction in the size and cost of LED luminaires without sacrificing light output. Measuring 1.6mm by 1.6mm by 1.4mm, this light engine is available in CRIs of 70 and 80 in white, blue, green, and red. White color temperatures range from 2700K to 8300K. The LEDs can be driven at 700mA or 1A max. • cree.com/xlamp • Circle 325

2. Illumastrip LED Troffer Insert, CeeLite Technologies • CeeLite is adding an LED insert to its Illumastrip series for use in commercial fluorescent-troffer retrofits. The insert is available in 2' by 2', 2' by 4', and 1' by 4' with up to four rows of LEDs. The white LED light engines come in 3500K, 4000K, and 5000K in standard or high output. A preassembled Class 2 LED driver is included. • ceelite.com • Circle 326

3. Bi-Directional Light Guides, Global Lighting Technologies • This edge-lit LED light guide can produce customized light-emission patterns that differ from the top and bottom surface, allowing luminaires to emit light upward and downward from a single edge-lit source with LEDs on one or two edges while varying the distribution pattern in each direction. • www.glthome.com • Circle 327

4. Flex LED Circuit Strips, Acclaim Lighting • Enclosed in a UV-coated flexible silicone jacket, the linear Flex LED Circuit Strips are designed for curved or straight cove, millwork, and signage. Available in a variety of interior- and exterior-rated models, including a standard output, a high output, a 98 CRI, an IP68 exterior rating, and RGB options. Offered in a single 16.4' length spool. • acclaimlighting.com • Circle 328





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selux.us



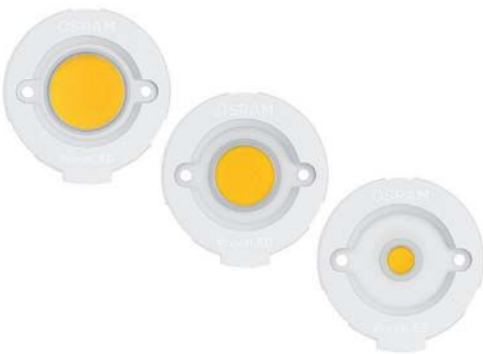
Element, Specialty Lighting • Element is a low-voltage, modular striplight kit offered in either cool- or warm-white LEDs with a 120-degree beam distribution. The clear acrylic LED strip consumes 1.5W and is 11.25" long. Multiples can be connected directly end-to-end or with cables for up to 12 fixtures on a 30W driver. Available with 120V remote dimming and non-dimming drivers, each four-fixture kit includes a driver, mounting clips and hardware, end-caps, and connection cables to complete the system. • specialtylighting.com • Circle 329



Sheer, 3M Architectural Markets • This linear LED pendant is made of clear acrylic and films that, together, are engineered to focus light while remaining translucent even when illuminated. It emits 800 lumens per linear foot. Sold in 8' lengths, connectors can be used to create longer runs. Beam-spread options include narrow, medium, and wide distributions. Available in clear anodized, black anodized, and white paint finishes. • 3marchitecturalmarkets.com • Circle 330



EcoDrive, Acuity Brands/eldoLED • A family of intelligent, programmable digital drivers, the EcoDrive provides smooth, flicker-free dimming for LED loads in commercial indoor applications. Dimmable from 100% down to 1% via zero-to-10V controls with a single, configurable constant-current max 0.7A LED output, the drivers include an NTC interface for optimal thermal management and a configurable LED code technology that works with most constant-current LED modules and arrays. • eldoled.com • Circle 331



PrevaLED Core Z3, Osram Sylvania • These LED light engines are meant for applications such as recessed downlights, accent lighting, and tracklighting. With a 120-degree beam angle, each 1.97"-diameter module measures 0.34" tall, and comes in a choice of 2700K, 3000K, 3500K, and 4000K. Available in four lumen packages—1,100 lumens at 12W, 2,000 lumens at 19W, 3,000 lumens at 19W, and 5,000 lumens at 23W—in either a CRI of 83 or 93 (3000K only). Fully dimmable. • sylvania.com • Circle 332



EcoSpec Linear Series, EcoSense Lighting • Offered in 12" or 48" lengths, these line-voltage fixtures can be connected end-to-end. The housing is made of extruded aluminum with plastic end-caps and includes a clear polycarbonate lens, together measuring 1.4" wide by 1.5" tall. White LED light engines come in a choice of 2700K, 3000K, 3500K, and 4000K with a CRI of 80-plus. The strips consume 4.5W per linear foot or 9W per lumen foot with a 120-degree-by-120-degree beam spread. • ecosenselighting.com • Circle 333



Flexlum, Tivoli • A flexible, low-voltage LED system for highlighting architectural details, Flexlum is available in modular strand, flexible channel, and straight channel styles. The flexible channel bends up to a radius of 6' and mounts in 4' and 8' interconnecting field-trimmable sections. The LED module strand mounts without a channel via screws or double-sided tape. Output is up to 310 lumens per linear foot and 185 lumens per linear foot with an optional acrylic diffuser. • tivollighting.com • Circle 334



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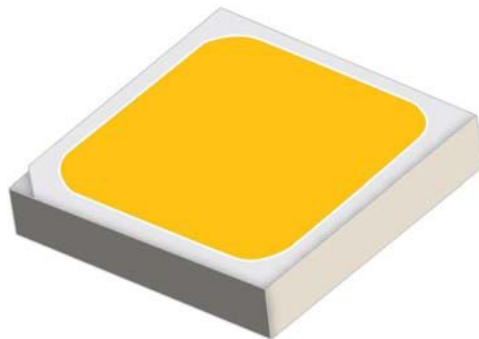
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Circular Line Voltage LED Engine, TerraLux Illumination • This is a fully integrated, plug-and-play, 15W LED retrofit solution for ceiling fixtures and pendants. The light engine has a 1.5" profile and an 8" diameter, and it is available in 2700K, 3000K, 3500K, 4000K, and 5000K, with a CRI of 85. LED temperatures are monitored and each can automatically be powered down to prevent overheating and to protect the LEDs' lifespan. Compatible with a 120V or 277V AC input voltage. • terralux.com • Circle 335



EzyLED, American Bright LED • Using a standard 24V DC power source, these square LED chips can be connected in parallel to simplify circuit designs in luminaires. Available in 2700K to 5700K with a CRI of 70 or 80. Measuring 5.4mm by 5mm by 1mm, the chips feature integrated IC for load and constant current management when arranged in parallel. Available in 5050, 5630, and K2 packages for various lighting fixture applications. • americanbrightled.com • Circle 336



eW Cove MX Powercore, Philips ColorKinetics • This line-voltage linear cove luminaire features DMX dimming for use in accent lighting and general indirect illumination. Dimmable from zero to 100%, distributions are offered in 50-by-70-degree and 110-by-110-degree beam spreads and can be adjusted in 10-degree increments. It comes in a choice of 1'- or 4'-long modules. The lengths can be linked end-to-end with connectors that allow 180-degree turns. • colorkinetics.com • Circle 337



Luxeon Q, Philips Lumileds • Luxeon Q is a direct drop-in high-power LED module replacement for the standard 3535 surface-mount package. The chip-scale package LED is offered in 2700K, 3000K, 3500K, 4000K, and 5700K in either a CRI of 70 or 80. Featuring high efficacy at a high-drive current, these modules can achieve an efficiency of 92 lumens per watt for a 3500K module when driven at 700mA. Suitable for use in indoor and outdoor luminaires, this module is a UL-recognized component. • philipslumileds.com • Circle 338



Everline 55W Driver, Universal Lighting Technologies • An expansion to its Everline family, this series of digitally programmable 55W LED drivers allow factory or OEM settings to specific current levels. The universal 120V to 277V Class 2 models are available with maximum current outputs of 1,050mA and 1,500mA. The drivers are tunable with a handheld tool that is connected to leads, allowing custom tunability in 1% increments of rated output current. • unvlt.com • Circle 339



Tile Gen II, Eaton's Cooper Lighting/io Lighting • This luminous LED tile can be surface mounted or recessed into walls and ceilings. Housed in a 0.75"-deep anodized aluminum frame, the linear LED strips edge-light the company's WaveStream panels. Laser-precise microscopic optics produce a directed light output enabling angle control, spread, and uniformity. It is offered in 2700K, 3000K, 3500K, and 4000K. Sizes range from 6" square at 5.6W to 12" by 24" at 22.4W. • iolighting.com • Circle 340



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Fresco, Acuity Brands/Axion Controls •

This glass-to-the-edge, 7" touchscreen station is designed for use in dynamic event spaces such as hotel ballrooms, museums, and restaurants. It allows the user to select and edit intensity, color, and position within a scene. The device can be used to control up to 36 zones on eight stations each for a total of 288 zones on a network. Fresco has Ethernet for wired access as well as Bluetooth for wireless app control on other devices. • axioncontrols.com • Circle 341



SmartCast Technology, Cree • An integrated, self-programming wireless control system that is interoperable with Cree's offerings of fixtures, switches, and dimmers, SmartCast Technology allows for daylight harvesting and vacancy sensing without extra devices. Motion and ambient light sensors are embedded in each luminaire. A hand-held remote allows for fixtures to be addressed using the one-button setup procedure which automatically creates intelligent luminaire groupings and configurations. • cree.com • Circle 342



LeafNut Wireless Control System, Venture Lighting •

An intelligent, wireless control system for area and streetlighting, LeafNut does not require panels, controls, or connections to servers and computers. Nodes are wired and mounted directly into or on top of the existing fixtures. All nodes communicate via radio, satellite, and cellular systems to deliver control and status messages to each other and to a secure off-site server that can be accessed continuously. • venturelighting.com • Circle 343



LightGrid Outdoor Wireless Control System, GE Lighting •

Using central management software, this wireless system can report operational data such as energy consumption for roadway lighting. A Web-based interface linked to the lighting controls allows users and owners to visualize the system's real-time performance from a remote location. Additional software capabilities include scheduling, customized reporting, grouping, and user access level management. • gelighting.com/roadway • Circle 344



GL-IPAC-SW8, Crestron • Crestron's surface-mounted Green Light Integrated Switching Panel allows up to eight 16A circuits of switched load at 120V to 277V AC and can be expanded to support up to 64 switched-load circuits by adding external panels and switching modules. A local input for sensors and keypads is included along with an LCD interface for installers and users to configure the system without connecting to a computer. • crestron.com • Circle 345



WiScape, Hubbell Building Automation •

WiScape is a wireless, streetlighting control system that enables utilities and municipalities to monitor, manage, and meter single streetlights or fixture groups. The system includes photocells, light sensors, motion sensors, and standard and astronomical time clocks. Its components work together to create a secure peer-to-peer mesh network infrastructure that allows for distances of 300' or 1,000' between devices. System is scalable. • www.hubbell-automation.com • Circle 346



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ODC Series Dual Relay Occupancy Sensors, Leviton • A family of line-voltage occupancy and vacancy sensors, the ODC series includes manual-on/auto-off override control. The compact, one-piece design eliminates separate power pack and sensor wiring. Available in passive infrared, ultrasonic, and multitechnology versions, the sensors feature both single and dual relay versions with mid-range, high-density, and extended-range lenses offered with select models. • leviton.com • Circle 347



Adorne Wireless Systems, Legrand • The Adorne system combines lighting, music, and video intercoms in a wireless control series designed to personalize residential environments. The whole-house lighting system allows users to control lights with a handheld remote or mobile device from any room, or remotely. Up to three interior units can be added and connected wirelessly to existing units. The Wi-Fi Music System connects to any wireless home network. • adornemyhome.com • Circle 348



Encelium EMS Phase-Cut Dimming Module, Osram Sylvania • This hardware module interface connects phase-cut dimmable (forward and reverse phase) ballasts and LED drivers to the Encelium GreenBus II communication network. Individually addressable, the phase-cut dimming module enables each group or zone of fixtures to be independently controlled and configured. Designed to control standard load types such as incandescent, halogen, fluorescent, and LED lamps. • sylvania.com • Circle 349



InFusion UDM08-EM, Vantage • Mounted in a main or secondary power enclosure, this 120V to 277V dimming module controls up to eight universal loads and includes up to four line feeds with 32 maximum amps per load. Features include load-by-load selectable load type, custom-load linearization profiles, and step-free ramping and dimming. The module includes built-in protection against current and thermal overload, current sensing for energy management, and support for AFCI breakers. • vantagecontrols.com • Circle 350



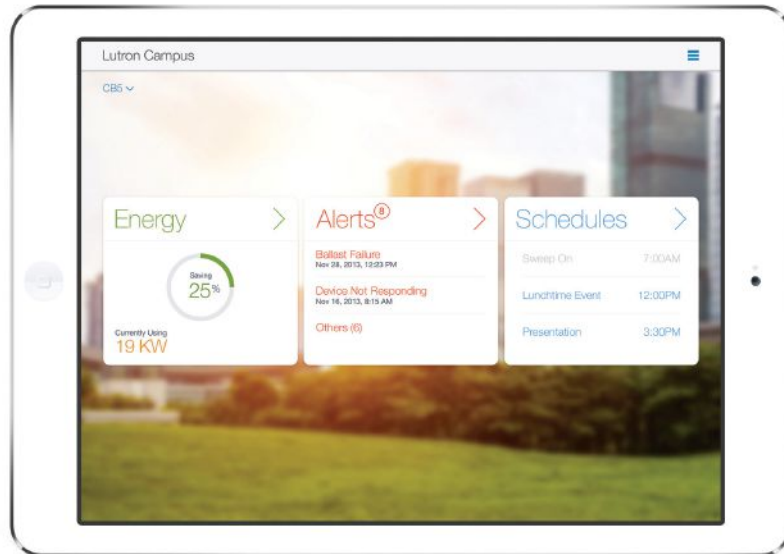
Wireless RF Occupancy Sensors, WattStopper • Designed for difficult-to-install applications, this wireless, passive-infrared occupancy sensor is powered by photovoltaic panels. With a 360-degree coverage pattern, one or more sensors can be paired with a variety of single- or dual-relay 120V/277V radio-frequency wall switches as well as with self-powered handheld and wall-mounted remotes. The sensor can accommodate a battery for low-light applications. • wattstopper.com • Circle 351



EcoSpec Linear Dimming Control Module, EcoSense Lighting • This module takes a zero-to-10V dimming signal and a fixed-line voltage input and converts it to an electronic low-voltage, reverse-phase dimmed output. Just one module is needed per run up to 1,000W with a 277V load and 450W with a 120V load. An in-line connection, the device is installed between the fixture input and building power, with a second leg branching off to the dimmer. Housing is injection-molded polycarbonate. • ecosenselighting.com • Circle 352



Antumbra, Philips • Antumbra pairs functionality with a contemporary aesthetic. Two styles of wall switches and dimmers are offered with individually configurable buttons while multiple hidden sensory inputs automatically control the local environment. Hidden indicators light up the wall when users approach and fade as they leave. An internal light level sensor adjusts the effect to the appropriate illumination level. A built-in temperature sensor integrates with building systems. • philips.com • Circle 354



Quantum Vue, Lutron • Quantum Vue allows building operators to manage their facilities remotely. The program can be used via a desktop, tablet, and smartphone, and works with new and existing Lutron Quantum systems. Users can view and adjust the lighting zones and automated shades in specific areas of a building while the client can visualize energy savings through expanded reporting per strategy. Re-imagined time clock scheduling facilitates setup and adjustments. • lutron.com • Circle 353



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CONTROLLING WHAT YOU CAN'T SEE

New luminaires for the home and workplace claim to improve occupant health by regulating the intensity and frequency of light.

text by Hallie Busta

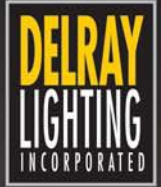
Developments in LED light-source technology are being met with new research on lighting's non-visual effects on human health. The resulting products and systems let users regulate the intensity of the light and the frequency at which they are exposed to it.

Lighting Science is bringing to market technology it derived from a partnership with NASA to develop a lighting system that regulates the sleep-wake cycles of astronauts who work on the International Space Station—where the sun rises every 90 minutes. The light spectrum of its Awake & Alert lamp uses a patented filter with blue-enriched white light to increase alertness. The lamp is part of the company's Definity Digital series of A19, BR30, PAR30, and PAR38 lamps that are adjusted for tasks such as improving melatonin production, increasing alertness, and protecting coastal wildlife. The Awake & Alert lamps have been used by members of the Los Angeles Dodgers and the U.S. Olympic Ski Team to fight jet lag while competing internationally. Other beneficiaries include third-shift workers in healthcare and factory environments.

This spring, Withings—a maker of Internet-enabled devices—released alarm-clock-LED-luminaire Aura, which measures factors such as noise pollution, temperature, and light levels in the room during sleep and syncs with a wireless sensor beneath the mattress to track functions such as an individual's movements. It uses blue light and soothing noises to wake its user, who can control the system and manage its collected data via a mobile app.

And earlier this year, Philips updated its LED light-emitting acoustic ceiling, developed in 2012 in partnership with building products manufacturer Saint-Gobain's Ecophon acoustic ceiling division. The new Soundlight Comfort Ceiling is designed for open-plan offices and features tunable white light at 3000K or 4000K with a CRI of 80-plus that can be adjusted via programmable lighting controls to balance electric light levels and daylight. •

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OUTDOOR

Bring high-output illumination to outdoor spaces from campus walkways to façades.



Tear Drop LED, Acuity Brands/Holophane • Styled to evoke the teardrop lamps that illuminated boulevards in the first half of the 20th century, this fixture comprises a cast aluminum housing and borosilicate glass refractor that provides symmetric or asymmetric distribution. Designed for use along streetscapes and pedestrian walkways, in parks, and on campuses where a traditional profile is desired, the luminaire can be specified with 38W, 55W, 77W, and 115W LED modules in 3000K, 4000K, and 5000K. • holophane.com • Circle 355



EcoSpec Floodlight Bullet and Bullet Mini, EcoSense Lighting • Built for architectural and landscape floodlighting, this luminaire comes in a robust cast-aluminum housing and offers a variety of optical and glare control solutions. Available in 27W and 10.9W configurations, the fixture is lamped with an LED module that delivers between 1,614 lumens and 2,048 lumens in 2700K to 4000K. The luminaire features 150-degree vertical aiming and 358-degree horizontal rotation. • ecosenselighting.com • Circle 356



LSM2 Mini Cascade, Auroralight • Measuring 3" in diameter, this rugged LED wall luminaire fits on standard 4"-by-4" posts, suiting it for decks and docks, and it can be mounted directly to a wall or recessed in an electrical box. The fixture takes a 1.25W LED module and is available in 2700K, 2900K, and 4500K with optional dimming. Available in brass and copper housings with smooth and grooved profiles and with natural, bronze patina, and brushed nickel finishes. • auroralight.com • Circle 357



Impressionist Series, Cast Lighting • This family of outdoor LED luminaires is tied together by a nuts-and-bolt design vocabulary and copper and bronze materiality. Featuring directional area, directional tree, and wallwash (shown) fixtures, the Impressionist Series is fitted with a single—or a double, for the wallwasher—2700K, 253-lumen LED source with a CRI of 82. The luminaires are equipped with a 20-step light level control that is operable via a handheld remote. • cast-lighting.com • Circle 358



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LINCOR LED

With its slim and unobtrusive design, the LINCOR LED luminaire draws an elegant line through the room. Efficient LED technology takes full effect in a section of only 2 inches square – resulting in high-quality direct/indirect lighting. Arranged as an individual or continuous row system, the innovative LED luminaire allows many application options as well as flexible arrangement of workstations.

Zumtobel. The Light.

zumtobel.us/lincor



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Cordia LED Bollard, Forms+Surfaces • Designed to coordinate with Cordia's family of benches and trash and recycling receptacles, this bollard has a powdercoated aluminum body available in a range of colors and with an optically clear acrylic lens that emits either 360-degree or 180-degree light. Measuring 38" tall, the fixture has an 8"-square top that tapers to a circular 6.38"-diameter base. Lamped with a 35W LED module, the luminaire is available in 3000K and 4000K. • forms-surfaces.com • Circle 360



XSPR LED Residential Street Light, Cree • Cree designed this cobra-head-style LED street luminaire to replace high-pressure sodium fixtures in residential neighborhoods. The XSPR can be lamped with either a 42W or 25W LED source in 4000K and 5700K. A contemporary silver-finish, die-cast aluminum cover and horizontal tenon mounting system is adjustable to plus or minus 5 C. • cree.com • Circle 359



Aire7 | X7, a•Light • This vertical, ground-mounted outdoor bollard stands 3' tall and gives designers the on-center spacing qualities typical of pedestrian-scaled light poles. The fixture can be lamped with 2W or 5W LED modules that deliver 120 and 600 lumens, respectively, in 3000K, 3500K, and 4000K. Suited for use in residential, commercial, and industrial applications. • alights.com • Circle 361



Luxor Wi-Fi, FX Luminaire • This LED landscape lighting control system offers both zoning and complete dimming capabilities that allow designers to preprogram up to 250 individual lighting groups. Using event-based scheduling, the system can change the dimming percentages of individual light groups. Available in 150W and 300W variants with either a stainless steel or a matte gray powdercoat cabinet finish, the system has a full-color LCD display interface as well as optional iOS and Android interfaces. • fxl.com • Circle 362



Q-Hex Mini, Q-Tran • This power supply can either be used as a magnetic toroidal transformer or as a low-voltage driver. It is designed for use with the company's Q-TRIX-R50 housing unit. Used as a magnetic toroidal transformer, it can handle loads from 10W to 75W with an output voltage of 12V AC or a DC power supply from 10W to 60W at 12V AC. It can also work with an electronic driver to power constant-current LED fixtures with loads ranging from 0.25W to 12W at 12V AC. • q-tran.com • Circle 363



PermaLED Area Light, Osram Sylvania • An LED alternative to high-intensity discharge luminaires, the PermaLED Area Light is offered in 90W, 140W, and 200W versions and either 4000K or 5000K. It can be specified with either a standard photo sensor or a dual technology motion and photo-control sensor. Suited for exterior lighting applications such as parking lots and street and pathway lighting. • sylvania.com • Circle 364



Drive LED Façade Lighting, Insight Lighting • The Drive LED façade lighting system offers white light from 2700K to 4000K, RGB color-changing options, and power consumption from 30W to 135W. It can be specified with optics producing beam spreads of 7, 15, 30, 45, and 100 degrees as well as 10 degrees by 60 degrees. An adjustable, cast-aluminum housing comes in two sizes: 10" tall by 7¾" wide by 2¾" deep and 14½" tall by 13" wide by 22½" deep. • insightlighting.com • Circle 365



ARF1 and ARF2 LED, Spaulding Lighting • This floodlight is designed for a variety of applications, including columns and façades. With a rugged die-cast aluminum housing that has a powdercoat finish and is fitted with an impact-resistant, UV-stabilized acrylic lens, the fixture packs 10 (ARF1) or 20 (ARF2) LEDs that deliver up to 2,285 lumens and 4,692 lumens, respectively, in options of 5100K at a CRI of 67, 4200K at a CRI of 70, and 3000K at a CRI of 80. • www.spauldinglighting.com • Circle 366



WW2 LED Series Aimable Outdoor Wall Washers and Flood Lights, Jesco Lighting • This series of high-output adjustable LED luminaires can throw light on façades and other architectural features, statues and landmarks, and landscape features, as well as site entries and atria. They can also be used indoors. The series is available in rectilinear strip-, square-, rectangular-, and round-shaped housings made from cast aluminum with clear tempered glass lenses and stainless steel hardware. • jescolighting.com • Circle 367



Sedi LED Recessed Wall Light, HessAmerica • This recessed LED wall luminaire from German designer Karsten Winkels features a stepped faceplate that adds depth to surfaces during the day and reduces glare at night. The fixture is available in a 9.5"-square 10W variant and in a 19.3"-tall-by-9.5"-wide 23W variant, both with an installation depth of 5.75". The LED source can be specified at either 3000K or 4000K and with a CRI of up to 85. • hessamerica.com • Circle 368



Executive RT-21, Sterner Lighting • Designed for grade lighting in spaces such as parking lots and campuses, the housing of this rectangular area fixture is formed from a single piece of extruded aluminum. Taking a reduced jacketed ED28 metal halide lamp at a maximum of 400W, the luminaire features a primary electrical disconnect, on-the-door mechanics, tool-free access, and a toolless modular system. Available with hydro-formed or segmented aluminum optics. • sternerlighting.com • Circle 369



Nyte Forms, Barron Lighting Group • This convertible LED luminaire family of outdoor fixtures features a simple bracket change system that allows it to adapt to use as a wallpack, floodlight, or area light, depending on an application's lighting needs. A part of Barron's TraceLite LED wallpack series, Nyte Forms is available in three sizes with an aluminum housing, stainless steel hardware, and tempered glass lens. LED source offers zero-to-10V dimming with a high lumen-to-watt ratio at 4000K. • barronltg.com • Circle 370



Salvus Site and Area Luminaire, Amerlux • This pole-mounted LED site and area luminaire can replace two to four metal halide and high-pressure sodium luminaires in applications such as parking lots, walkways, and campuses. The die-cast aluminum housing comes in post- and side-mount variants and it can attach to any standard round or square pole. It is available in a range of wattages, lumen outputs, and color temperatures, and provides up to 20,000 lumens at 330W. • amerlux.com • Circle 371



EcoForm LED Luminaire, Philips Gardco • The EcoForm LED delivers between 4,000 and 20,000 lumens in a compact, low-profile housing for lighting spaces such as parking lots, campuses, and pathways. It can be specified with LED arrays that consume from 55W to 215W in 3000K, 4000K, and 5700K with a CRI of 70. A retrofit arm allows for integration into existing sites. Available in a range of finishes and optics. • sitelighting.com • Circle 372



Treemount, Luminated Landscapes • Luminated Landscapes says it developed the industry's first mono-point mounting system for fixing low-voltage light fixtures in trees. The system, made from powdercoated low-carbon steel components, features a stand-off bolt that leaves 5" of clearance between the fixture and the tree trunk to accommodate 20 years of growth, the company says. • luminatedlandscapes.com • Circle 373

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TASKLIGHTING

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LoTek Lamp, Artemide • The mechanics of Artemide's LoTek LED task lamp are inspired by the industrial developments of the 20th century. Its 24.5"-tall articulated arm is made of anodized aluminum and is fitted with a painted aluminum head. The head rotates 270 degrees horizontally and pivots up to 150 degrees up and down; it includes an infrared touch dimmer and a touch on-off switch. The base can be adjusted up to 40 degrees in two directions and can rotate 360 degrees while the elbow offers 120 degrees of mobility. A table clamp is also available. The luminaire provides 288 lumens at 3000K and it consumes 7W. • artemide.us • Circle 374



Lightbar 90+, Nora Lighting • This low-profile linear LED undercabinet fixture complies with California's Title 24. Dimmable, it consumes 4W per lumen foot and is offered in lengths of 6", 12", 24", 36", and 48" with a maximum run length of 24'. The LEDs are spaced 1" apart and deliver 220 lumens per lumen foot in either 3000K or 4200K at a CRI of 90-plus. Flat and adjustable mounting clips and end-to-end connectors are included. Finishes are bronze and natural aluminum. • noralighting.com • Circle 375



SG-LED and SGA LED, Jesco Lighting
• A plug-in connector allows the SG and SGA series of LED luminaires to fit a range of tight or concealed applications such as miniature coves or shelving. The low-profile, lensed fixtures measure 3/4" wide and 1 1/4" tall and is offered in 12", 24", 36", and 48" lengths. LED variants include 3000K, 4000K, and 6000K at a CRI of 85. The SGA model offers 360-degree rotation; the SG option includes 45-degree-angle mounting clips. Powered at 120V, these luminaires include an integral power supply and are not dimmable. • jescolighting.com • Circle 376

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Kingsun Optoelectronic is one of the world's leading developers of LED lighting technology, bringing the science of light distribution and heat dissipation to the design and manufacture of best in class commercial LED lighting luminaires.

Kingsun luminaires feature high tech aesthetics packaged in slim streamlined designs, at home in any structure or environment. Multiple light distribution options in an integrated modular design let you scale the same fixture up or down for various lighting requirements. All compatible with common controls and passing on an exceptional average luminaire efficiency of 100 lm/W.

Kingsun also provides local manufacture and delivery customized service in the U.S to aggressively grow the sales of Kingsun LED luminaires through its joint venture partner Electro-Matic Products Inc., Farmington Hills, MI. The JV facility contains extensive engineering and manufacturing capabilities with over 50,000 sq. ft of manufacturing space.

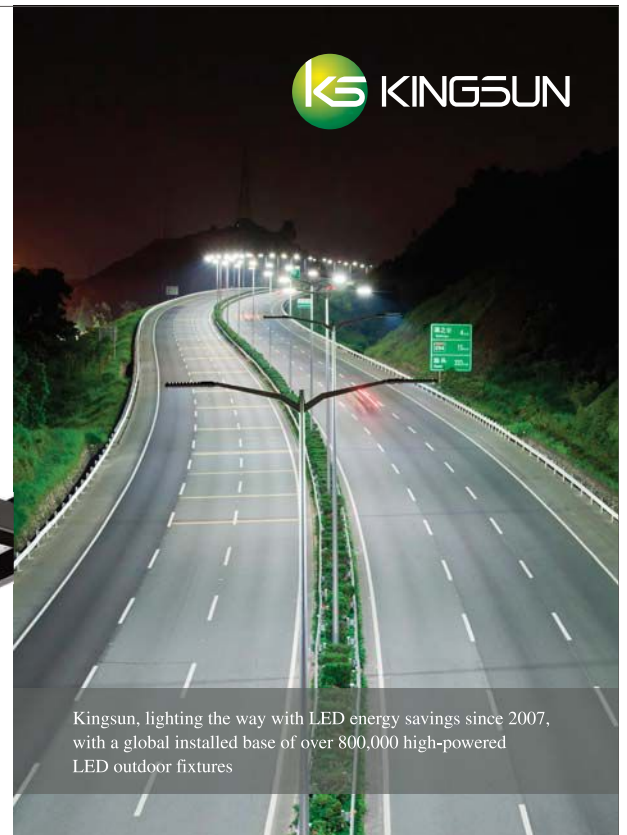


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Line Chandelier, WAC Lighting • This edge-lit LED task luminaire provides 30-degree asymmetrical forward-throw light distribution. Each section is $\frac{5}{8}$ " thick, less than 5" wide, and is offered in incremental lengths from 6" to 30". The LEDs are available at 2700K and 3000K, consuming approximately 6.5W per lumen foot and, for the 12"-long model, offering 415 lumens. Its extruded aluminum body is fitted with a polycarbonate lens and features an abrasion-resistant brushed finish. • waclighting.com • Circle 377



Goldman, Flos • Designer Ron Gilad has revised the classic banker's desk light with an LED lamp and a streamlined frame. The luminaire includes the traditional glass shade, while its pull-chain is replaced with a contemporary on-off switch embedded in the base that is dimmable with soft-touch technology. The LEDs produce 430 lumens at 2700K with a CRI of 85 and use 5W. Available in a brass body with a green glass diffuser and in a black nickel body with smoked glass diffuser (shown). • flosusa.com • Circle 378



SlimBar LED, Amerlux • For use in refrigerated retail cases, the SlimBar LED is available in 46", 66", 92", and 132" lengths that each measure 0.9" wide. Constructed of anodized aluminum, the luminaire mounts to shelves with fixed or lockable adjustable clips. A linear array of 0.5W LEDs is offered in arrangements of either eight or 12 LEDs per foot. Light output ranges from 300 to 400 lumens per foot in 2800K, 3500K, and 4100K. Standard beam spread is 120 degrees. A remote 24V DC driver is required. • amerlux.com • Circle 379



LED wUndercab, Bruck Lighting • This low-profile, line-voltage LED luminaire is designed for under-cabinet applications. Each unit features a standard rocker switch and optional switch box occupancy sensor. The luminaire is lamped with LEDs in 3000K or 4000K with a CRI of 80-plus. It is offered in five lengths from 8.7" to 32.7" to match standard cabinet sizes, and it can be run up to 45'. An integral power supply is dimmable with TRIAC, leading edge, or trailing edge ELV controls. • brucklighting.com • Circle 380



Tameto, Waldmann Lighting • This linear tasklight comes with fixed and suspended mounting options for use in workbenches and at assembly workstations. The luminaire is offered with 2'-, 3'-, and 4'-long T5 fluorescent lamps, with an optional aluminized parabolic louver, and an internal fluorescent ballast. The fixture includes an anodized aluminum housing with a PMMA clear prismatic lens and an integrated on-off switch. The luminaire has an IP20 rating. • waldmannlighting.com • Circle 381



Gira, Estiluz • Estiluz has reissued the Gira task lamp, which was first designed in 1978. Its square base is made of anthracite cast iron and from it extends a chrome-plated stem that can tilt 40 degrees to the left and right and is fitted with an adjustable aluminum shade. The luminaire is 20.5" tall; its shade measures 6 $\frac{3}{8}$ " in diameter and its base measures 5 $\frac{1}{8}$ " inches square. Available in black and silver anodized finishes. The luminaire is outfitted with a medium base 120V socket. • usa.estiluz.com • Circle 382

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TRACKLIGHTING

These energy-efficient, high-output, easy-to-aim fixtures enhance designers' control.



Solandra, Journée Lighting • Compatible with any standard line-voltage H-Track or Global 2 Circuit 2 Neutral Track, this LED track head, which measures 7.5" long by 3.12" wide, has an integrated driver and works with ELV dimmers. The field-replaceable luminaire offers 1,982 lumens at 26W and with beam spreads in 20, 30, and 50 degrees. The LED modules are offered in 2700K, 3000K, and 4000K with a CRI of either 80 or 95. White and black finishes are available. • journeelighting.com • Circle 383



Fiato, Amerlux • Engineered with a passively cooled aluminum heat sink and thermally isolated constant-current driver, this LED track fixture is designed for retail, supermarket, and commercial accent and display lighting applications. The 10-degree spot delivers 32,616 candelas of center-beam candlepower from a single LED point source. For use on 120V to 277V systems, the track heads are offered in 27W, 33W, and 38W versions with up to a 90-degree tilt and a 360-degree rotation. • amerlux.com • Circle 384



O2 Mini LED Track Fixture, ConTech Lighting • This dimmable fixture is available in a horizontal or vertical driver configuration and constructed of die-cast aluminum. The luminaire offers 950 lumens at 11W; 1,200 lumens at 16W; and 1,500 lumens at 24W. Utilizing a multichip LED array, beam spreads include a 13-degree spot, a 27-degree medium flood, and a 40-degree flood. It is available in 2700K, 3000K, 3500K, and 4000K in CRIs of 83 and 93. • contechlighting.com • Circle 385



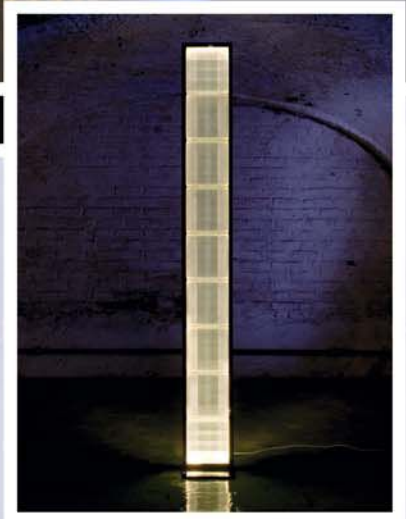
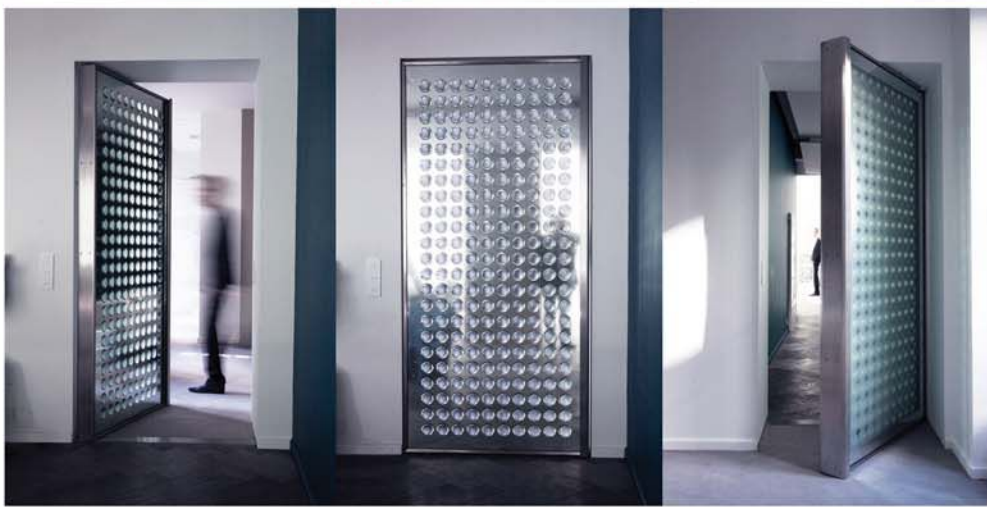
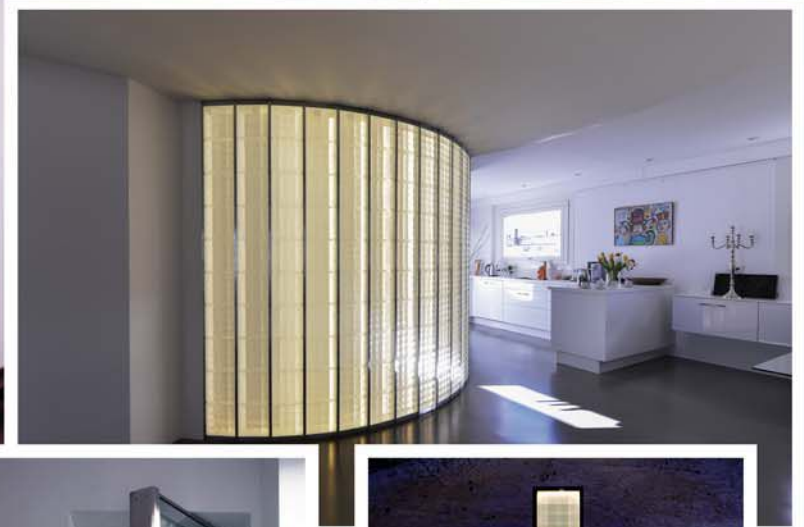
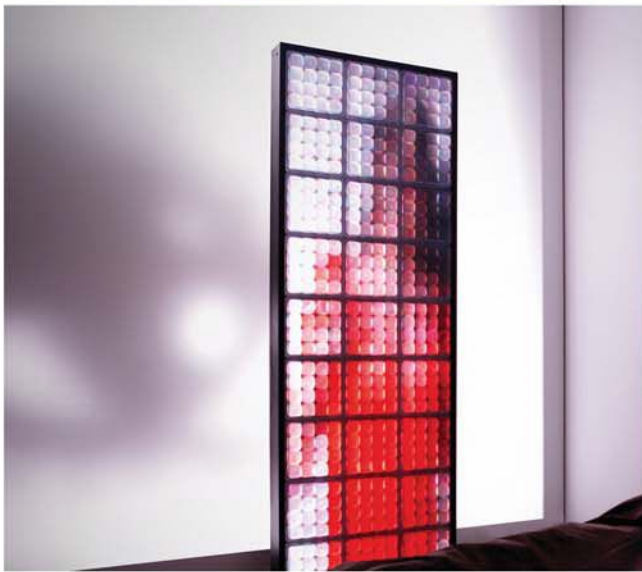
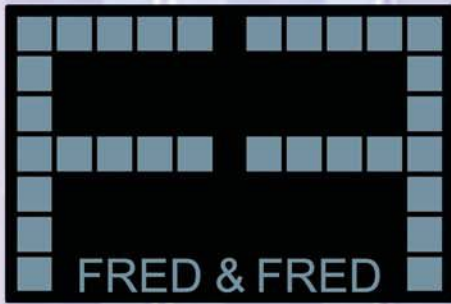
Priority LED Track Spot, Bruck Lighting • This LED track head, designed for the company's GEO or ECO line-voltage track or as a retrofit option for other systems, provides 2,500 lumens at 26.8W with an onboard side driver. The LED module is offered in either 3000K or 3500K at 80 CRI and dimming is available through trailing-edge electronic low-voltage dimmers. Anodized aluminum mirror-finish reflectors come in 12, 20, 40, and 60 degrees. Finish options include white, silver, and black. • brucklighting.com • Circle 386



Joely Series LED Cylinder Track Head, LF Illumination • Designed with an integral phase dimmable power supply, the Joely Series features a track head made of die-cast aluminum, and offers 120-degree-by-120-degree vertical tilt and 360-degree horizontal rotation. It is compatible with one- or two-circuit tracks and allows the track heads to be individually set to four light levels. The 16W LED module is available in 2700K, 3000K, 3500K, and 4000K at 80 CRI. • lfillumination.com • Circle 387



LP2 SuperSpot Series, Lighting Services Inc • Designed for medium- to long-throw applications traditionally handled by PAR lamp technology, the LP2 SuperSpot (above left) features a 6-degree optic that delivers 50,000 candelas of center-beam candlepower with 1,150 lumens at 26W. Also available with 10-, 20-, and 32-degree optics. Optional addressing and control are available by using Lumentalk through DALI, DMX, TRIAC, ELV, or 1V to 10V panels, which are dimmable to 1%. • lightingservicesinc.com • Circle 388



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GRG Series, Acuity Brands/Lithonia Lighting • This front-loading AR111-style aluminum track fixture, which measures 4.41" wide by 4.57" long, features a GUO 110V to 120V AC lampholder that can be paired with Acculamp LED lamps. Track adaptors, which are compatible with Lithonia, Nordic Global Aluminum and Halo-brand track systems and adjustable adaptor contacts, can be positioned for one- or two-circuit tracks. Fixture finish is white. • lithonia.com • Circle 389



Revo, Nora Lighting • This radio-controlled, motorized track head offers 340 degrees of horizontal rotation and vertical tilt of up to 200 degrees. Designed for high-ceiling applications, a single remote can reposition any track head using individual laser identification. The heads are compatible with Halo-brand tracks; L-style and J-style track adaptors also are available. Dimmable, and adjustable when dimmed, the total power consumed by the fixture is 0.5 plus the installed lamp wattage. • norahlighting.com • Circle 390



Lytespan LightFlood LED, Philips Lightolier • The Lytespan LightFlood LED, an architectural track-mounted fixture for retail and residential settings, features up to 90 degrees of vertical adjustment for aiming flexibility. For use with the company's Radius, Basic, and Advent tracks, the non-dimmable 34W, 120V luminaire offers 2,250 lumens at 2700K, 3000K, and 4000K with a CRI of 80. Accessory options include a louver and a visor with an internal kick reflector to redirect light onto the wall. • lightolier.com • Circle 391



Faretto, Sistemalux • Faretto, a new family of extruded aluminum track luminaires, is available in two sizes, small (15W) and large (22W), and can be used with Bridgelux, Xicato, or Philips Lumileds LED modules. The fixture is available in 3000K, 3500K, and 4000K, while lumen outputs range from 781 lumens to 1,811 lumens at a CRI of 80 or 95, depending on which module is selected. The luminaires can be adjusted up to 330 degrees vertically and 270 degrees horizontally. • sistemalux.com • Circle 392



SX20, Times Square Lighting • Designed to accommodate Xicato's LED remote phosphor module, the SX20 is a 28.8W track luminaire with an integral electronic driver for use in museums and retail applications that require high output at a low wattage. The luminaire is available in 2700K, 3000K, 3500K, and 4000K with a CRI of 80-plus. Field-changeable reflectors come in 20-, 40-, and 60-degree beams spreads. Various track or canopy mounting options also are available. • tslight.com • Circle 393



730 LED Spot Series 3, Wila Lighting, Ledra Brands • Wila's 730 LED Spot Series includes a 3" aperture LED luminaire in a machined aluminum housing for canopy or track applications. The remote phosphor LED modules offer 700 lumens and 1,000 lumens in 2700K, 3000K, 3500K, and 4000K at CRIs of 80 and 95. Alzak anodized aluminum reflectors are available in 20-, 40-, and 60-degree distributions. Accessories include various diffusion lenses and a clear protective lens. • wilalighting.com • Circle 394

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WALLWASHERS

Enhanced lumen power and installation flexibility make these products a fit for versatile spaces.



802 Span LED, Eaton's Cooper Lighting/Halo

• The 802 Span LED is a linear, 27"-long wallwasher made of die-cast aluminum construction designed to be mounted on flexible, power, or architectural tracks. Light output ranges from 2,119 lumens to 4,058 lumens and is available in either 3000K or 4000K with a CRI of 80-plus. The lampholder offers a vertical tilt of up to 90 degrees. Its 330-degree rotation offers toolless locking, while angle-indicators enable consistent aiming. • cooperlighting.com • Circle 395



622 Recessed LED Wall Wash, Wila Lighting, Ledra Brands

• The 622 Recessed LED wallwasher is fitted with a cold remote phosphor LED module by Xicato in 2700K, 3000K, 3000K Vibrant, 3500K, and 4000K at a CRI of either 80 or 95. Available in two apertures—4" and 6" round—the luminaire has a 360-degree rotatable optical assembly. A lamp-specific, UL-Makrolon reflector is provided with a microprism optic. Wattages vary from 25W to 50W. • wilalighting.com • Circle 396



S222, S223, and S224, The Lighting Quotient

• This family of low-profile semi-recessed LED wallwashers uses a combination of refraction and total internal reflection to create an asymmetric distribution of light. A molded light bar optic made of high-temperature, clear acrylic produces approximately 50 lumens per watt and consumes 16W to 50W of power in either 4" by 8", 4" by 14", and 4" by 24" (shown) apertures. Offered in 2700K, 3000K, 3500K, and 4000K. • thelightingquotient.com • Circle 397



EcoSpec Linear HP INT WW, EcoSense Lighting

• This line-voltage linear LED wallwasher is available in 12" or 48" lengths and mounts with a fixed or adjustable mounting bracket. Color temperatures include 2700K, 3000K, 3500K, and 4000K with a CRI of 80-plus. A variety of optical distributions are available, ranging from 6 degrees by 6 degrees to 60 degrees by 60 degrees. An integral driver is dimmable using electronic low-voltage reverse-phase, and zero-to-10V dimming controls. • ecosenselighting.com • Circle 398



AK, AKTB, and AKS Series, Engineered Lighting Products

• ELP has re-engineered its AK, AKTB, and AKS Series with a distributed-array LED module in 3000K, 3500K, and 4000K with a CRI of 80-plus. Designed for recessed drywall, T-bar lay-in, and surface- and pendant-mounted applications, the housing measures 3.5" deep and contains an integral dimming driver. Recommended luminaire placement is 24" to 36" from the front edge of the fixture to the lighted wall for 8' to 12' ceilings. • elplighting.com • Circle 399



Piazza Small Recessed LED Wall Wash, LF Illumination

• This recessed, adjustable luminaire has a 5.25"-square aperture and is fitted with a nine-LED array that consumes 21W. The LEDs come in 2700K, 3000K, 3500K, and 4000K with a CRI ranging from 80 to 97. Its optics include 12-, 25-, and 46-degree distributions with a lockable tilt offering up to 88 degrees of aiming below the ceiling. The fixture has an integral dimming driver with zero-to-10V, phase, and Lutron dimming drivers. • lfillumination.com • Circle 400



TUBE

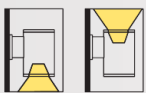
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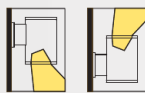
— 5", 6", 8" —



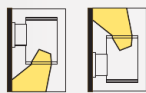
Symmetrical and Asymmetrical Distribution Options:



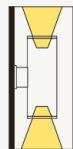
Up or Down



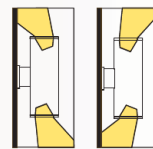
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Gorgeous White, Beautiful Color – One Light

The recent renovation at London's Theatre Royal, Drury Lane called out for energy-efficient LED fixtures to showcase the restored architectural elements of its Grand Saloon. It was imperative that the modern-day fixtures didn't distract from the 19th century style of the space. Small enough to be tucked out of sight, but bright enough to properly light the space, Rosco's MIRO Cubes proved to be the perfect solution for this installation.

The color mixing MIRO Cube 4C creates a flattering white light that accentuates the architecture of the Grand Saloon during normal exhibition and performance hours. They also allow the theatre's staff to easily customize the Grand Saloon's lighting scheme to match the color pallet of the special events that are held there throughout the year.



Fourteen MIRO 4C fixtures, specified in white housings, were installed throughout the Grand Saloon. Fixtures were mounted above the main entry as well as hidden on top of the crown moulding to accentuate the gilded decorative accents designed into the curve of the Grand Saloon's arched ceiling.

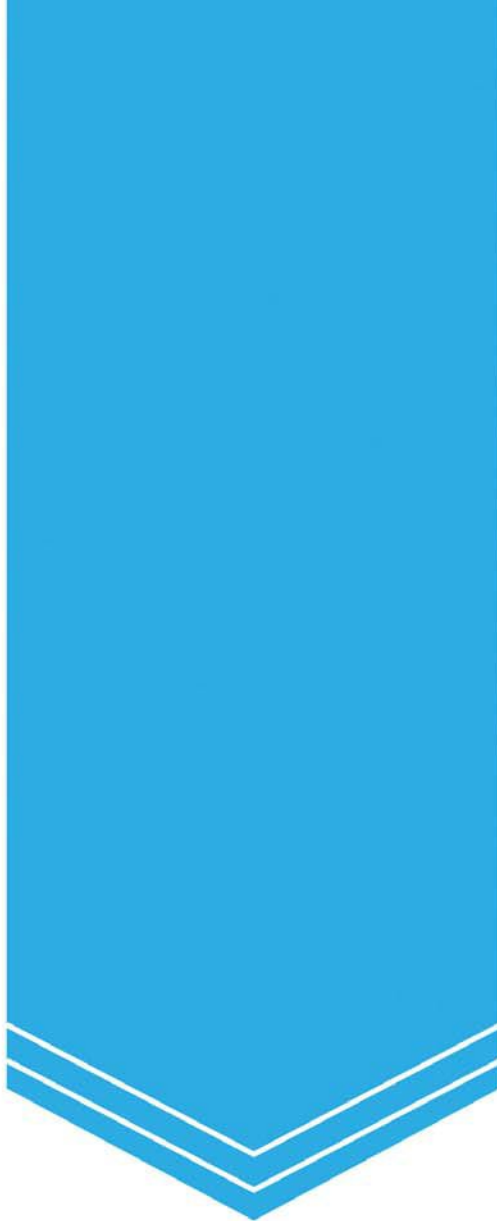
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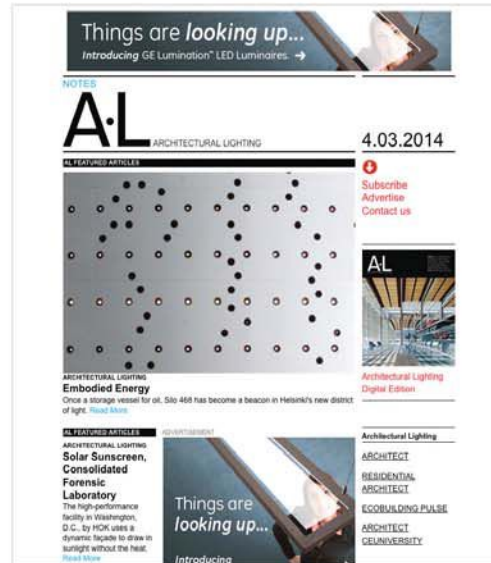
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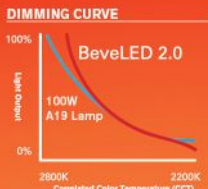
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d. The independently design of light distribution device control is greatly improved uniformity of light effect and light energy utilization that highlight the LED street light energy saving advantage.
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GY500LD 22/28/33/45W
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GY910LD 160/200W
GY750LD 80/100/120W
GY720LD 33/45/65/65/90/90/100/110W

GY920LD 45/55/65/80/90/100/110W
GY750NLD 45/55/65/80/90/100/110/120/135W
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National Manufacturing Week
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Gilbert Lang Mathews

interview by Elizabeth Donoff

photo by Adam Tetzloff

“The evolution of the lighting industry is more than just a shift to LEDs; it’s about marrying sustainable design and energy efficiency with these new lamp sources. It requires a detailed understanding of how products can be deployed—and controlled. There’s a great deal to know now to specify lighting correctly. Unless you have the time to really study this, you can get it wrong. That’s why the future holds such great promise for lighting consultants.”

Art and design have always been important to Gilbert Lang Mathews, Hon. AIA. His passion for fine art and architecture have remained true even as he studied law and went on to practice in Houston at the start of his professional career. But lighting was never far from his mind. He witnessed the power of what illumination could do to create atmosphere and highlight fashion in high-end department stores—Frost Bros.—owned by his family. They were one of the first to employ a European-imported low-voltage striplight for casework, what became known as the Lucifer light and served as the starting point for Lucifer Lighting Company, founded by Mathews in 1980. Now, with his children working alongside him, the company continues to evolve, exploring the potential that solid-state lighting has to offer, but never straying from the company’s commitment to design excellence.

What fascinates you about light?

The quality of light; it affects the mind and the body in ways that are still being learned.

What is your business philosophy?

We focus on fixture development that is minimalist, elegant, and that will disappear after defining the interiors. We talk about the three Ds: design, define, and disappear.

What makes a great luminaire?

It’s a convergence of industrial design and control. But it’s also about functionality and beauty. If you can design a product that achieves all that, you’ve succeeded.

How has lighting changed since you started Lucifer Lighting Company?

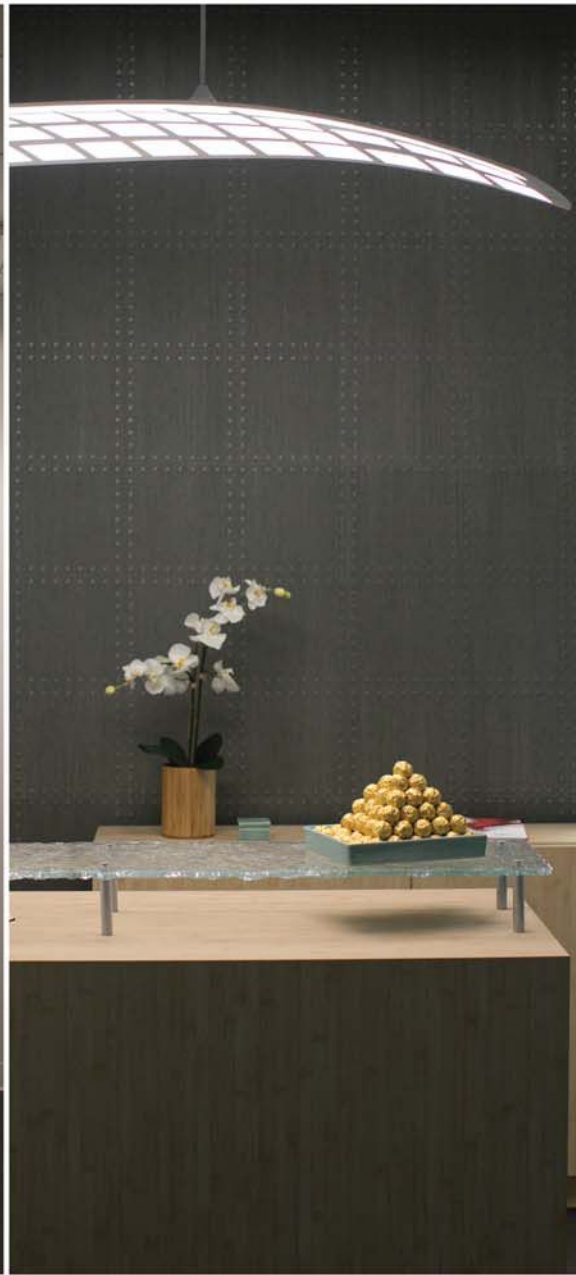
Lighting was more of a straightforward industry years ago. It was about hardware and big [lighting] footprints in ceilings. Low-voltage came along and created a degree of miniaturization. With the introduction of LEDs, lighting is now a high-tech industry. Lighting is no longer as straightforward as it once was.

What traditions are important to maintain as Lucifer Lighting Company grows?

We take pride in what we release; it’s more than just a lighting product. I want people to believe that what we release is the best that can be done in industrial design.

What’s key to running a successful lighting business as the industry evolves?

Successful businesses are marketing knowledge. Those that can impart information to allied professionals, contractors, and owners will have a place. Those that are most successful are going to be known as knowledge purveyors. •



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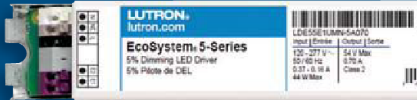
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[†]California Title 24, ASHRAE 90.1, ASHRAE189.1, IECC, IgCC



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