

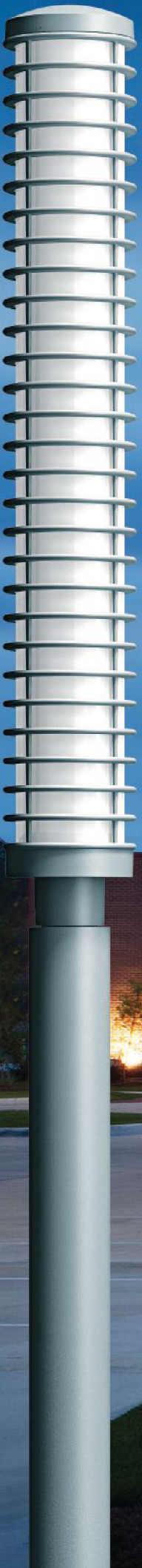


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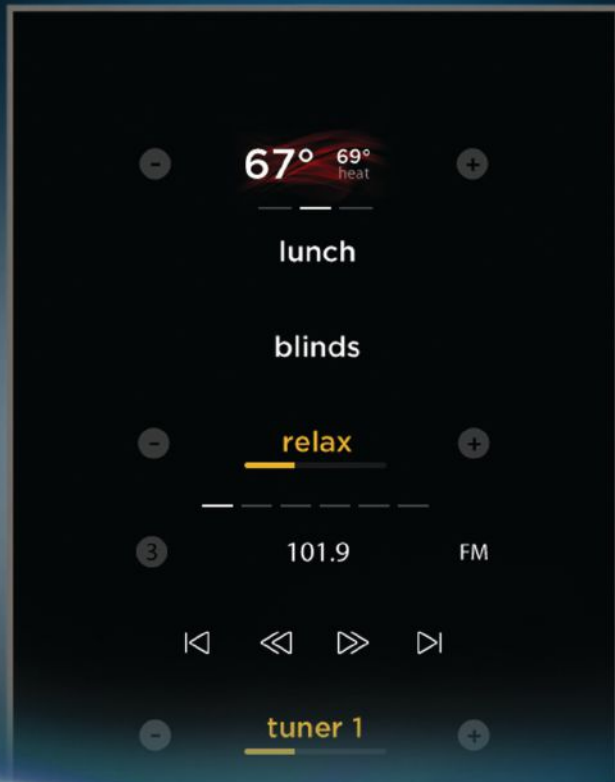
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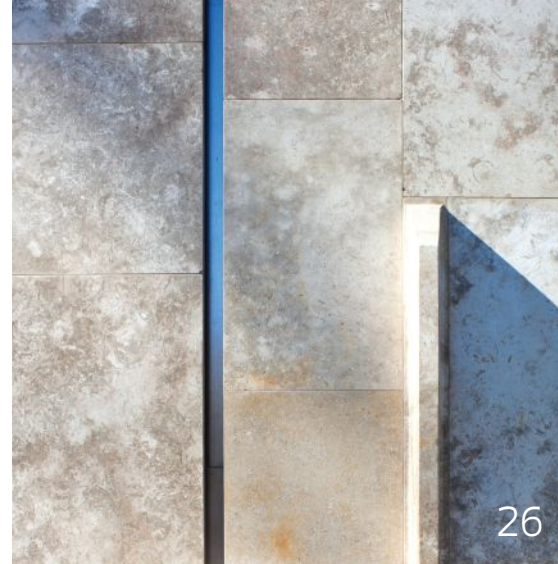
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Cover: Theory, an indirect/direct pendant luminaire, courtesy Focal Point
Top right: Michael Moran/OTTO; Bottom right: Jessica Rubenstein



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“Is lighting better off if everyone is playing in the same sandbox? Or is it more advantageous to have multiple sandboxes?”

PROGRESS? OR MARKET DISRUPTION?

Just when you think the lighting industry finally might have a chance to catch its breath—to adjust to the latest generation of lighting technology as well as the most recent round of manufacturer mergers and acquisitions—events take place that cause a bit of a stir. Two events, to be specific: the introduction of a 40W and a 60W A19 replacement lamp at the \$10 price point, and the Federal Consumer Product Safety Commission’s recall of 554,000 A19, G25, and PAR20 LED lamps.

What’s cause for concern about these two events is not the events themselves or the manufacturers associated with them, but what they represent in the larger context of the lighting industry as it works tirelessly to adapt to changes—both economic and technological—that are already well under way.

As new players enter the industry from other arenas, what’s at risk is its historical sense of fair play and communal support. No one is denying a company its ability to be successful and sell goods in a free-market economy. But in the current lighting marketplace, with seasoned and fledgling manufacturers competing for the same customers, the gentlemanly type of business etiquette that was so essential to the lighting industry’s formation may now be at risk. And that’s where the two examples I mentioned above come in.

A \$10 LED Light Bulb

The price barrier that separates traditional filament-style light sources and LED products has been a huge issue in the industry, and it has culminated in a holy grail-style quest to create an affordable LED replacement for the iconic incandescent. Many companies (Philips, GE, Toshiba, Sharp, Lighting Science Group, and 3M) have introduced versions of an A19 incandescent, both on their own and through programs such as the U.S. Department of Energy’s L-Prize Competition. But it was not until Cree’s March introduction of the aforementioned 40W and 60W A19 replacement lamps that anyone has approached the \$10 price point, making these products a more competitive alternative for consumers. (Only the 40W actually dips below \$10, at a manufacturer’s suggested retail price of \$9.97, while the two 60W versions retail for between \$12.97 and \$13.97.)

This seems like an important step forward. It also seems to fly in the face of programs such as the L-Prize Competition, which was launched to create an outlet for everyone in the industry to work toward a shared goal. The L-Prize process was by no means perfect, but its intent, to encourage technology developments across the industry that aid in establishing baseline product standards for solid-state lighting, is crucially important.

So what does it say when companies introduce products outside of industry platforms such as this? How can the lighting industry as a whole get a handle on the complexity of solid-state lighting and establish the next generation of lighting metrics? Is lighting better off when everyone is playing in the same sandbox? Or is it more advantageous to have multiple sandboxes?

Lamp Recalls: A Technology Self-Check

The recalled lamps noted above were produced between Oct. 4, 2010, and March 18, 2011, by the Lighting Science Group (LSG), and were sold under the brand names Definity (Lighting Science Group brand), EcoSmart (Home Depot brand), Sylvania, and Westinghouse. The reason for recall? Reports that overheating was leading to fire.

Product recalls are not new, but the one that effected the LSG LED lamps is the first one with these particular shapes (A19, G25, and PAR20). Of course, no technology is perfect, and companies such as LSG know that a key part of innovation is risk. This specific recall gives rise to important questions that the lighting industry is figuring out how to deal with now that solid-state lighting technology has introduced a new set of issues. These are questions such as: What is at risk when the manufacturing process relies on both in-house production and outsourcing of components? How does a manufacturer find trustworthy suppliers? Where do warranties factor in?

And what about price? This too is part of the overall issue. As prices drop, is it because the cost of materials has dropped, or are compromises being made unknowingly in the production process?

Another unfortunate side-effect of this recall is that it provides an excuse for some in the industry to pile on the usual LED bashing. To that, I would simply ask: Haven’t we moved beyond this?

The next few months will be interesting. Having sorted through more than 300 lighting related products for this annual product issue of ARCHITECTURAL LIGHTING, I feel as though I might know the manufacturers’ product offerings as well as they do themselves. I’m curious to see who shows what at Lightfair and how each will be received in the marketplace.

I’m also eager to see who decides to operate within industry channels and who decides to play outside those boundaries. For the moment, at least, I haven’t been able to decide if that’s progress or if it’s a type of market disruption that handicaps the lighting industry in the long term.

Elizabeth Donoff
Editor



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The Lighting Research Center is currently testing more than 115 lamps for reliability in its laboratory, which is the only university-based laboratory accredited by the National Voluntary Laboratory Accreditation Program.

ILLUMINATING THE WAY, 25 YEARS LATER

The Lighting Research Center's silver anniversary drew 175 industry leaders to Rensselaer Polytechnic Institute.

text by Wanda Lau

The value of light is typically measured in dollars, color temperature, or efficacy. But how does one quantify the sense of security that light provides in a parking garage, or the increased productivity of workers in a bright factory? This question of enumerating the objective, along with the psychological benefits of light, was posed to the roughly 175 industry experts and participants who attended the 25th anniversary celebration of the Lighting Research Center (LRC) at Rensselaer Polytechnic Institute, in Troy, N.Y., on March 20.

Audience members representing a number of fields, such as architecture, lighting, manufacturing, and policy, came from across the U.S. and around the

world—including attendees from Germany, South Korea, Taiwan, the United Kingdom, Spain, and Sweden—to commemorate the university-based research center and educational institution. The LRC is internationally recognized for conducting objective, third-party testing of lighting products as well as for its research and development work with lighting technologies and their associated impact on human factors.

In his opening remarks, LRC director and co-founder Mark Rea stressed the importance of finding “additional metrics to expand the definition of the value of lighting to the benefit of the environment and society.” Because the private and public sectors gravitate toward objective “perceived” metrics, the qualitative “real” value of lighting is at risk of being value engineered out of projects.

Keynote speaker Rory Sutherland, vice chairman of Ogilvy Group UK, enlightened the crowd with case studies in which prioritizing general psychological metrics led to tangible benefits. The challenge of ascertaining and communicating the value of lighting was discussed by a five-member panel, which included Sutherland along with Peter Bennich, Solid-State Lighting chair, Swedish Energy Agency; Steven Briggs, general manager of Global Product Management, GE Lighting Solutions; Randy Burkett, president and design principal, Randy Burkett Lighting Design; and Andrew Vesey, COO and executive vice president, AES Corp.

During the day, the LRC also hosted an open house of its facility in the historic W. & L.E. Gurley Building, which dates back to 1862. Though it may appear like

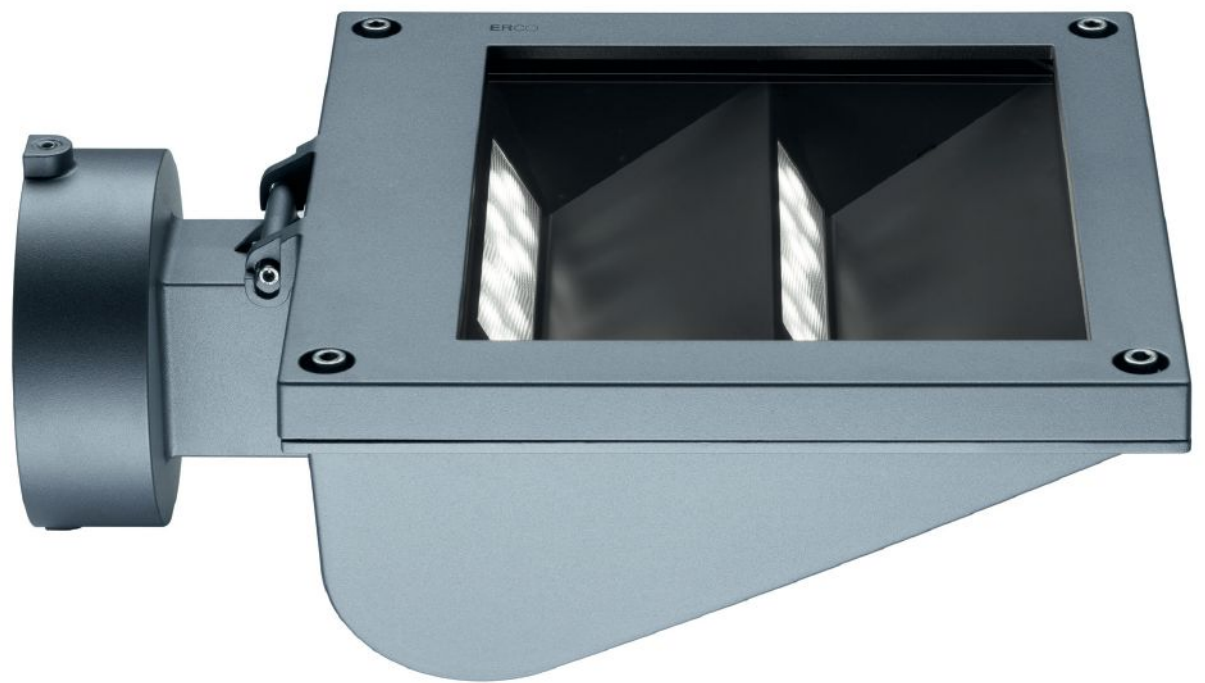
“an old factory with basically empty space,” Rea says, the four-story building allows the LRC to fulfill its core competence to measure light and electricity while responding to the needs of its particular customers—a diverse range of constituencies that includes the Federal Aviation Administration and dairy farmers. The space also allows the LRC to adapt quickly to industry-wide changes in lighting products. “We’re not committed to a technology,” Rea says. “We’re committed to lighting.”

The event also celebrated the opening of the LRC’s new photometry laboratory, funded by the New York State Energy Research and Development Authority (NYSERDA). Irvin “Jack” White, the past NYSERDA president who issued the original 1987 request for proposals that would establish the LRC, cut the ribbon alongside Rea and current NYSERDA president and CEO Frank Murray Jr.

The day culminated at the historic Franklin Plaza Ballroom, where Rea and other LRC staff paid tribute to individuals and organizations with longtime affiliations with the center. Rea also announced the launch of the Glenn W. Bailey Industry Mentor program and its first honoree, Fred Heller, chairman emeritus and former CEO of Genlyte. As part of the program, Heller will help introduce students and researchers at the LRC to important practices in the lighting profession. The LRC then presented a 25-Year Award to NYSERDA for its leadership in lighting research and support for the center.

For more information about the LRC, go to lrc.rpi.edu and for event images go to <http://bit.ly/13OA7YP>.

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NEXT GENERATION LUMINAIRES COMPETITION WINNERS ANNOUNCED

The program recognizes energy-efficient LED luminaires for the commercial lighting marketplace.

text by Elizabeth Donoff

The winners of both the outdoor and indoor categories of the annual Next Generation Luminaires (NGL) Solid-State Lighting Design Competition were announced in February and March. The outdoor portion of the competition was announced first, during the Strategies in Light conference in Santa Clara, Calif., on Feb. 12-14. The winners of the indoor portion of the competition program were announced on March 20 during LEDucation 7 in New York City.

The NGL competition was launched in 2008 "to promote excellence in the design of energy-efficient LED luminaires for general illumination in commercial lighting applications." It also serves as a specification resource for designers so that they can better navigate the abundance of luminaire offerings in the marketplace. The competition is sponsored by the U.S. Department of Energy (DOE), the Illuminating Engineering Society, and the International Association of Lighting Designers. In 2012, the program began to evaluate indoor and outdoor fixtures separately under two competitions.

In the outdoor competition, 176 products were submitted for consideration, but only 151 were eligible. Of those, only 120 moved on to the actual judging stage as they met both the market readiness and proper documentation requirements. In the end, 37 luminaires were recognized from the pool of entries, representing 42 different manufacturers.

The four Best in Class winners were as follows:

- The Lighting Quotient's fraqtir Outdoor - Style S170 façade lighting fixture
- Relume Technologies' Oxford Decorative Acorn streetscape and walkway luminaire
- GE Lighting's Evolve LED Scalable Cobrahead roadway fixture
- Edge Lighting's TV and Dial LED decorative wall sconces

The entries were judged by a panel of nine lighting industry professionals: David Ghatan, C.M. Kling & Associates; Ron Gibbons, the Center for Infrastructure Based Safety Systems at the Virginia Tech Transportation Institute; Mike Lambert, KCL Engineering; Edward Smalley, Seattle's City Light's Streetlight Engineering Unit; Jason Tuenge, the DOE's

Pacific Northwest National Laboratory; Craig Bernecker, the Lighting Education Institute; Mary Matteson Bryan, an independent consultant; Nancy Clanton, Clanton & Associates; and Barbara Cianci Horton, HLB Lighting Design. The luminaires were evaluated as objects and tested in their proper field or site application at the Virginia Tech Transportation Institute in Blacksburg, Va., using the following criteria: color, appropriate illuminance, light distribution, glare control, appearance, serviceability, value, and energy efficiency.

In the indoor category, 28 luminaires were recognized from a pool of 156 entries. (Only 99 made it to the judging phase with market-ready samples and proper documentation.)

The three Best in Class winners were as follows:

- Juno Lighting Group's Trac-Master T254L Cylindra track-mounted accent luminaire
- Digital Lumens' XLE-3-10 Xpress High Bay industrial luminaire
- Acuity Brands/Lithonia Lighting's W Series LED stairwell luminaire

The 2012 indoor competition reflected continued improvements in LED luminaire ability to address color rendering as well as increased efficacies. The 2012 winner's averaged 75 lumens per watt, compared to 65 lumens per watt in 2011 and 37 lumens per watt in 2008.

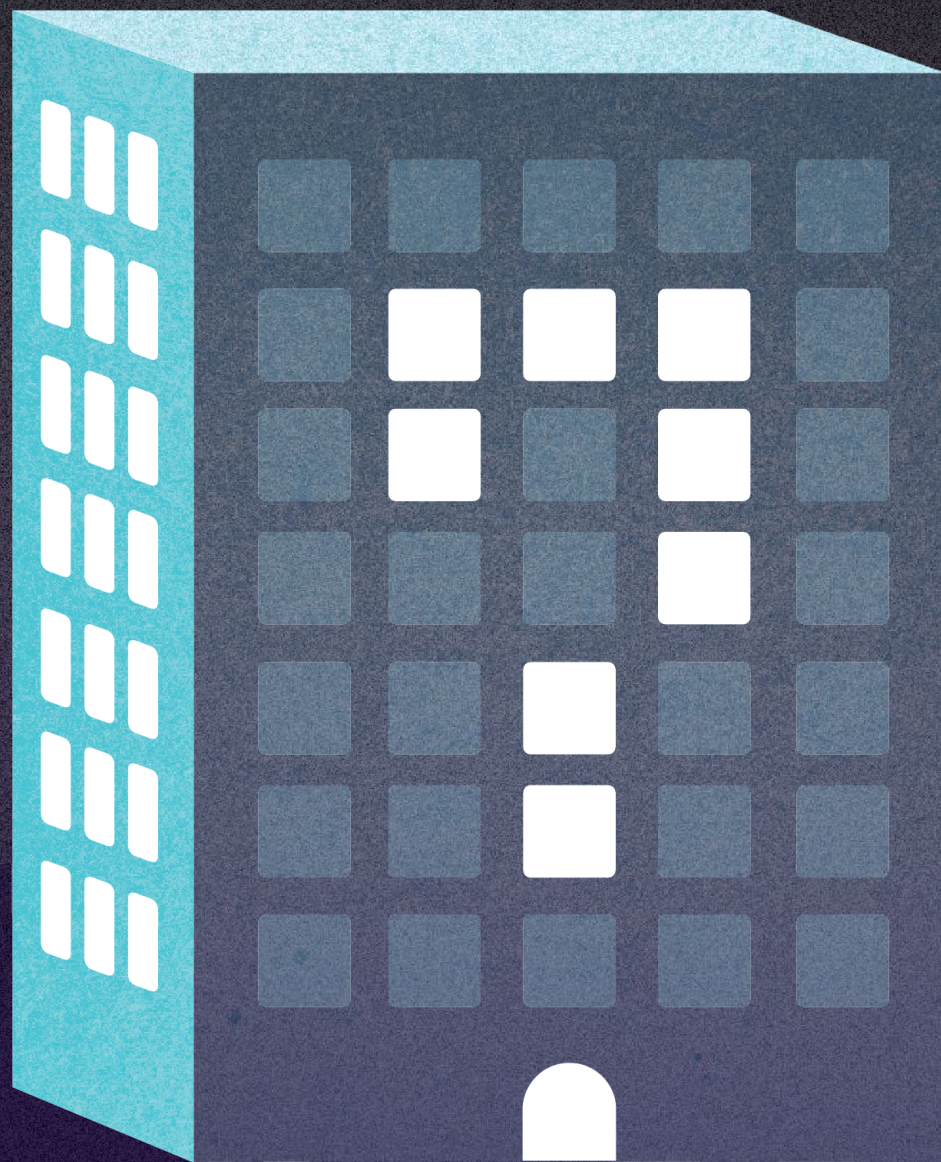
The entries were judged by a panel of 11 lighting industry professionals: Jeffrey L. Brown, Illuminart; Samantha LaFleur, LaFleur Associates; Scott Shellberg, Paramount EO; Daniel Rogers, ICF International; Aram Ebben, U.S. Services; Jim Baney, Schuler Shook; Avraham Mendall Mor, Lightswitch Architectural; Craig Bernecker, the Lighting Education Institute; Melanie Taylor, WSP Flack + Kurtz; Charles Thompson, Archillum; and Mary Matteson Bryan, an independent consultant. The testing was conducted at Intelligent Lighting Creations in Arlington Heights, Ill., and the products were evaluated both as stand-alone fixtures and as installed luminaires using the following criteria: color, appropriate illuminance, light distribution, glare control, appearance, serviceability, value, and energy efficiency.

For more information about the NGL program and the complete list of recognized luminaires in both the outdoor and indoor competitions, go to www.ngldc.org.



A few of the Best In Class winners from the Next Generation Luminaires competitions:

1. The Lighting Quotient's fraqtir Outdoor - Style S170
2. Relume Technologies' Oxford Decorative Acorn luminaire
3. GE Lighting's Evolve LED Scalable Cobrahead
4. Acuity Brands/Lithonia Lighting's W Series LED stairwell luminaire



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text by Peter J. Lamont
illustration by James Provost

Peter J. Lamont is a business and commercial litigation attorney nationally recognized in a wide variety of highly specialized areas within the kitchen, bath, lighting, construction, and design industries. He routinely represents various national and international companies within the design sector, and has achieved the highest rating in both legal ability and ethical standards as awarded by AVVO (avvo.com).

Every lighting design project has its own inherent risks and liabilities. For example, a designer may spend a good deal of time preparing initial drawings and plans for a project that ultimately falls through. Or perhaps the project's owner, developer, or architect files for bankruptcy protection and the designer is unable to recover the fees and costs associated with his or her work. There is very little, if anything, that a designer can do to prevent the above scenarios from playing out.

But there is one risk that is extremely commonplace, and often very damaging both to a designer's reputation and profitability—it is called "scope-creep." Scope-creep is created as a result of a lack of communication between the lighting designer and the project owner and other subcontractors, and by failing to utilize proper contract procedures. Scope-creep can also be a product of a designer's ego or desire to increase revenue. It is an equal opportunity danger—meaning that it is equally prevalent in large commercial projects as it is in small residential jobs. The good news is that the damaging effects of scope-creep can be managed or limited by following a few simple guidelines.

What Is Scope-Creep?

A term coined by project managers, scope-creep is the continuous growth or change in the scope of a particular project beyond its original stated intent. In small residential jobs, lighting designers encounter this problem when a homeowner or interior designer

expands on the original scheme; in large projects, the architect may redesign a particular floor or design component.

In one real world example, which we will use throughout this article, a homeowner retained the services of an interior designer to redesign her home's entire first floor. The interior designer, in turn, retained the services of a lighting design firm. Both the interior designer and the lighting consultant entered into a standard contract for services that outlined the scope of the lighting designer's responsibilities. Unfortunately, the lighting designer never spoke to the homeowner directly and only relied on the interior designer's explanation of the scope of work.

Two months into the project, the homeowner emailed the lighting designer and requested a redesign of some of the rooms, as well as additional work in the screening room in the basement. The lighting designer, believing that he would be able to generate additional revenue from the added work in the basement screening room, quickly agreed. Unknowingly, the lighting designer germinated the seeds of scope-creep.

Scope-creep is analogous to pachysandra, which is a low-growing, shade-loving evergreen that spreads rapidly. If you plant a small patch of pachysandra in the spring, by the end of the summer it will have doubled or tripled in size. This is what happens with scope-creep. As you begin to accept changes to the original scope of work without taking the proper measures to control scope-creep, your workload will double or triple, your liability will increase, and your profitability will usually decrease.

What Creates Scope-Creep?

It is most commonly born out of poor communication between the lighting designer and the homeowner or architect, or from a failure to implement proper contract procedures. But scope-creep can also arise from improper analysis of the original scope of work; failure by the lighting designer to establish and comply with internal procedures for dealing with change orders; lack of communication between the architect, developer, and owner; the inability to procure certain design elements for construction materials; the allure of making more money on the project; or from clients seeking to get more work out of the designer for free.

What Are the Risks?

Generally, the risks are proportionate to the level of creep that exists on a particular project or job. For example, if a homeowner asks a lighting designer to oversee a small portion of an electrician's work, the potential risk to the designer is relatively minor. On a



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It is imperative, regardless of whether hired by a homeowner, developer, or architect, that the lighting designer clearly explains his or her services and expertise as well as explains what types of work are included—and excluded—in the project agreement. This all should be outlined at the initial meeting and also should be referred to briefly in his or her contract. If the lighting designer is required to sign the developer's or architect's contract, he or she should look to include language in the contract clearly establishing his or her scope of work.

larger project where the potential for creep is greater, however, the risks can be devastating.

The best way to illustrate the magnitude of the potential risk is to go back to the aforementioned story of the lighting designer. Shortly after agreeing to take on the additional work, the designer began developing the screening room's lighting design scheme without communicating with the interior designer first. After spending hours designing the layout, the lighting designer presented his design to the homeowner and interior designer. The interior designer explained that the proposed lighting plan would not work because she was redesigning the entire basement, not merely the screening room. The homeowner apologized for not clarifying the issue with the lighting designer and asked if he would be able to work with the interior designer to formulate a new lighting plan for the basement. At this point, the job had significantly decreased in profitability for the lighting designer.

The homeowner then approached the lighting designer and asked if he would supervise her electrician's work, offering an additional hourly fee for this. The lighting designer explained that he is a designer and not an electrician but agreed to oversee the implementation of his lighting plan. The electrician caused a fair amount of unnecessary damage to the home's ceilings and walls, which created a nearly four-week delay. Ultimately, the electrician and lighting designer were sued for negligence and breach of contract. The homeowner sought more than \$700,000 in compensatory and consequential damages. In an effort to avoid the protracted litigation, the lighting designer settled his portion of the claim for \$115,000.

Can Scope-Creep Be Prevented?

While many would like to believe that scope-creep is something that can be prevented, in reality, it cannot. Changes to the scope of work are inherent to almost every project. To suggest that it can be avoided or eliminated is wishful thinking.

That being said, every job is going to require some tweaks to the original scope of work. These adjustments to the original scope are not necessarily damaging if the increase in scope of work is handled and documented properly. In other words, you cannot eliminate changes to the project scope, but you can manage its effect by following a few simple procedures.

The two best ways to manage changes to the scope of the project are through proper communication and contract procedures.

Proper Communication

It is imperative, regardless of whether hired by a homeowner, developer, or architect, that the lighting designer clearly explains his or her services and expertise as well as explains what types of work are included—and excluded—in the project agreement. This all should be outlined at the initial meeting and also should be referred to briefly in his or her contract. If the lighting designer is required to sign the developer's or architect's contract, he or she should look to include language in the contract clearly establishing his or her scope of work.

For example, the designer in our story should have advised the homeowner in writing that he is not qualified to oversee the work of the electrician and that he would only be overseeing implementation of his design. Separately, he should have advised her that he would not be held liable for any consequential damages arising from the implementation of his design. Consequential damages are damages that are not directly related to one's contract, but which can arise from his or her work—such as penalties for delay or loss of use.

Changes to the project's scope should be treated as an entirely new agreement with the client. This means that you should fully understand the scope of the new assignment, confirm it with your client, and put it in writing. Had the designer taken the time to discuss with the homeowner the nature and extent of his responsibilities with designing the screening room, he would have learned that the interior designer had plans for the entire basement layout. The lighting designer also should have consulted with the interior designer concerning the basement plans.

There's an overlooked and often underutilized word used to combat the expanding scope of a project: "No." Lighting designers should not be afraid to tell their clients that they cannot or do not want to expand the scope of their duties. Had the lighting designer told the homeowner that he did not want to supervise the electrician, he most likely would not have been sued. But if you are interested in expanding the scope of your work, you must communicate effectively with your client and stay in control of your client's demands and expectations.

Proper Contract Procedures

Regardless of whether your client is signing your contract or insisting that you sign his, it is your obligation to ensure that the scope of work is adequately defined. Far too often, general terminology is used when defining the scope of work, such as "to design and implement a formal lighting plan throughout floors 1 through 15." This does not adequately define the designer's scope of work. Specific language explaining your job and your limitations should be included in the scope of work section.

If, during the course of a job or project, the original scope of work changes, you must document the change in writing. While minor changes or deviations may be outlined in an email, larger scope changes should be included in a change order or as an addendum to the original contract.

Scope-creep is often the result of undocumented verbal communications. In order to protect yourself, any conversations concerning the scope of your duties or responsibilities should be put in writing. That way, if a dispute arises, you have proof of the agreement. It is not uncommon to see a lighting designer and an architect tied up for years in litigation arguing over non-payment of work done in connection with verbal scope-of-work changes.

It is very difficult for a designer to claim that he or she is entitled to payment for additional work performed if the request for the additional work is not contained in writing. In fact, much of the litigation between architects and lighting designers involves disputes where a designer believes he or she should be paid for the additional work, while the architect argues that no request for additional work was made or that the additional work falls under the original scope.

So you need to establish protocols to deal with expanding work scopes. Before the project outline begins to change, have a standard protocol set up for which to accept, confirm, and memorialize changes to the scope of work. One of the easiest ways to deal with an expansion of work is to make a habit of creating addendums to your existing contracts. The addendum should clearly spell out the expanded scope of work as well as payment terms and conditions. It should be signed by both parties and should clearly establish your rights and remedies. While the damaging effects of scope-creep cannot be eliminated, they can be managed and controlled through effective communication and proper contract procedures. •

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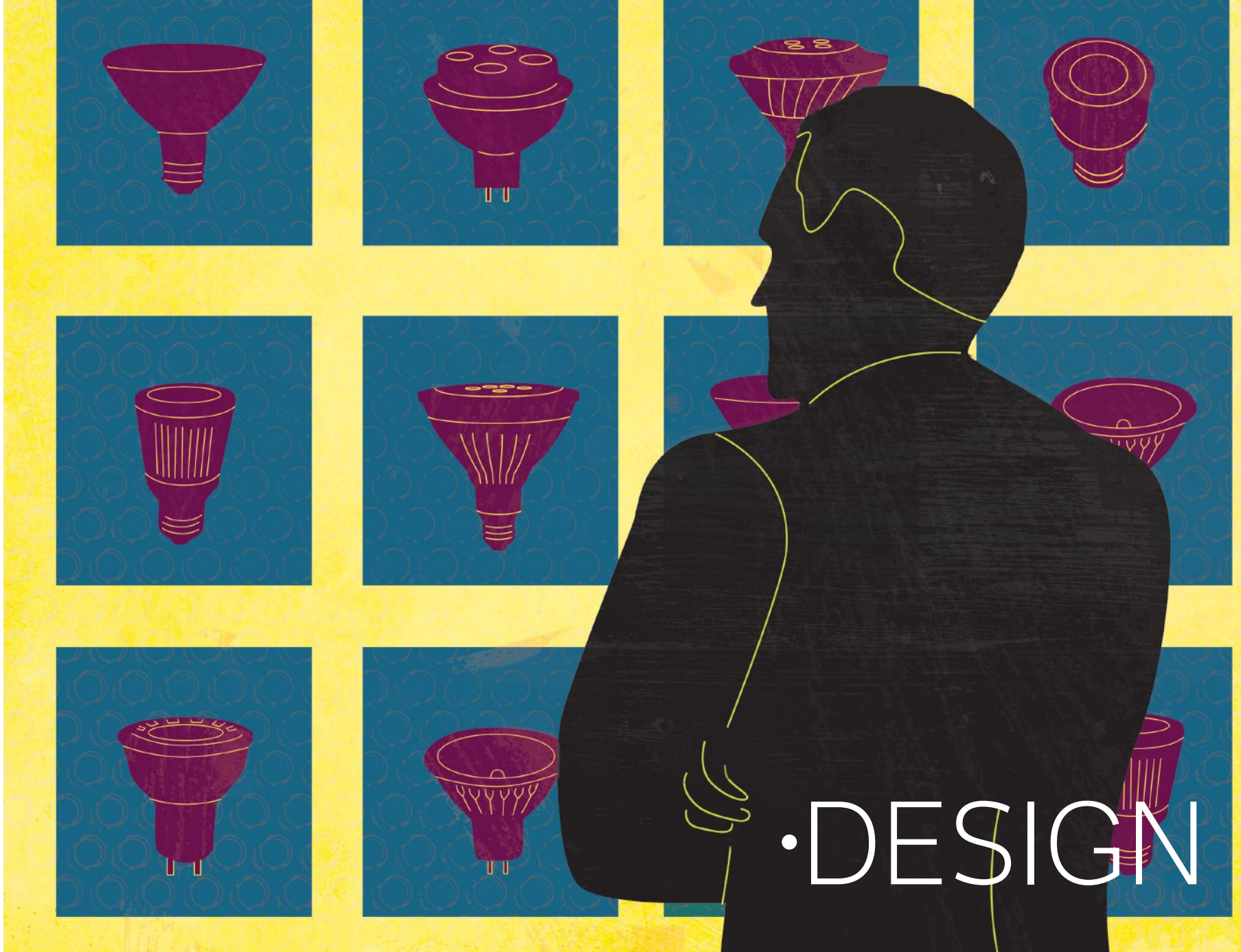
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REPORT

MEET THE REPLACEMENTS

Many lamp options don't meet EISA energy standards. Large-scale replacement raises questions for architects, lighting designers, lighting manufacturers, and clients.

text by Bill Millard

illustration by Jessica Rubenstein

Contrary to what the public has been led to believe, the Energy Independence and Security Act (EISA) of 2007, which expanded on the 2005 Energy Policy Act (EPAct) and began taking effect in July 2012 (and which is to be phased in through 2014), hasn't banned anything. There is neither an official war on the familiar A-shape incandescent lamp, nor a mandate to adopt any particular alternative. What there is, though, is a 28 percent higher efficiency standard, as measured in lumens per watt, plus baselines for lamp lifetimes. No conventional incandescent lamp in the 40W to 100W range can meet these criteria, while three major categories of lamps—halogen, CFL, and LED—can, so a de facto phaseout of inefficient lamps, no matter the source, is under way nationwide.

Changing lamp technology and its marketplace impact started long before EISA, says Domingo Gonzalez, principal at New York lighting design firm Domingo Gonzalez Associates. Facilities in many sectors (schools, airports, and libraries, for instance) haven't depended on incandescents for 15 to 20 years. Comparing the current situation to the dawn of incandescents in the 19th century, Gonzalez says, "We didn't have to pass a law banning gaslight. It banned itself."

It might appear that EISA has limited manufacturers' ability to produce lamps, but what it actually has done is give manufacturers a time frame to develop more-efficient next-generation technologies. The Department

of Energy's 2009 Rulemaking on Incandescent Reflector Lamps (IRL) and Linear Fluorescents—required by EISA and covering the R, PAR, ER, BR, BPAR, and similar lamp shapes, along with linear and U-shaped fluorescents—also went into effect in July. T12 magnetic ballasts have been banned from manufacture or import since 2010, but the sale of inventoried T12 lamps is permissible. The National Electrical Manufacturers Association (NEMA) supports the EISA standards, and major lamp producers have focused on halogens, CFLs, and LEDs, abandoning incandescents despite the loudly publicized congressional defunding of EISA enforcement in 2011.

And the nation's lighting is not changing overnight. Inventories of incandescents, T12s, and older halogens remain on hand, and habits respond slowly to incentives. "The reflector legislation ... was a bigger shock to the system, because that was everything all at once," says Brian Vedder, LED Portfolio Manager at Philips Lighting. "They had this new efficacy requirement, [whereas] the A-shape [regulation] was phased in over the course of three years." Still, the scale of change is massive. Options for specifiers boil down to:

- A switch to halogen, ideally the newer infrared (IR) and/or silver-coated varieties, for moderate gains in efficiency but not much gain in lamp life.

As incandescent options fade away, halogens, CFLs, and LEDs become more viable alternatives. But informed observers caution that “equivalency” is a vague term, especially when it comes to color quality. Instead, they recommend tailoring features, savings, and timing to specific applications.

- A switch to CFLs for comparable energy gains and longer life if initial cost is the chief concern; dimming and a tight beam aren't essential; end-of-life disposal isn't worrisome; and bad memories of early-generation CFLs—with their widely variable quality control and poor color rendering—don't linger.
- A switch to LEDs, which requires higher initial costs and some research on driver or fixture compatibility and color metrics, but offers better energy savings and lamp longevity, along with the potential for sophisticated control options if fixtures are appropriately matched.
- A switch from T12 linear fluorescents to T8s (which fit the T12 fixture, but need a new ballast) or T5s (requiring new fixture and ballast). This change is required by the 1992 EPA Act. (Of note, market parity between T8s and T12s took until 2001.)

Non-lighting-specialists face a learning curve, having to translate the familiar 40W, 60W, 75W, and 100W power levels into the language of brightness (respectively, about 450, 800, 1,100, and 1,600 lumens). They do, however, have some help: Manufacturers and the Energy Star program offer online overviews; and the Federal Trade Commission, through the Lighting Facts label program, requires packaging to display brightness, cost comparisons, longevity estimates, and (if applicable) presence of mercury. Commercial personnel who are specifying lamp choices are unlikely to find lumens-per-watt ratios intimidating, but it is also advisable to become conversant in candelas and color rendering index (CRI), Vedder says, particularly for PAR lamps in directional retail applications.

For a purchaser under time pressure whose circumstances rule out extensive research or sample testing, Energy Star ratings are a reliable guarantee of quality in screw-based lamps, notes Joseph Howley, industry relations leader for GE Appliance and Light. The important variables are built into the Energy Star specifications: lumen output, candlepower, lamp life, beam spread, chromaticity, color points, and startup time, which specifically can vary in fluorescents.

A key principle in all of these decisions is to assess the questions that an application presents rather than to take any one technology for a catch-all answer. “I've been around long enough to remember 30 years ago when MR16s came on the market,” Gonzalez says. “They were the new, hot thing, and the answer to every question

was ‘low-voltage tungsten halogen,’ to the extent that it almost became a design mantra. It was no longer about ‘What do you like? What don't you like? How do you light a space?’ It was ‘How do I put the MR16s in on the project?’” (But we should not underestimate the vitality of MR16s: They remain unregulated and are available in all three major varieties—halogen, fluorescent, and LED—and popular for their small size, range of beam angles, high CRI, and dimmability.)

As incandescent options fade away, halogens, CFLs, and LEDs become more viable alternatives. But informed observers caution that “equivalency” is a vague term, especially when it comes to color quality. Instead, they recommend tailoring features, savings, and timing to specific applications.

Halogens: Still Viable, but Not Optimal Long-Term

These lamps offer the simplest substitutions. “It's just another resistive load on the circuit, and the same rules,” Vedder says. “If you want a complete, ‘I-don't-have-to-think-about-how-it-works’ [decision], pull out an incandescent, stick in a halogen, and it'll work just the same.” Up-front costs and complex research for a transition to LEDs may be enough of a hurdle in some settings that the “good-enough” option of substituting halogen lamps, offering about a 30 percent gain in efficiency, will be preferable.

Older halogens, however, will join incandescents among the phased-out lamps. Halogens in the PAR30 and PAR38 classes, Howley says, will require IR filament technology, silverized coating, or both to meet energy standards. Cheryl Ford, marketing manager for Osram Sylvania, notes that the 2009 IRL regulations call for replacing the majority of her company's halogen line by July 2014. Osram Sylvania is pursuing a three-tier strategy with consumer lamps lasting 1,500 hours, a mid-range line lasting 3,000 hours, and a 4,500-hour model that will be of greatest interest to the commercial market. Among PAR38 lamps, there is a 30 percent improvement in efficiency—notable, though not competitive with the 80 percent savings from LED PAR38s.

There are also fewer suppliers in the halogen market than in other sectors, Vedder notes, because legislated requirements are harder to meet. Whereas ANSI tolerances for incandescents allowed 4 percent leeway plus half a watt (some 100W lamps, for example, actually drew 104.5), the “equivalent” 72W halogen has a firm maximum of 72W. Estimates of energy performance with halogens, however, should include their thermal effects. Even the new IR halogens, Vedder observes, waste about 70 percent of their wattage as

heat, and they emit ultraviolet frequencies that can damage merchandise. Longevity in the 1,000-hour range makes current-generation halogens acceptable, but not ideal, replacements for incandescents in applications where familiar color rendering is a priority.

CFLs: Cheap, Easy, but Not Universally Loved

Opinions about these once-iconic spiral lamps vary widely. Still, the CFL has a stronghold on certain lighting types. Downlighting, however, is not one of them, Gonzalez says. With price points of CFL and LED products converging over the past three years, he says, “we haven't specified a compact fluorescent downlight in our office for sometime.” But he views CFLs as appropriate substitutes for incandescents in restaurant and hotel applications, despite objections over their color temperature; he prefers a 3000K white over the common 2700K. A 13W CFL's lamp life of 12,000 hours improves on a 60W incandescent's 1,000, but it does not compete with an LED's estimated 25,000 to 50,000 hours.

Though dimming is a persistent problem with CFLs, Gonzalez notes that major hospitality chains have standardized using switches instead of dimmers in their rooms. Dimmability has been an acceptable sacrifice for energy savings, which include indirect HVAC expenses.

Mike Krames, chief technology officer of the startup LED manufacturer Soraa, contends that the CFL era will be historically brief. The CFL sector “blew it,” he says. They didn't see any other technology coming down the pike [and] ignored LEDs. ... Having come from a company [Philips Lumileds] that made both, I can tell you there's a lot of consternation [about] how to do that transition.” The only metric favoring CFLs, Krames believes, is initial cost, a variable that is skewed by rebates.

“CFLs will remain viable as long as they're cheaper than LEDs,” Vedder says. GE's Howley notes that CFLs outperform halogens in longevity, lasting about 8,000 hours rather than 1,000, and that the NEMA Premium standard for ballasts provides a shorthand for reliability. As for progress in color quality, Mary Beth Gotti, director of General Electric's Lighting Institute in Nela Park, Ohio (just outside Cleveland), has noted that visitors to the institute pick CFLs over filaments approximately half the time in randomized comparisons.

Upgraded linear fluorescents are also alive and well: Ford, of Osram Sylvania, cites her employer's T8 model, the Octron XPXL (Extended Performance Extended Life), that is estimated to last up to 84,000 hours on programmed start or 75,000 hours on instant start. The economics, she suggests, indicate that the T8 form factor, unlike PAR, is not yet ripe for LED conversion, except in settings that are hard to reach or require shatter resistance. High-performance linear fluorescents can also be combined with the same firm's Powersense zero-to-10V dimming ballasts and/or a lighting-management system such as Encelium, a flexible nonproprietary protocol. With more established management systems for fluorescents than for LEDs, major migrations to linear LED lamps are unlikely for about five or more years, Ford says.

LEDs: Proceed with Eyes Wide Open

For the foreseeable future, LEDs are the fastest-expanding sector. If the descent of some LED prices to \$10 per lamp is any indication, this tendency should accelerate—particularly, Ford notes, when the Zhaga Consortium's industry-wide voluntary fixture specifications, currently being organized into seven spec books, catalyze widespread interchangeability among LED engines, heat sinks, and drivers (See “Z is for Zhaga” at archlighting.com/leds/z-is-for-zhaga.aspx). Another reason for greater LED adoption, she adds, is the increasingly tight wattage-per-square-foot



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Efficiency improvements in the LED realm, says Philips Lighting's Brian Vedder, don't quite keep pace with the 18-month power-doubling period that Moore's Law associates with microchips, but they are still occurring fast enough to create a dilemma between early and later adopters. Domingo Gonzalez, principal of Domingo Gonzalez Associates, sees new breakthroughs in LEDs appearing every few months, in some cases, every 90 days.

requirements as states review their energy codes; the DOE, she notes, is requiring such reviews by October of this year and the adoption of ASHRAE 90.1/2010 or equivalent.

Rapid technical progress and price reductions make it difficult to find the optimal time to convert to LEDs, though the extended payoffs are usually worth the trouble. Efficiency improvements in the LED realm, Vedder says, don't quite keep pace with the 18-month power-doubling period that Moore's Law associates with microchips, but they are still occurring fast enough to create a dilemma between early and later adopters. Gonzalez sees new breakthroughs in LEDs appearing every few months, in some cases, every 90 days.

Replacing other lamps with LEDs requires attention to fixtures and often a conversation with a lighting manufacturer or consultant. "Any time that you have an electronic circuit and not just a resistor, you have to translate the input to [the] dimming function through the electronics," Vedder says. "And any time you do that, you can have some compatibility issues."

Mixing older and newer LEDs on the same dimmer circuit is a common source of uneven performance or shortened lamp life. These problems can occur whether lamps are labeled as dimmable or nondimmable, Howley says. Industry standards for dimming control are in an early evolutionary stage; some dimmers take lamps down to 20 percent of their maximum output and some down to 1-2 percent, while others involve awkward step-down functions. Though manufacturers provide dimming curves and compatibility information online, all the sources for this article suggest that direct testing of sample lamps gives better results than choices based on spec sheets. Ford recommends equipment with trailing-edge dimming curves rather than a four-phase cut. Inrush current can limit the number of lamps that can go on a single circuit, and when low-wattage LEDs replace incandescents, the relation is not always linear. (One-sixth the wattage per lamp does not mean it's OK to use six times as many lamps on a circuit.) "With LEDs," Ford says, "it's always good to install a few before you make any decision."

The only predictable thing about the LED field appears to be its unpredictability. Gonzalez contrasts it to an earlier technology, still valued for applications where slow warmup times aren't a problem: "For many years, we thought we'd hit the wall in metal halide performance, and then we had a breakthrough called ceramic metal halide technology, which took it a little bit further. But we were measuring those breakthroughs every five to seven years, or every 10. ... With LED technology, we're making a breakthrough every seven months. So you ask the question: 'What is the finite limit of LED performance?' They're still plumbing it. They haven't found the wall yet." •

Bill Millard is a New York-based writer whose work has appeared in Architect, Oculus, eOculus, The Architect's Newspaper, Icon, LEAF Review, Blueprint, OMA's Content, The Annals of Emergency Medicine, College Hill Review, and other publications.

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DESIGN

THE ART OF LIGHTING

The new home of the Barnes Foundation in central Philadelphia sheds new light on the world's most important collection of post-impressionist paintings.

text by Aaron Seward

photos by Michael Moran/OTTO

In the early 20th century, Albert C. Barnes—a poor Philadelphia boy who made his fortune from inventing and marketing the antiseptic drug Argyrol—assembled what is widely considered to be the most important collection of post-impressionist paintings on Earth. Before the rest of the world caught on, he was laying out modest sums for the purchase of works by Renoir, Cézanne, van Gogh, Matisse, and many more. To house this collection, he erected a stately Beaux-Arts edifice in the midst of an idyllic arboretum in the suburban community of Lower Merion, Pa. On the gallery's burlap-covered walls, he arranged his pictures in idiosyncratic, symmetrical layouts that grouped works of art not by period or artist, but by interrelationships of composition, color, and form. As a finishing touch, he established a school on the grounds wherein students were taught art appreciation. The gallery was not open to the public, but if you wanted to view its riches all you had to do was write to Barnes himself. If he liked you, the door would open. If he didn't, the door would remain shut.

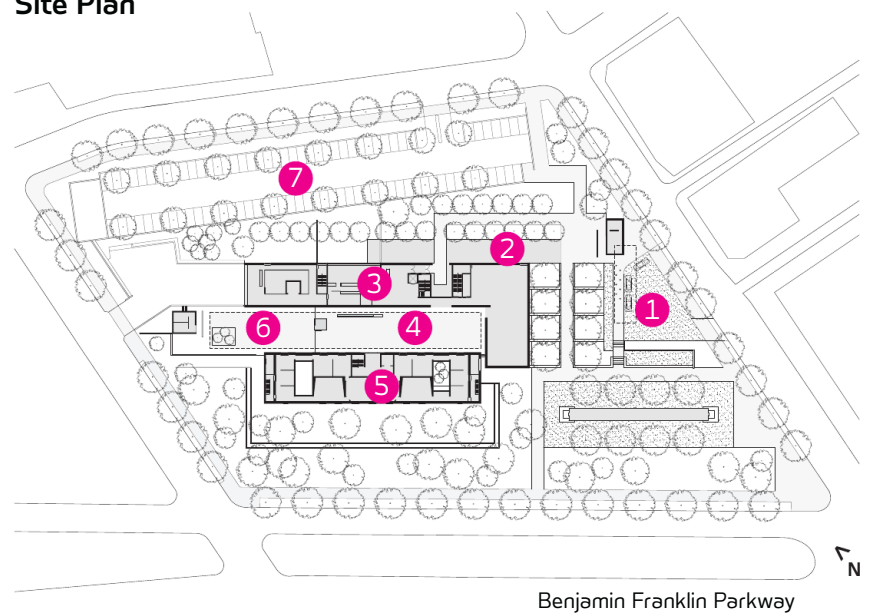
That would have been the state of the collection forevermore, had Barnes's will been followed to its letter. But after his death, a course of events—motivated by a certain ratio of financial illiquidity, avarice, civic-mindedness, politicking, and the ravages of time—drew this unique body of work out of its institutional confines and into the public realm. In the late 2000s, the board of the Barnes Foundation, backed by a court decision, determined to move the art to a site on the Benjamin Franklin Parkway in the heart of Philadelphia. The board then hired New York-based Tod Williams Billie Tsien Architects to design a new museum.

In a conciliatory gesture to the memory of Barnes, the new museum was required to re-create the interiors of the original Merion galleries down to the last detail, including the exact placement of the works of art. Outside of that, the architects were free to encase the galleries within a contemporary wrapper, so long as it provided the programmatic elements—café, gift shop, traveling exhibition galleries, art library, and queuing space—necessary for a public building that expected to host hundreds of thousands of visitors each year.



The Barnes Foundation at dusk (previous spread). A series of gardens and hard- and soft-scaped areas surround the museum. Visitors cross a reflecting pool as they enter the museum (top). A sensor on the roof—built as a miniature scale-model of the building—reads the galleries' light levels so that shades can be raised and lowered as needed (above).

Site Plan



- 1. Entry Court
- 2. Reflecting Pool
- 3. Pavilion Building
- 4. The Light Court
- 5. Collection Gallery Building
- 6. The West Terrace
- 7. Parking



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Architects Tod Williams and Billie Tsien wanted to make sure that the new Barnes was infused with natural light. To that end, one of the main architectural features of the project is the Light Court (left). Here, museum guests make the transition from the public areas to the galleries. The angled ceiling—the light canopy—captures southern light entering through a huge light box that runs the length of the building and casts it down into the space. The natural light combines with 28W T5 fluorescents and washes the perimeter walls, helping to give the space a sense of scale—and visitors a reference to the time of day.

But whatever the merits of Barnes's original museum, it did have one failing on which everyone seems to agree: the lighting. The intention, when constructed in the 1920s, was that the artwork would be viewed in the daylight from the galleries' windows, and in the context of the beautiful natural landscape that surrounded the building. Conservationists later discovered the deteriorating effects of sunlight on the paintings and drawings, so heavy draperies were drawn across the museum's windows, leaving the art to be experienced in the gloom provided by incandescent pendant fixtures that hung in the middle of each room.

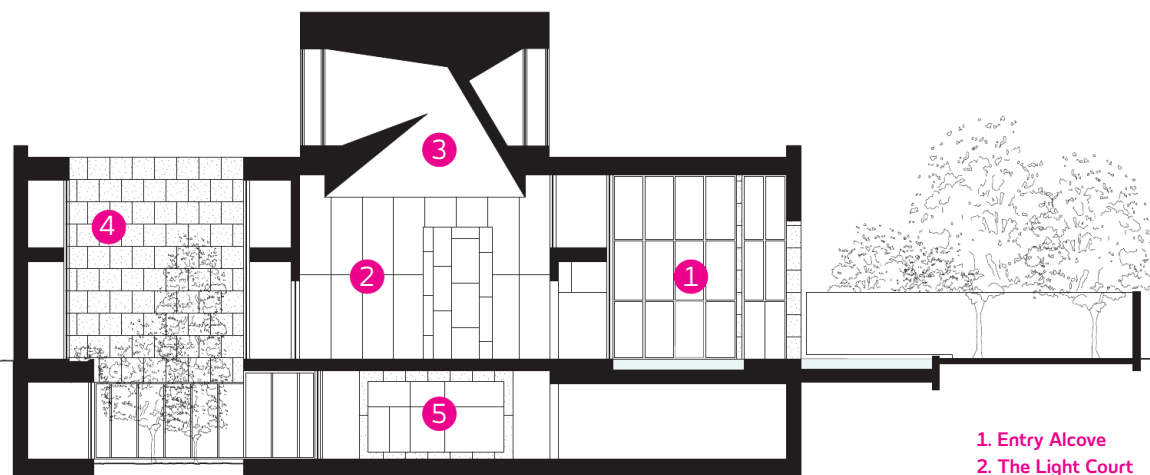
In designing the new structure, Williams and Tsien intended to bring daylight back into the Barnes. "In rethinking the problem," Tod Williams says, "one of the first ideas we had was to try to make sure that the windows could be real windows, without shades, that look out onto the parkway landscape."

Early in the process, the architects hired lighting design firm Fisher Marantz Stone to help devise a scheme that would combine natural and electric light in order to create an optimal condition in which to view the art without causing it to fade. They also made an effort to remain faithful to the spirit of the original galleries, while at the same time improving the lighting. "We decided early on that we were not going to light pictures, we were going to light rooms," says lighting designer Paul Marantz. "The pictures would be lighted because the room is lighted, so no tracks with lots of spotlights."

In the new building, as was the case at Merion, the main galleries face south. In large part, this southern exposure is guarded by an allée of mature London plane trees that flank the parkway, but a lot of daylight still gets through, especially during the winter months when the sun is low in the sky. To mitigate this condition, the design team specified glazing that cuts out all but 15 percent of transmitted light. The windows are also outfitted with a coating that eliminates 100 percent of ultraviolet light. Even with these measures in place, the natural light levels can reach amounts that would alarm conservationists. So the team equipped the windows with an automated shading system with two blinds: one is opaque and the other is a solar shade that reduces light transmission to 5 percent.

The daylighting combines with an electric scheme that is made up entirely of indirect fluorescent sources. On the first floor, 54W T5HO fixtures concealed in the cornice send a wash of light across the ceiling. On the second floor, T5s concealed in the coves of the clerestories provide additional indirect light to each room. The team also designed pendant fixtures for each gallery, equipped with compact fluorescent lamps, which are interpretations of ones that hung in Merion. In the first floor's smaller galleries, the team applied silver leaf to the ceilings, providing a more reflective surface for the indirect lighting from the electric sources.

North-South Section through the Building



1. Entry Alcove
2. The Light Court
3. The Light Canopy
4. Gallery Garden
5. Lower Lobby

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Lighting remains true in spirit to the layouts of the original Merion site, but a concerted effort was made to light the galleries, not the art. The first gallery that visitors enter is the Main Room (top). Highlights here include Paul Cezanne's *The Card Players* and Georges Seurat's *Models*. To address southern light entering the space during winter, when the sun is low, the windows are treated with a UV coating, and outfitted with an automated shading system. In the galleries on the second floor, T5s concealed in the coves of the clerestories provide additional indirect light to each space (above left and right).



ARCHITECT LIVE



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In the lower level lobby area (right), the theme of natural light working in concert with electric light continues. Track-mounted PAR wallwashers illuminate the art on the walls, while a linear fluorescent cove light uplifts the concrete-exposed ceiling. Daylight, from the gallery garden seen beyond, makes up the balance of illumination.

"All of the fluorescent fixtures are 3500K color temperature," Marantz says, "warmer than daylight but cooler than most tungsten gallery lighting. We felt that if the electric light was going to complement the natural light in a way that they both work together, then you needed to have soft sources so that the transition is less abrupt."

Photo sensors on the gallery wall opposite the windows monitor the amount of daylight entering the room and adjust the electrical sources in order to maintain a consistent light level. The fluorescent sources, however, are never turned off completely. Another sensor on the roof raises and lowers the shades—this sensor is a miniature scale model of the building. In addition, the automated control system has optional manual overrides that can dial in the exact condition desired in any one of the rooms.

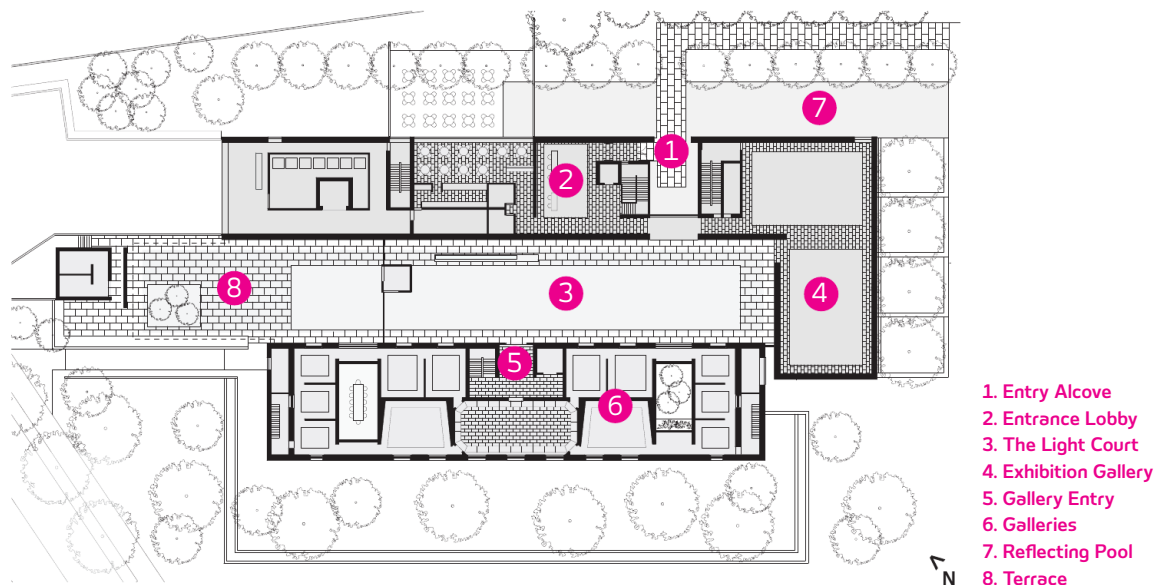
The rest of the museum is lit with a combination of fluorescent electric sources and daylight. The most phenomenal of these spaces is the cavernous court where visitors queue up to await their turn to experience Barnes's peculiar world. Here, Williams and Tsien reiterated a theme that they have applied to many projects, most recently the C.V. Starr East Asian Library at the University of California at Berkeley. The angled ceiling captures southern light entering through an enormous light box that runs the length of the building and casts it down into the space. The natural light combines with 28W T5 fluorescents that wash the perimeter walls.

The one exception to the fluorescent-and-daylight approach is in the exhibition gallery, which combines T5s concealed behind a Clipso fabric ceiling with 90W halogen PAR and AR111 fixtures on tracks.

Not everyone has been happy with the collection's move from Merion to central Philadelphia. It's undeniable: Something special was lost in the destruction of Barnes's original museum. The old sylvan setting he cultivated for the appreciation of art is now used merely for the horticulture education program started by his wife in 1940. But much has been gained from the new arrangement. Not only is this treasure trove of art more accessible and better protected, it is also easier to see. "When we moved into the new building, everybody said, 'Oh, you cleaned all the pictures,'" Marantz says. "That wasn't true. It was just that the color rendering got improved so radically. For the first time since they shuttered the windows at Merion, you could see the blues." •



Ground-Floor Plan

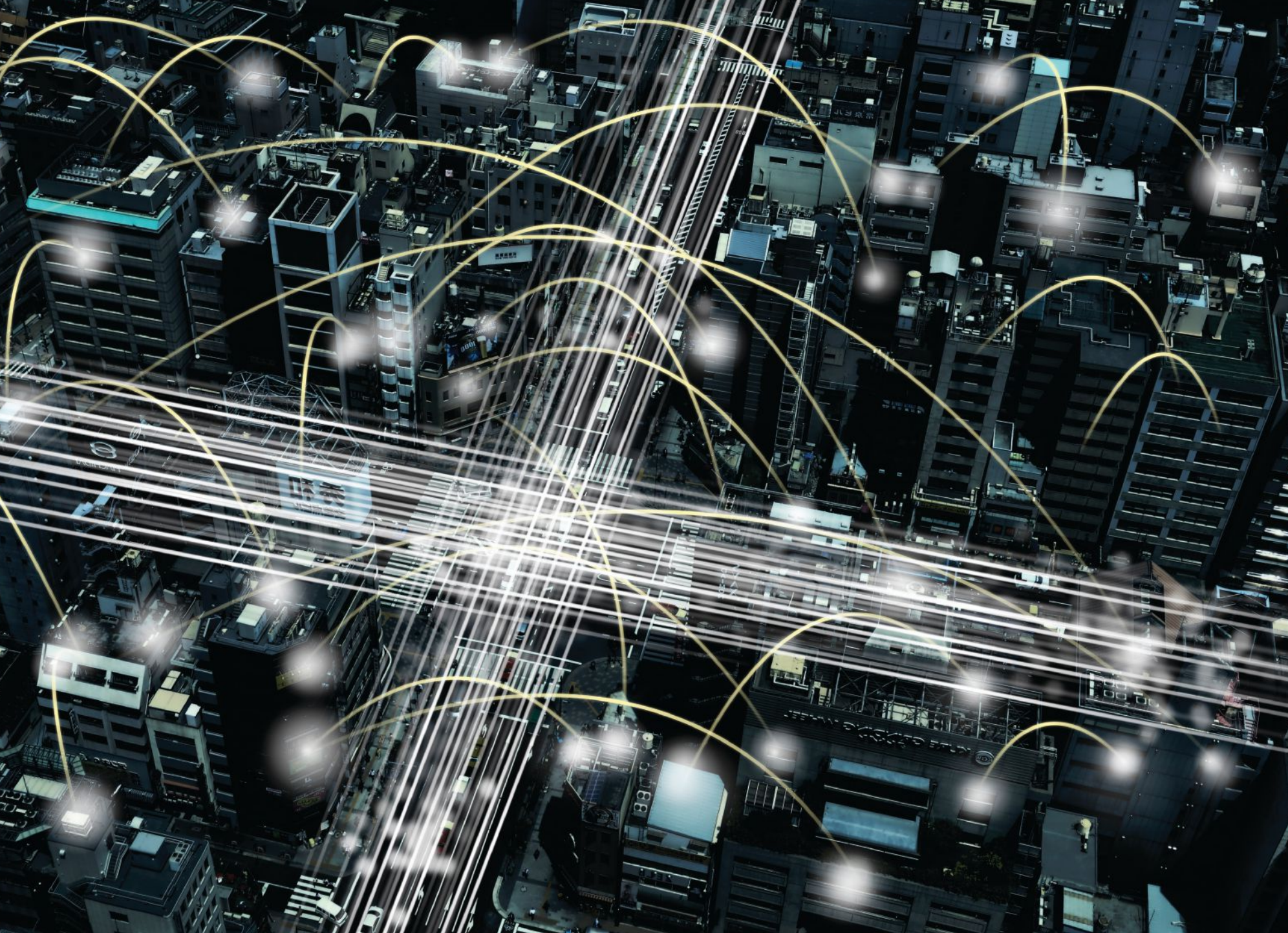


Details

Project: The Barnes Foundation, Philadelphia • **Client:** The Barnes Foundation, Philadelphia and Merion, Pa. • **Executive Architect:** Tod Williams Billie Tsien Architects, New York • **Landscape Architect:** Olin, Philadelphia • **Associate Architect:** Ballinger, Philadelphia • **Lighting Designer:** Fisher Marantz Stone, New York • **Structural Engineer:** Severud Associates, New York • **M/E/P Engineer:** Altieri Sebor and Weiber, New York •

Project Size: 93,000 square feet • **Project Cost:** \$150 million (construction and related expenses) • **Lighting Cost:** Not available • **Energy Code Compliance:** ASHRAE 90.1-2004 • **Watts per Square Foot:** 1.1 • **Manufacturers/Applications:** Aurora Lampworks (decorative pendants in galleries); Birchwood Lighting (T5HO fluorescent channel in Light Court clerestory, T5HO asymmetric reflector fluorescent uplight in galleries and clerestories, and linear fluorescent uplight in luminous ceiling in

special exhibits gallery); Cooper Lighting, RSA (PAR38 downlights in auditorium); Edison Price Lighting (recessed-mounted halogen downlights throughout, track-mounted accentlights—halogen/day, metal halide/night—illuminate main stairway chandelier, and tracklighting throughout); Kurt Versen (PAR30 adjustable accent downlights in gift shop); Specialty Lighting (downlight in Gallery 1, cove lighting in auditorium); The Lighting Quotient/Elliptipar (asymmetric reflector linear fluorescent channel in Light Box)



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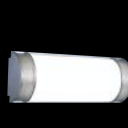
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• TECHNOLOGY



TECHNOLOGY

A PLACE IN THE SUN

Once an afterthought in architectural design, lighting is now securing a front-row seat.

text by Brian Libby

illustration by Tang Yau Hoong

Architectural lighting designers, once relegated to specifying luminaires on a room-by-room basis during late-stage schematic design, are now among the growing number of consultants gathering around the project kick-off table—and for good reason. Strictures such as LEED certification and tighter energy codes demand an integrated design process coupled with a holistic, systems-thinking approach.

Case in point: the Ohio State University Wexner Medical Center's 1.6-million-square-foot expansion. To achieve the ambitious efficiency goal of LEED Silver certification for a healthcare project the size of 28 football

fields, architecture firm HOK had all hands on deck from day one—from the client to representatives of every major design discipline. "Every design move we made had to be calculated back against a performance criteria," says Tom Kaczowski, who leads HOK's lighting group. From influencing building siting to coordinating the intensive infrastructure layouts, the lighting design team needed to "direct design solutions rather than react to them" to meet the building's performance requirements.

Technology is making early collaboration not only more imperative, but also more feasible. The evolving generation of building information modeling (BIM) programs, for instance, helps prevent costly collisions in the maze of overhead building systems—lighting, structural, HVAC, electrical, audiovisual, and fire suppression. But to prove the value of illumination, designers must use more than just software.

Daylight by Design

The industry's increasing role in architectural design coincides with the growing need to emphasize the value of lighting in more than just dollars and lumens. Beyond electric illumination, a lighting designer helps oversee the design of the entire visual environment, says Russ Leslie, associate director of the Lighting Research Center at Rensselaer Polytechnic Institute, in Troy, N.Y.

“We have evolved tremendously. It’s not just about the lighting equipment anymore. Over my career, I’ve seen how [lighting designers have] become more recognized and more valued.”

—Tom Lyman, HDR

To achieve a project team’s vision, integrating architecture, engineering, and lighting should start with conceptual design, says Tom Lyman, director of lighting design at HDR, an AEC design firm headquartered in Omaha. Lighting designers’ daylighting knowledge can be used to inform architects about details such as window sizing, shading devices, and louvers. Meanwhile, knowing whether an office has an open or enclosed plan, or 4-, 6-, or 8-foot-tall partitions, will help determine where ambient light and tasklights are most appropriate, he says. “Space planning relates to our lighting design.”

Lyman and his staff create study models in SketchUp and AGi32 to recommend approaches to architects and clients. Ultimately, they use detailed AGi32 models for analysis and Revit for coordinating lighting systems with architectural and engineering models.

Changing Conditions

As BIM programs such as Revit gain popularity, lighting designers are increasingly asked to estimate the total electric load in a building. After all, somebody has to monitor and track all the lighting in a building, Kaczkowski says. By embedding smart data such as lighting loads, lamping data, manufacturer’s names, and catalog numbers into Revit’s lighting families, designers can assess the project’s anticipated energy performance in real time. “You have to say at the end of the day, ‘We delivered a project that consumes this much energy and has this many controls,’” he says.

By coupling BIM with other software programs, designers can address problems before they happen. “We’ll use it to run clash detection, a tool to go in and see what wasn’t coordinated,” Kaczkowski says. This digital coordination translates to huge savings in the

field where construction mistakes are costly to fix. “There are huge benefits for Revit and BIM,” he says. “You’ll see more firms being vetted who are not able to do it.” He cites AGi32, ElumTools (a plug-in for Revit), and COMcheck as common electric lighting software programs. Meanwhile, his go-to daylighting programs include Ecotect Analysis, Radiance, COMFEN, and DAYSIM.

Software doesn’t guarantee project coordination and success though: good designers and good communication do. For the Martin Luther King Jr. National Memorial, in Washington, D.C., Randy Burkett Lighting Design worked with lighting designer David Mintz to create an evening illumination scheme that was as soft and subtle as the sculpture’s daytime presence was grand. Professionals in lighting, landscape design, and architecture came together to generate mock-ups in the office and on the site, Burkett says. Being involved early on and talking to stakeholders about what King and the project meant to them changed the design, he says. “If not for the early engagement, it just wouldn’t have happened.”

Working across disciplines is becoming essential not just for veteran designers, but also for those learning their craft. “Even in a scholastic environment, the [architecture students] are working with interior designers, who are working with lighting designers,” says Nelson Jenkins, principal of New York City-based Lumen Architecture, who also teaches lighting at the School of Constructed Environments at Parsons The New School for Design. (The school has been actively working to integrate its architecture, lighting, and interior design programs, as well as create dual degree programs in architecture and lighting.)

To hone their integrated designs, Jenkins says, students use programs such as Radiance, Ecotect Analysis, DAYSIM, 3ds Max, and Rhino to ensure that ideas complement each other from the start. “It’s picking each of their distinct views on design and merging them together,” he says. “The hope is that you have a more flushed-out, integrated design in the end.”

Minding the Gap

One potential downfall of becoming involved early and often is that the emphasis on performance and technical data may make lighting designers’ work seem more prescriptive than artistic. “Some of my peers complain that we’ve almost become lighting accountants, whether it’s light levels or consumption,” Kaczkowski says.

But with an early say in a project, lighting designers can become vital to educating other professionals about common misconceptions in illumination. Take, for instance, solid-state lighting: While it can help reduce energy and maintenance costs over time, it often requires a higher initial investment. Kaczkowski says he frequently has conversations with other team members unaccustomed to the price of LEDs. “We’re still on the cusp of convincing estimators and contractors,” he says.

This balance between right- and left-brain thinking is precisely a lighting designer’s niche, Lyman says. “I’ve often acted as a bridge between architects and engineers because we have to be sensitive to both [fields].”

Of course, not every project will follow the ideal model of early collaboration among architects, lighting designers, and other consultants. For projects not utilizing BIM software, design teams may be less motivated to proactively coordinate. But, overall, the blossoming of integrated project delivery in the early 2000s has helped the design profession see the light. “We have evolved tremendously,” Lyman says. “It’s not just about the lighting equipment anymore. Over my career, I’ve seen how [lighting designers have] become more recognized and more valued.” •

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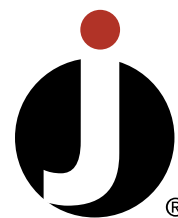
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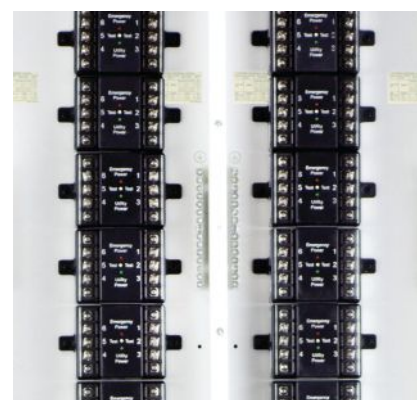
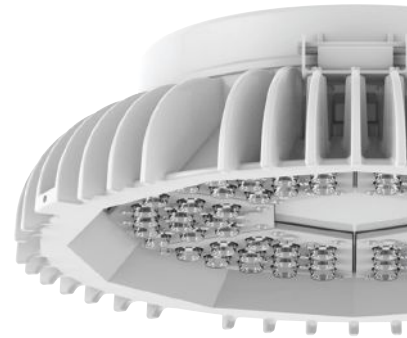
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text by Elizabeth Donoff

Industry faces and company names may change, but one thing is constant: There will always be luminaires. This year, ARCHITECTURAL LIGHTING received more than 300 lighting-related products for consideration for our annual product issue, which we narrowed down to just over 150. That's never an easy task, nor one that we take lightly. So how do we decide what to include? First, we rule out any products that we have already covered over the past year. Then, as we read through the literature and technical spec sheets, we ask: Is this something a lighting designer or an architect would specify for a project? We also take into consideration evolving lighting technologies and how they are playing out in the marketplace. Once the decisions have all been made, we then cull the salient features of a product to provide you with a useful snapshot—as we do with all of our product coverage throughout the year. Consider it our way of providing you with an advanced scouting report. •



DECORATIVE



Possini Euro Chrome Ring LED Pendant, Lamps Plus • Designed for foyers, large rooms, and dining areas, the Possini Euro Chrome Ring LED Pendant uses 12 1W LEDs as its light source, which are positioned in 12 separate chrome spheres. The fixture measures 18¹/₂" wide by 2¹/₂" high and includes 12' of cable and wire to suspend the fixture from the 6³/₄" wide canopy. • lampsplus.com/pros • Circle 100



Deyo, Hudson Valley Lighting • The Deyo table lamp suspends a wide, white drum-shaped shade from a curved metalwork base that is available in either a gold or silver finish. The curved arm is anchored in position by a small cylindrical base and kickstand-like leg that together stabilize the structure. • hudsonvalleylighting.com • Circle 101



Rue Picot Light Series, Unitfive Design • Designed by Kelvin Goddard and Lisa Santana of Unitfive Design, the Rue Picot Light Series resulted from a custom lighting solution that the duo originally designed for a project completed by Toronto and New York-based design firm Yabu Pushelberg. Now the line includes three different shaped pendants: round, oval, and petal. Each fixture is composed of a minimum of 2,000 linear feet of antique brass wire that is hand-cut and woven together. The wire formations radiate out from the light source—a single 40W lamp. Stem lengths for the canopy can be customized to project and site needs. The round version is available in four diameters: 47", 60", 78", and 96"; the oval has a 60" diameter; and the petal has a diameter of 34". • unitfive.ca • Circle 102



Lace Metal, Form Us With Love for Cappellini • Designed by Stockholm-based design studio Form Us With Love, the Lace Metal lamp features steel mesh with gradient-sized holes, which resemble lace. The design was inspired by a manufacturing technique observed at the metal-working factory of one of Sweden's oldest companies—Häfla Bruks. The small holes on the fixture gradually become larger, moving from the top to the bottom as they diffuse light. The luminaire measures just over 5' tall and the shade's diameter measures 27.5". Finish options are black and white lacquered matte. • www.cappellini.it and formuswithlove.com • Circle 104

Naked Pendant, Ayre Architectural Lighting • The Naked Pendant's streamlined design is free of any visible screws or decorative fasteners. The GU-5.3 socket base serves a dual purpose: It supports the clear mouth-blown glass diffuser and takes one of two types of lamps—either a 35W 3000K MR16 or a 10W 3000K LED. The fixture is finished in brushed nickel, matte black, or chrome, and measures 60" high by 6¹/₂" wide by 7" deep. • ayrelight.com • Circle 103





Elliptic Constellation Chandelier, jGoodDesign • The Elliptic Constellation Chandelier is composed of hand-blown glass and hand-brushed aluminum or brass. The chandeliers are fully customizable in terms of size and overall configuration. Lamping options include incandescent, LED, halogen, or fluorescent. The various glass color options include clear, gray, Caribbean blue, amber, black, bronze, and dark purple. • jgooddesign.com • Circle 105



Bordeaux, Troy Lighting • The Bordeaux chandelier features hand-worked wrought iron in a Parisian bronze-finish, hand-carved wood accents in a distressed gold finish, and crystal strings. The chandelier version is available with five, 10, or 15 lamps (candelabra-style), and is also available as a one- or two-lamp sconce. • troy-lighting.com • Circle 106



Fin, Koza Lighting • The Fin pendant, which measures 18 $\frac{1}{2}$ " in diameter, is composed of a series of spherical polycarbonate sheets that recall the shape and texture of a fish's fins. The fixture is suspended from a white canopy by a stainless cable assembly. Lamping options are either 100W medium base incandescent or 24W GU-24 fluorescent. • kozolighting.com • Circle 107

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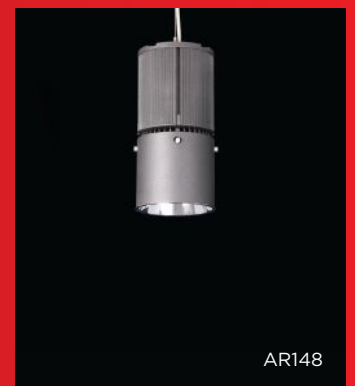
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Artic Grande, Tech Lighting • The metal arms of this decorative pendant simulate the path of the light emitted from the luminaire. A high-gloss, semi-translucent shade, available in three finishes—black-gold, black-silver, or white-silver—allows the silhouette of the light source to be seen. The fixture ships with a satin nickel canopy, 21' of field-cutttable cloth cord, and 12' of aircraft cable. Lamping options include 60W S21 Squirrel Cage lamps, 11W 3000K LED PAR30, or 75W Halogen PAR30. The luminaire is dimmable with a standard incandescent dimmer. • techlighting.com • Circle 109

Lansing, Hudson Valley Lighting •

Designed for residential or commercial settings, the Lansing pendant is inspired by 1930s overhead fixtures that replaced workbench-mounted lamps. Its die-cast lamp-guard protects the glass diffuser, which houses 12 1.2W LEDs. Finish options are polished or satin nickel and can be combined with black or white accents. • hudsonvalleylighting.com • Circle 108



Ice Block, Boyd Lighting • The Ice Block series of sconces uses glass as its primary material to highlight the different qualities of light. The fixtures are particularly well-suited for hospitality, healthcare, and general commercial applications, and are available in both a rectangular and an oval version. The luminaires use two 4" LED strips. Backplate finish options are black granite, matte white, or polished nickel. • boydlighting.com • Circle 110



Boccia, Boffi • Designed by architect Piero Lissoni, and composed of opal glass-bowls, Boccia is available in pendant (shown) and wall-mounted versions. The pendant style, which uses a G9 lamp, attaches to its ceiling mount with telescopic, height-adjustable aluminum tubes. The wall-mounted version, shaped like a slightly flattened sphere, is supported by a satin stainless steel ring and uses a 12W LED as its light source. • boffi.com • Circle 111



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Vela OLED Chandelier, Modern Forms, a WAC Lighting Company • The Vela Organic LED chandelier features a thin profile (2¹/₄"") crafted from aluminum with a brushed finish. Available in two configurations, with 12 (six arms) or with 24 (12 arms) OLED panels, half of the panels emit light upwards and the other half provide downlight. The luminaire has a color temperature of 4000K, a lumen output of 2,040, and a CRI of 80. The six-arm version measures 13" wide by 24⁵/₈" long and the 12-arm version measures 28⁷/₈" wide by 50⁷/₈" long. • modernforms.com • Circle 112



Atelier, Sonneman • The Atelier family of fixtures features a sconce (three-light, shown) and two pendant versions (six-light and eight-light). The luminaire was created for open spaces and was designed with a contemporary industrial aesthetic. Candelabra-base 60W lamps are positioned on movable arms. The frame finish is satin black. The pendant versions mount 6" from the ceiling. • sonnemanawayoflight.com • Circle 113

Anora, Hellman-Chang • The Anora lamp, by Brooklyn, N.Y.-based furniture studio Hellman-Chang, is the company's first foray into lighting. Using the studio's "Z line" form, the fixture is made of solid wood (maple, walnut, or oak) and features an asymmetrical lampshade composed of white linen with a blackened stainless steel interior frame. Anora measures 15" wide by 16" deep by 64" high, and can be used with standard 65W, 75W, or 100W halogen lamps. • hellman-chang.com • Circle 114



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Pull, Tech Lighting • The Pull wall sconce, available in two sizes, features a metal shade finished in either a black or white matte rubberized paint, and a fabric cord that adds a pop of color with options in orange, gray, or black. The fixture is lamped with an 8W, 400 lumen, 3000K LED module. Both sizes have a width of 4.35" and a depth of 3.9"; however, the small Pull measures 7.45" high, while the large Pull is 12.2" high. • techlighting.com • Circle 115



Meltdown, Cappellini • Meltdown was designed by Johan Lindstén and is composed of thin, colored, spherical-shaped, hand-blown glass suspended from a mount. Inspired by the 2011 nuclear disaster in Fukushima, Japan, the Meltdown fixture has an 11" diameter and comes in six colors: dove, pink, tobacco, light blue, amethyst, and amber. The luminaire can be arranged linearly or in a cluster. • www.cappellini.it • Circle 117



Juno Chandelier, Derek Marshall • The Juno Chandelier is composed of three cylindrical pendants that are suspended from an S-curved armature. Each pendant features three overlapping, curved petals of American art glass. These, in turn, are fastened together with stainless steel screws. Available in more than 40 glass colors and various metal finishes, the Juno Chandelier measures (from the armature) 28" in diameter and 15" deep. Lamping options include three 100W incandescents, halogens, or compact fluorescents. • derekmarshall.com • Circle 116

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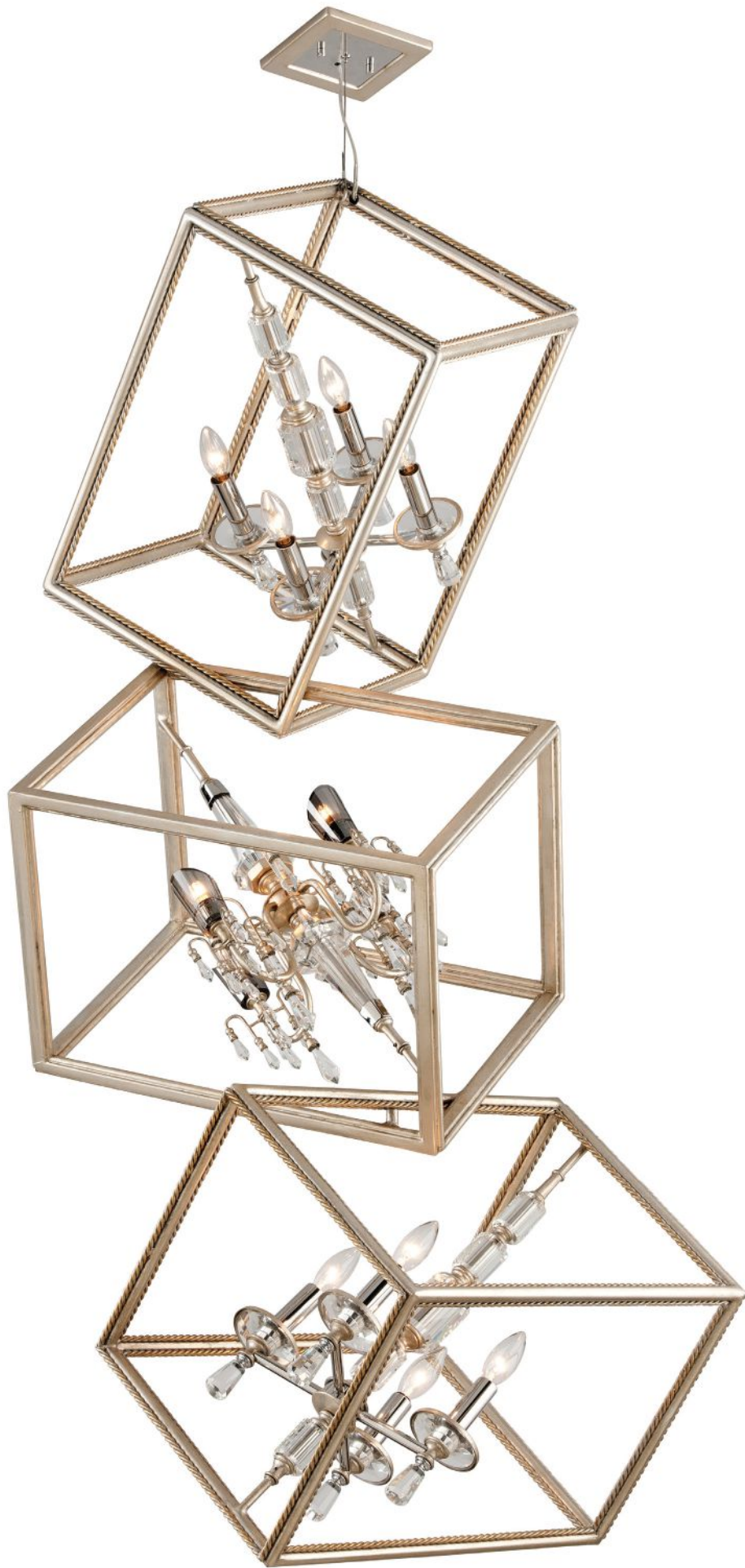
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Houdini, Corbett Lighting • The Houdini family of fixtures, designed for the contract hospitality market, features several pendant configurations as well as a sconce option. The luminaire was designed as a series of chandeliers alternating in tilted cubes made of hand-cast iron, textured and dipped in silver or gold leaf. Polished stainless steel accents and a two-toned square canopy complement the candelabra lamps. • corbettlighting.com • Circle 118



Planar 2D P-180 Series, DigitalSpeck Lighting • The Planar 2D Series pendant is part of Manning Lighting's new dedicated line of solid-state luminaires called DigitalSpeck Lighting. Six strips of 42W 4000K LEDs are integrated into two bisecting anodized aluminum planes that simultaneously serve as the heat sink. A proprietary microlens pattern evenly illuminates both sides of the extrusions and produces 4,410 total lumens. Each LED board is compatible with 120V or 277V electrical systems and zero-to-10V dimming equipment. • digitalspeck.com • Circle 119



Cylindro Pendants, Delray Lighting • Designed for lobbies, reception areas, and retail applications, this family of cylindrical pendants provides diffuse light using LEDs in either red, blue, cool white, warm white, or RGB sequence. The fixture has a white frosted acrylic diffuser and is constructed of curved, extruded aluminum available in three standard finish options—black, white, and silver—as well as custom RAL colors. The Cylindro II's lighting element is located on the inner side of the aluminum housing, while the Cylindro III's (shown) lighting element is positioned on the outside of the aluminum housing. Both models are available in 3', 4', and 5' diameters. • delraylighting.com • Circle 120



Marrakesh, Boyd Lighting • The Marrakesh family of luminaires features contemporized Middle Eastern design motifs and includes pendant and wall-mounted versions. A "candle" with a copper "flame" sits at the center of the fixture's cage-like ribbed housing and a concealed lamp—either a 50W (max.) halogen or a 10W (max.) LED—downlights the flame's tip giving the illusion of an actual candle. The fixture is UL damp-rated for interior use and, depending on the style (pendant or sconce), the luminaire ranges from 18 $\frac{1}{2}$ " tall by 9" wide to 27" tall by 12 $\frac{1}{2}$ " wide. • boydlighting.com • Circle 121

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What does



all of lighting shown here



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DOWNLIGHTS

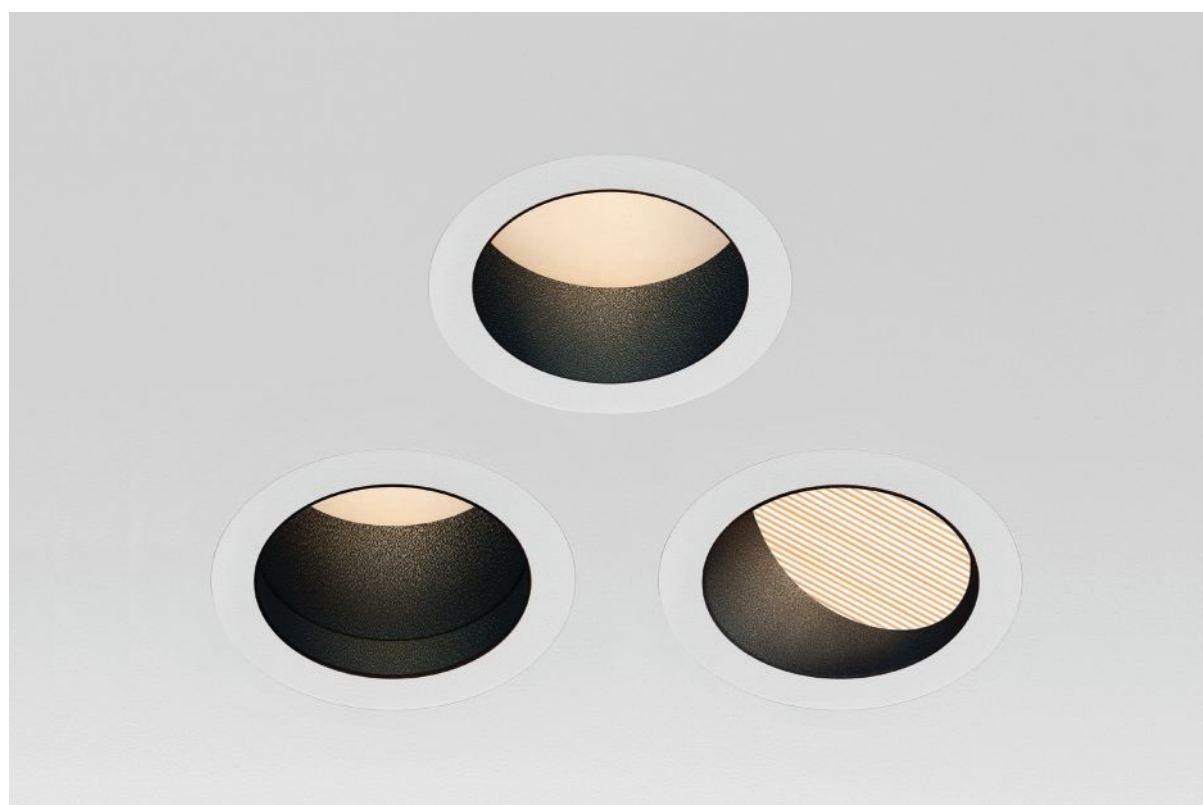


Xacara Tiros LED, Beta-Calco •

Designed for retail and commercial display applications, the Xacara Tiros LED, part of the Xacara family of luminaires, is available in multiple fixture-head configurations (from two to 12) and comes in several lengths (from 33.5" to 134"). Each fixture head can be adjusted individually while illuminated and is available with 26W LEDs in 3000K, 3500K, or 4000K with a CRI of 80 or 90, depending on the color temperature. The housing and trim is composed of steel and extruded aluminum with a metallic silver powder coat finish. • betacalco.com • Circle 122

Y Series Downlight Family, Lucifer Lighting •

Designed for ceilings with a height of up to 30', the Y Series Downlight Family is available in round and square apertures and can be used for both interior and IP-64-rated exterior applications. The fixture uses Xicato's LED module as its light engine, and has three lumen package options: 1,250, 2,250, and 3,000 lumens. Multiple lens offerings and effects devices provide a range of beam spreads. The adjustable model can tilt up to 45 degrees with full internal rotation and room-side locking, while the wallwasher model provides even illumination without scalloping when spaced at 3' to 5' at 3¹/₂' to 5' o.c. • luciferlighting.com • Circle 123





Compact LED IP65, Erco • The Compact LED family of luminaires is designed for outdoor areas, arcades, passages, and atriums. The lens system produces uniform distribution and uses an anti-glare ring and cross baffle with a cut-off angle of 30 degrees. Available in 8W to 40W, the fixture produces 640 to 4,000 lumens with Wide Flood (980 degrees) and Oval Flood (45 degrees by 90 degrees) beam distributions. The housing is composed of cast aluminum with a silver powder coat finish. • erco.com • Circle 124



CR4 and CR6 LED, Cree • The CR4 and CR6 LED Downlights are designed for both residential and light commercial applications, and can be installed in most standard 4" and 6" recessed housings. The luminaire maintains a high color consistency due to Cree's TrueWhite technology, which provides a CRI of 90-plus. The CR4 delivers 575 lumens and is a direct replacement for a 50W 4" incandescent downlight; the CR6 delivers up to 800 lumens and is a direct replacement for a 90W, 46" incandescent downlight. • cree.com • Circle 125



5" Eco-Downlight, Creative Systems Lighting • The 5" Eco-Downlight is offered in remodel and new construction versions and delivers 2,200 lumens. Featuring both an 80 and a 90 CRI package, the fixture offers a full range of dimming capabilities including incandescent, electronic low-voltage, and zero-to-10V. The downlight also includes 12-, 25-, 45-, 65-, and 85-degree beam spreads and offers three color temperatures: warm white (2800K), soft white (3500K), and natural white (4000K). • csllighting.com • Circle 126

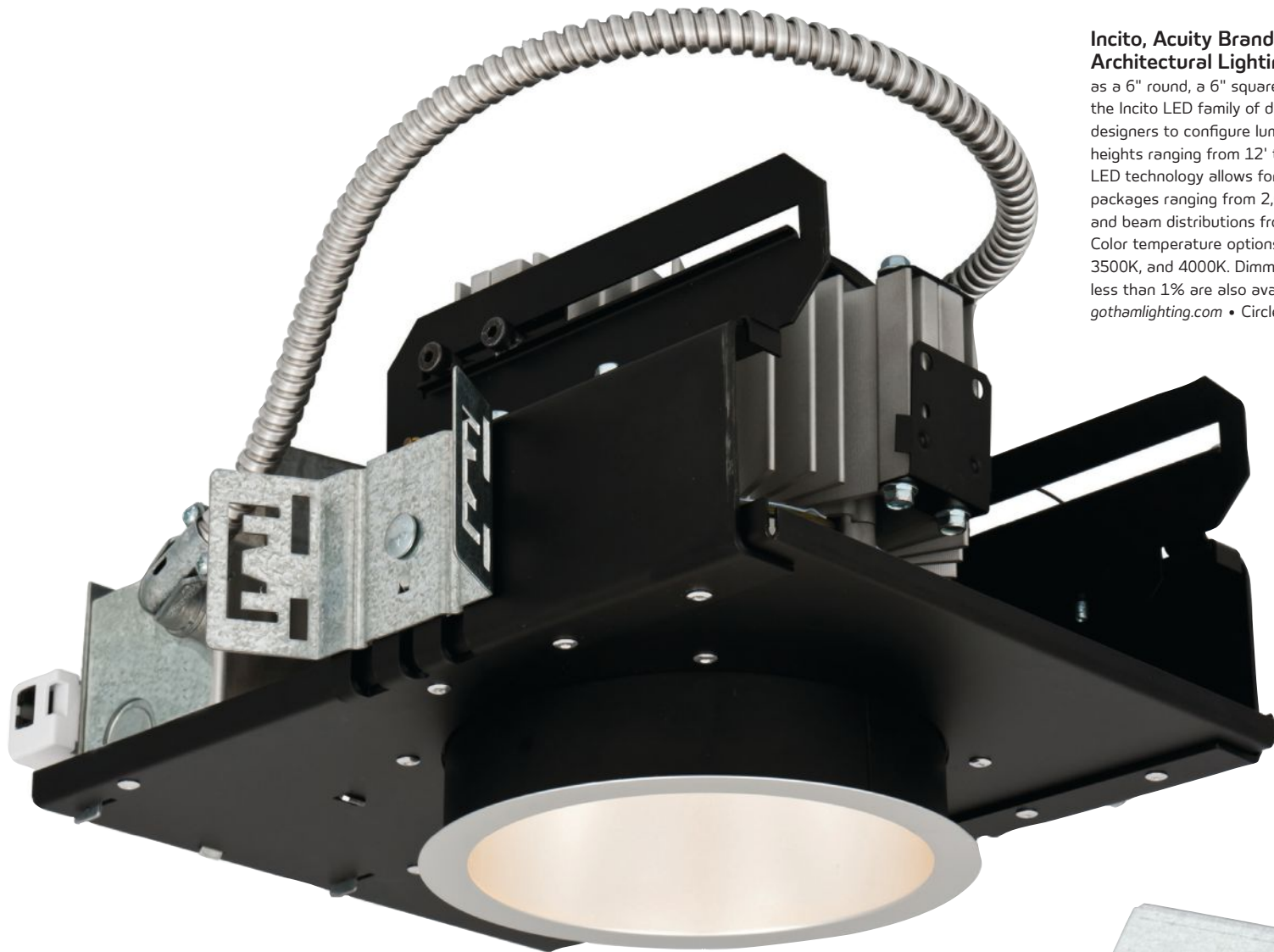


S9051 LED Downlight Series, Orr Lighting • Designed for both commercial and residential use, and for both new construction and remodel installations, the S9051 LED Series downlights are available with a 4" aperture. The fixtures use Nichia's high-efficiency LEDs in 15W or 21W and have a dual 55-degree/40-degree beam angle. Trim finishes are available in brushed aluminum, graphite, and white. • orrlighting.com • Circle 128



ICL-MBS, Intense Lighting • The ICL-MBS is a multiple-lamp recessed luminaire with two retractable heads. Designed for accent lighting, each head is capable of up to 60 degrees vertical tilt at the full pull down position and also features a vertical locking mechanism. Available in one- to four-fixture head configurations, the ICL-MBS has four light engine options (24W, 36W, 48W, and 56W), a range of lumen outputs (800 to 1,700) and two CRI options (82 and 92). • intenselighting.com • Circle 127





Incito, Acuity Brands/Gotham Architectural Lighting • Available as a 6" round, a 6" square, or a 6" cylinder, the Incito LED family of downlights allows designers to configure luminaires for ceiling heights ranging from 12' to 100'. The fixtures' LED technology allows for numerous lumen packages ranging from 2,000 to 6,500 lumens and beam distributions from 20 to 70 degrees. Color temperature options are 2700K, 3000K, 3500K, and 4000K. Dimming capabilities to less than 1% are also available. • gothamlighting.com • Circle 129

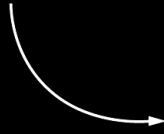


LED Monopoint, No. 8 Lighting • Part of the Beyond Halogen LED family of luminaires, the LED Monopoint is Title 24 compliant. It uses Philips' Lumileds Luxeon S LED with an 85 CRI, 3000K, 1,050-lumen light engine. The fixture is ceiling- and wall-mountable and the fixture head can adjust up to 320 degrees and tilt up to 100 degrees. The all-aluminum housing has four finish options: white, black, oil-rubbed bronze, and satin aluminum. UL listed for damp locations. • 8lighting.com • Circle 130

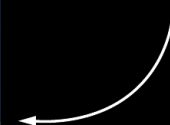


A2LED, Prescolite • Part of Prescolite's 2" LED series, the A2LED was designed to address sloped ceiling conditions as well as accent lighting applications. It uses Xicato's Artists Series LED module and has a 35-degree optical pattern that can be adjusted and locked up to 30 degrees from vertical. The luminaire is capable of 360-degree rotations and is compatible with new construction or retrofit installations. • prescolite.com • Circle 131

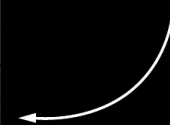
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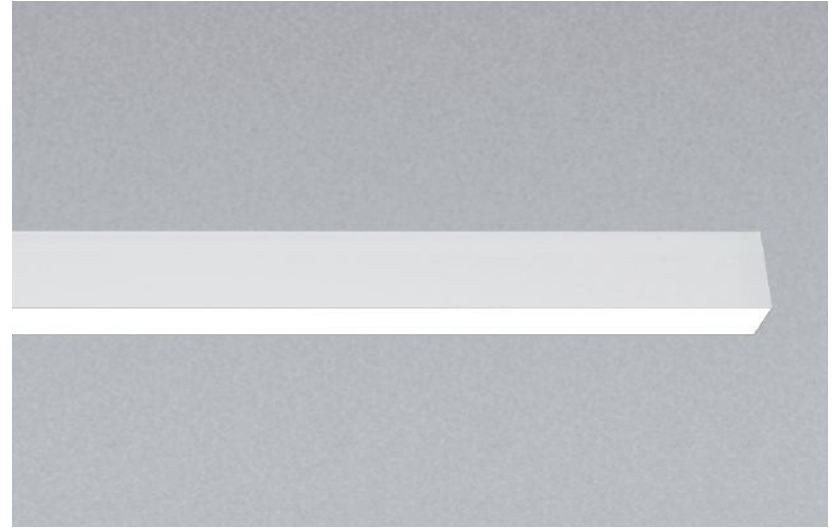
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TP20LDL, Inter-Lux/Whitegoods • The TP20LDL is a 3/4" continuous linear recessed downlight with a very minimal footprint. It is designed for trimless plaster-in applications in walls and ceilings and can be specified to custom lengths. The luminaire provides 492 lumens per foot at 3000K with a CRI of 85, and has a snap-in opal acrylic diffuser. • inter-lux.com • Circle 132



4" LED Downlight, Nora Lighting • Designed for residential interiors, the 4" LED Downlight—the latest model in the company's Diamond Series—can be installed in retrofit or dedicated housings, and provides up to 610 lumens with a CRI of 94. Available in 2700K, 3000K, and 4000K, the fixture operates with leading edge electronic dimmers as well as trailing edge incandescent dimmers. • noralighting.com • Circle 133



Evoke 2.9 Second Generation Downlights, Amerlux • The Evoke 2.9 G2 LED Downlights were designed for upscale residential and retail settings as well as a variety of commercial applications. The luminaire is available in 2700K, 3000K, 3500K, and 4000K; produces more than 670 net lumens; has a CRI of 82 to 90; and a beam spread range from 15 degrees to 60 degrees. • amerlux.com • Circle 134

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LED Cylinders, Cooper Lighting, Portfolio • The LED Cylinders from Cooper Lighting's Portfolio line are well-suited for high-ceiling installations and where plenum space is limited. The luminaire offers lumen packages of 1,000, 1,500, and 2,000 with color temperatures of 2700K, 3000K, 3500K, and 4000K. The curved transitional lens design aids in reducing LED brightness, and a two-stage reflector system provides low aperture brightness. Housing finish options are available in white, matte black, bronze, or silver. • cooperlighting.com • Circle 135



Tesla High Output LED Recessed Downlights, WAC Lighting • Available with 2" and 3 1/2" apertures, the Tesla High Output LED Recessed Downlights offer a variety of styles and optics including a Spot (15 degree), Narrow (26 degree), and Flood (45 degree) beam spreads. Delivering the same lumen output as a 50W MR16 halogen luminaire, according to the manufacturer, the Tesla High Output LED Recessed Downlights use 60% less power. • wacighting.com • Circle 136



TLS-DCA6 and TCL-DCA8 LED Downlights, Toshiba • The TLS-DCA6 and TLS-DCA8 LED downlights, well-suited for museum and retail applications, are designed to be direct replacements for metal halide or other HID downlights. These luminaires offer lumen outputs of 2,800, 5,500, and 8,500; color temperatures of 2700K, 3000K, and 4000K; and have apertures of 6" and 8", respectively. • toshiba.com/lighting • Circle 137

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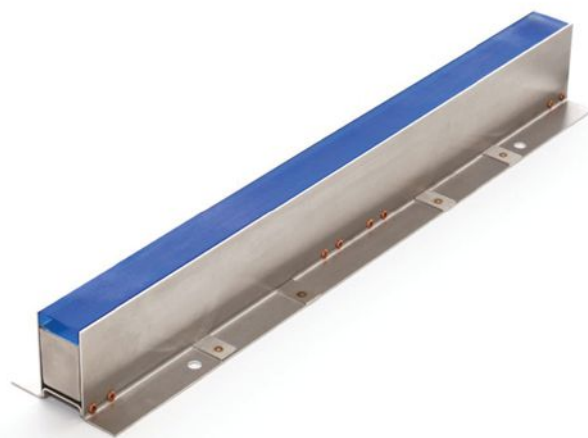
Theory, Focal Point • Theory is a 4'-long LED pendant with an edge-lit, patterned, tubular body and die-cast polished chrome end caps. Concealed LEDs provide both direct and indirect light distribution at either 3000K or 3500K. The dual circuit operation modulates whether the light is all on, inside only of the luminaire body, or outside only of the luminaire body. The 60" adjustable aircraft cable suspension provides low-voltage power delivery, while the acrylic canopy and yoke provide below-ceiling access for hard surface applications. Zero-to-10V dimming is a standard option. • focalpointlights.com • Circle 138



Lucen, Pinnacle Architectural Lighting • Lucen, which has both a fluorescent and LED version, features a convertible LED option enabling the luminaire to be field-upgraded as higher LED efficacies become available. It is available in 3000K, 3500K, and 4000K with a CRI of 80-plus, and three sizes: 2' by 2', 2' by 4', and 1' by 4'. • pinnacle-ltg.com • Circle 139



AL Series, Acuity Brands/Lithonia Lighting • The AL Series of ceiling luminaires features both a fluorescent version (2AL) and an LED version (2ALL). The 2AL can be lamped with a 14W T5, a 17W T8, a 24W T5HO, or a 40W CF40. It also includes an instant-start electronic ballast and is suitable for damp locations. The 2ALL is rated to deliver 3,700 lumens and contains nLight embedded controls that make each individual luminaire addressable. Both fixture versions are available in three sizes: 1' by 4', 2' by 2', and 2' by 4'. • lithonia.com • Circle 140



Step Up Slim, Inter-lux/Filix • This linear recessed LED fixture is designed to be installed in-grade or in floors, either outdoors or indoors. It has a stainless steel housing that measures 1.3" wide by 3.6" deep, and a 3/8" tempered glass lens. It is available in two lengths: 16" and 40"; and four color temperatures: 3000K, 4000K, Blue, and RGB. It provides 3W and 165 lumens per foot. The fixture is supplied with a universal power supply (120V–277V) and a zero-to-10V dimming driver. Filix is IP-68 rated for wet locations and walkover conditions. • inter-lux.com • Circle 141



LED Door Retrofit, Harris Lighting • This LED Door Retrofit kit is contained entirely within the door frame. It features adjustable latches and hinges to ease installation. The door frame comes in powder coated white or matte aluminum and includes three light engine options: 25W, 37W, or 55W in three color temperatures: 3500K, 4000K, and 5000K. Occupancy sensors and/or photocells can be integrated into the assembly. • harrislights.com • Circle 142



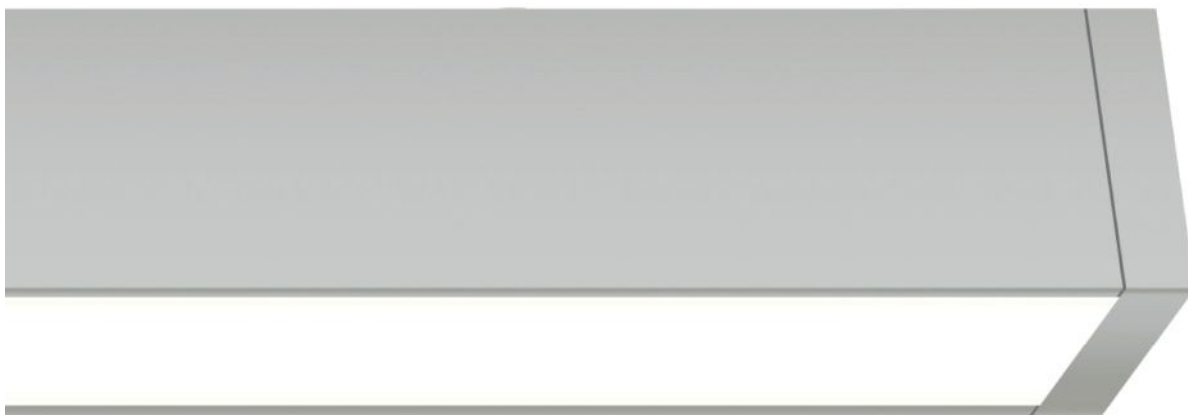
LED High Efficiency, Expansive Cavity Recessed (ASC), LSI industries • This LED luminaire is designed specifically to provide uniform illumination throughout a room from floor to ceiling. It is available in three sizes: 2' by 2', 2' by 4', and 1' by 4'. All have a depth of 3.5". Color temperature options are cool white, neutral white, and warm white. • lsi-industries.com • Circle 143



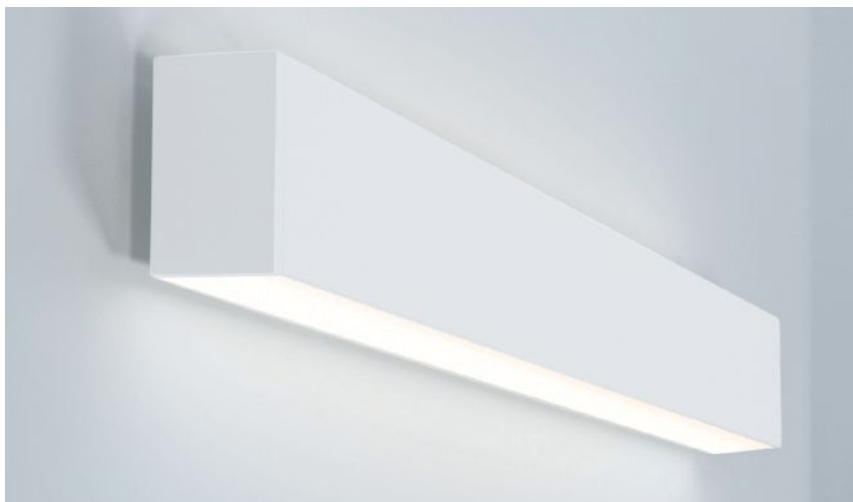
Wing, Prudential Ltg. • The Wing architectural recessed luminaire features the company's patent-pending FusionOptics, which distribute an even wash of soft light on the work plane. The luminaire's wide-angle distribution limits unwanted light that falls in the "glare zone" above 65 degrees. Wing is available in both fluorescent (T5, T5HO, T8) and LED (3000K and 4000K) versions, as well as in various sizes including 1' by 1', 1' by 4', 2' by 2', and 2' by 4'. RightLight sensor technologies can be integrated into the fixture for daylighting strategies. • prulite.com • Circle 144



Staple, Acuity Brands/Peerless Lighting • The Staple family of luminaires is a suite of suspended and wall-mount fixtures that are available for T5, T5HO, or T8 linear fluorescent lamps. Staple is offered in 4', 8', and 12' lengths and can be installed as an individual fixture or joined together to form a continuous run. Different shielding, reflector, and lens options provide glare-free illumination. Acuity Brands' nLight Micro Sensor can also be integrated into select models. • peerlesslighting.com • Circle 145



Cirrus Channel, Edge Lighting • Designed for architectural lighting, tasklighting, general lighting, or retail applications, the Cirrus Channel is available in 12" increments up to 120" and has a direct 1" (D1) flat linear lens with a 100-degree beam spread. With its smaller profile than T5 fixture options, the LED luminaire provides continuous illumination up to 40' without dark spots. It is available in warm white (2700K or 3000K), has a CRI of 82, and operates on a 24V DC system. Housing finish options include satin nickel, chrome, antique bronze, satin aluminum, white, and black. • edgelifting.com • Circle 146



Lumenline, Lumenpulse • The Lumenline family of indirect/direct LED luminaires is designed for indoor commercial and institutional applications. With its slim profile of 2.5", it is available in pendant, surface mounted (shown), and recessed versions, as well as single units in 1' to 8' increments or continuous runs. It delivers 59 lm/W with a CRI of 80-plus. The housing is composed of a polyester powder coat finish and an extruded acrylic lens. Reflector assembly and control gear access is done via a toolless system. • lumenpulse.com • Circle 147



Aerial, Litecontrol • Aerial is a fluorescent luminaire designed specifically for spaces with low ceilings or very high open ceilings where energy codes limit indirect lighting options. It can be either pendant or surface mounted and can be lamped with a T5, T5HO, or T8. The direct option provides 100% downlight and the semi-direct option provides 2% uplight. The fixture comes standard with a high-reflectance white reflector; for wider light distribution and increased fixture spacing, a broad distribution reflector can be specified. • litecontrol.com • Circle 148





IW2DL, Engineered Lighting Products • Designed specifically for spaces with video conferencing capabilities, the luminaire delivers indirect vertical illumination to an individual's face so that the person looks good on camera. It does this by providing an asymmetric cross wash of light. The luminaire is designed to be installed centered along the length of a conference table in a room with 8' to 9' tall ceilings. The 5" deep fixtures comes in two sizes, 2' by 2' or 2' by 4', and can be used with a T5 or Biax lamp. • elplighting.com • Circle 149



FlatLight Fixture, Pixi Lighting • Meant to replace fluorescent 1' by 4' and 2' by 2' ceiling fixtures, FlatLights can be installed either as a pendant or in a T-Drop ceiling grid. The edge-lit LED luminaires offer bright uniform light at 4000K with a CRI of greater than 80 and a lumen output of 4,200 lumens. Suitable for dry locations, the luminaire does not offer dimming capabilities. • pixi-lighting.com • Circle 150

TruLine LED, Pure Lighting •

The TruLine LED is designed for indoor applications and is available in 1' increments up to 10'. It features 24V commercial-grade LEDs inside a slim, paintable aluminum extrusion and can fit in drywall from 1/2" to 1" thick. The TruLine LED delivers 122 lumens per foot at 2700K or 3000K and is dimmable using a zero-to-10V constant voltage power supply. • purelighting.com • Circle 151



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Specifiers and owners want to know that appropriate light levels are maintained to ensure visibility and safety

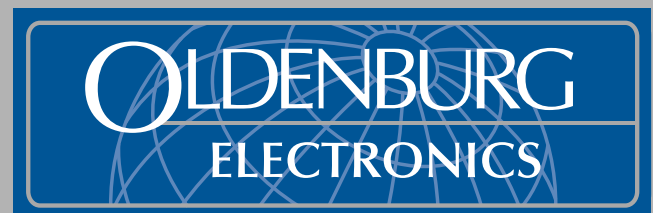
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- LumenTrac measures actual light output throughout the life of an LED product and notifies you when light level falls below your specification (L70 typical).
- Notifications are based on the true output of the light source, not a timer or clock. The compact sensor module is mounted within the luminaire's optical chamber, eliminating interference from external factors. An accurate measurement algorithm accounts for the effects of ambient light in a space.
- LumenTrac sensor models can be installed at the factory or in the field, and can be specified and integrated into most manufacturers' luminaires.
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- Visual and electrical notifications of a source's end-of-life are provided via an indicator LED on the sensor module and an interface for building automation systems.

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**Proteon SL LED, Acuity Brands/
Lithonia Lighting** • Designed for
commercial, retail, and institutional settings,
the Proteon SL LED is available in 4' and
8' lengths and features continuous-row
installation. Custom optics provide even
illumination for the luminaire's four beam
distributions: Aisle, 17-degree off center;
Aisle 24-degree off center, Narrow Area; and
Wide Area. Occupancy and photocell sensing
and an emergency backup accessory are
integrated in to the fixture. • lithonia.com •
Circle 152



Drive LED, Inter-lux, Schmitz • These luminaires, designed to be installed in ceiling and
wall applications, have an anodized aluminum housing and an acrylic white or prismatic diffuser. It
is available in 3000K (78 lm/W) or 4000K (84 lm/W) with a CRI of 80-plus. The fixture comes in
four sizes: 14.7" square; 25.5" square; 14.7" wide by 25.5" long; and 14.7" wide by 36.4" long. •
inter-lux.com • Circle 153



Sketch, Axis Lighting • This fixture is available in two form factors: Sketch Straight comes in 2', 3', 4', and 8'
lengths, and Sketch Curved (shown) comes in 15", 30", and 45" radii for circular configurations. The housing is 4.75" deep
and can be installed in drywall with a flange or a spackle flange. Sketch is available in three color temperatures: 3000K,
3500K, and 4000K, with a CRI of 80. The lens is made of a frosted opal polycarbonate. • axislighting.com • Circle 154



Fino, Amerlux • This ultrashallow, $\frac{5}{8}$ " deep asymmetric luminaire can be wall- or ceiling-mounted. It uses just 5W per foot and has an extruded construction for a seamless fit and hairline joints. The snap-in lens provides light transmission with an integral reflector in a high-reflectance white finish. Color temperature options are 2700K, 3000K, 3500K, and 4000K, with a CRI of 80. Zero-to-10V dimming is standard. • amerlux.com • Circle 155



Sequoia 1, Blue Ridge Lighting Solutions • This linear LED luminaire is designed for tasklighting, cove-lighting, and area space lighting installations. It is available in lengths from 1' to 4' and individual units can be connected to form a series. There are several color temperatures, from warm to cool white and color LEDs, and a range of AC input options including 120V, 277V, and 120V mains dimmable. • blueridgelighting.biz • Circle 156

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Patent Pending

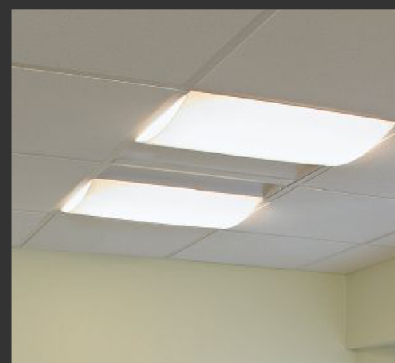
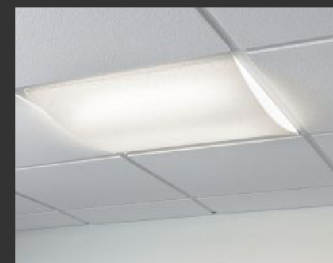
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- Optional RGB color-changing LED for visual interest
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WALLWASHERS



ML56 LED, Cooper Lighting, Halo •

The ML56 LED Recessed Downlighting system was created for use with 5" or 6" downlight and directional trims and is suitable for new construction, remodels, or retrofit installations. The wallwash trim has shower-rated baffles and an adjustable kick reflector, which attaches to the trim with magnets for easy repositioning. The ML56 LED is available in two lumen packages (up to 708 lumens for the 600 Series and up to 1,010 lumens for the 900 Series, with a CRI of 80 and 90, respectively). The luminaire uses R/BR lamps in four color temperature options: 2700K, 3000K, 3500K, and 4000K. • cooperlighting.com • Circle 262



Round Suite, Acuity Brands/Peerless Lighting • This suspended luminaire is available in various configurations including a wallwasher with a rotating body, as well as a wall-mounted indirect luminaire. Round Suite is available in two lumen packages: 2,000 lumens and 4,000 lumens, and three color temperatures: 3000K, 3500K, and 4000K. The fixture's extruded aluminum housing measures 2³/₄" in diameter and is available in three finishes: white, aluminum, or custom. • peerlesslighting.com • Circle 261



T-Wash, Nora Lighting •

The T-Wash luminaire's housing incorporates an LED module, driver, and a frosted lens for even light distribution. Available in two lengths (a 2' model with 33W and 2,100 lumens or a 4' model with 66W and 4,200 lumens), the T-Wash was created for retail and commercial applications. Both options offer high CRI and either 3000K or 4000K output. • norlighting.com • Circle 263



ICL-MBW2, Intense Lighting • This wallwash recessed luminaire has a fully retractable fixture head capable of 60 degrees of vertical tilt at the full pull-down position. Utilizing two high-output LED arrays, it delivers more than 2,500 lumens, has a range of wattage options from 24W to 55W, and a color temperature range of 2700K to 4100K. It is capable of lockable vertical aiming. • intenselighting.com • Circle 264



LED Linear Wall Lighter, Con-Tech Lighting • Suited for wall applications, the LED Linear Wall Lighter has a finned aluminum housing with a heat sink and cast aluminum end caps. It measures 4" deep by 3³/₄" tall by 16¹/₄" long. Its specular reflector, which can be rotated a minimum of 180 degrees and a maximum of 360 degrees, was specifically designed for use with LEDs, of which there are 22 that provide a total of 56W. The luminaire is available in 2700K, 3000K, and 3500K. • contechlighting.com • Circle 265



Jill Asymmetric Wallwash, Birchwood Lighting • Birchwood's Jill Asymmetric Wallwash is a drop-lens recessed luminaire that is encased in a 1.65" housing and was created for hard ceiling and drywall interior applications. Available with either a frosted clear or frosted white acrylic lens, the luminaire has two housing trim options: 3/4" flanged trim or mud—over trimless flange. Lamp options include T5 and T5HO linear fluorescents as well as T5HO and T5HE seamless fluorescents. • birchwoodlighting.com • Circle 266



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GY750LD

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TRACKLIGHTING



Optec, Erco • Specifically designed for retail areas, restaurants, and galleries, the Optec spotlight range features a thermally separated mounting to aid heat management. The fixture can accommodate a variety of light sources including LED (2W–24W), low-voltage halogen (75W–100W), low-voltage halogen reflector (35W–50W), metal halide (20W–150W), and high-pressure sodium vapor (100W). Housing sizes are adapted to meet source, wattage, and beam-spread requirements, which include very Narrow to Wide Flood. A number of accessories are also available including a projector lens. • erco.com • Circle 267



O2, Con-Tech Lighting • The O2 LED track fixture is available in three wattages: 14W, 29W, or 42W. Designed with a die-cast aluminum driver housing that comes in two widths, regular (3³/₄") and thin (2¹/₂"), the fixture has 360-degree horizontal aiming and 180-degree vertical rotation. The O2 is available in four color temperatures: 2700K, 3000K, 3500K, and 4000K. It is also available with a nondimming (120V/277V) and a dimming (120V only) option. • contechlighting.com • Circle 268



ICL-OB1, Intense Lighting • The ICL-OB1 is a multiple lamp luminaire with semi-recessed heads that are capable of delivering up to 1,200 lumens at 20W each. The lamp heads feature a 60-degree vertical tilt and a 360-degree horizontal rotation, and has lockable vertical aiming capabilities along with active thermal management. The fixture heads extend 2³/₁₆" below the housing in the full pull-down position. The ICL-OB1 is available in several color temperatures: 2700K, 3000K, 3500K, and 4100K, with CRIs of 82 or 92. • intenselighting.com • Circle 269



L806 and L807, Cooper Lighting, Halo • The L806 and L807 were designed for accent and display lighting applications and feature a low-profile die-cast extruded aluminum housing. Available in 3000K or 4000K, the luminaire delivers 71 lm/W with a CRI of 80-plus. The LED light engine has nine 3W white LEDs. The arms of the fixtures' lamp housing tilt back and forth 90 degrees horizontally to adjust for three beam distributions: Flood (37 degrees), Narrow Flood (22 degrees), and Spot (15 degrees). • cooperlighting.com • Circle 270



Hornet LED Low Voltage Track Luminaires, Amerlux • The Hornet LED Low Voltage Track Luminaires are designed to replace 50W halogen MR16 track heads and are well-suited for illuminating color or heat-sensitive merchandise. The luminaire delivers white light at 3000K with a CRI of 82 and can be adapted to a 15-degree Spot, a 28-degree Flood, or a 45-degree Wide Flood. The fixture has a die-cast lens bezel and a die-cast aluminum heat sink. Finish options include white, black, and silver texture, and custom colors. • amerlux.com • Circle 272



ISO Low-Voltage Track Head, Tech Lighting • The ISO Low Voltage Track Head is a 16W 850-lumen directional LED track head that features a solderless connector, making it easily field-replaceable and upgradable. The fixture head, which measures 2.8" wide by 3.6" in diameter, is able to rotate 360 degrees and pivot 90 degrees. Finish options are satin nickel or white. • techlighting.com • Circle 271



LEDme Reflex Luminaires, WAC Lighting • The upgraded LEDme Reflex Luminaires feature enhanced lumen output as well as 2700K and 3500K color temperatures. Available in two sizes, the smaller version consumes 8.7W and delivers up to 554 lumens, while the larger model runs at 17.5W and delivers up to 1,017 lumens. Each has a CRI of 85 and interchangeable reflectors in Spot (10 degree) and Flood (25 degree) beam spreads. • wacighting.com • Circle 273

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LP3 Super Spot Series, Lighting Services Inc • Designed for long throw, tight beam applications, the LP3 Super Spot Series is intended to replace aging low-voltage luminaires such as PAR56 or PAR64. It is also the first luminaire to accept the recently released Lumentalk Technology from Lumenpulse, which uses existing electrical wiring for data communication so that LED fixtures can be controlled without the need for any additional wiring. The LP3 produces a six-degree beam and has a CRI of 80-plus. It is available with LSI's standard mounting options and has a lockable yoke for horizontal and vertical focusing. • lightingservicesinc.com • Circle 274



Yori, Reggiani Lighting USA • Yori is an adjustable projector designed for both LED and metal halide sources. The LED version is available in 10W or 26W. It has a die-cast aluminum body and comes with an adapter for mounting on the company's three-circuit track. Yori is adjustable up to 356 degrees in the horizontal axis and up to 100 degrees in the vertical axis. • reggianiusa.com • Circle 275

TRACKLIGHTING



21W LEDme Impulse Track Luminaires, WAC Lighting • The 21W LEDme Impulse Track Luminaires are made of solid die-cast aluminum and come in various color temperatures and optics. With a CRI of 80, the 21W LEDme delivers 950 lumens at 2700K; 1,020 lumens at 3000K; 1,010 lumens at 3500K; and 1,030 lumens at 4000K. It also comes with two different types of reflector optics, including Spot (28 degree) and Flood (45 degree) beam spreads. • wacighting.com • Circle 276



Hornet High Power LED Track Heads, Amerlux • The Hornet High Power (HP) LED 21W track head serves as a replacement for a 20W ceramic metal halide fixture and can be configured with a vertical or horizontal ballast housing. The Hornet HP LED 18W semi-recessed and recessed luminaires deliver up to 1,000 lumens. Both models have a CRI of up to 85 with an optional 90-plus CRI at 3000K. The luminaire is also available in 2700K, 3500K, and 4000K and with Spot, Flood, Wide Flood, and Linear Spread beam distributions. • amerlux.com • Circle 277

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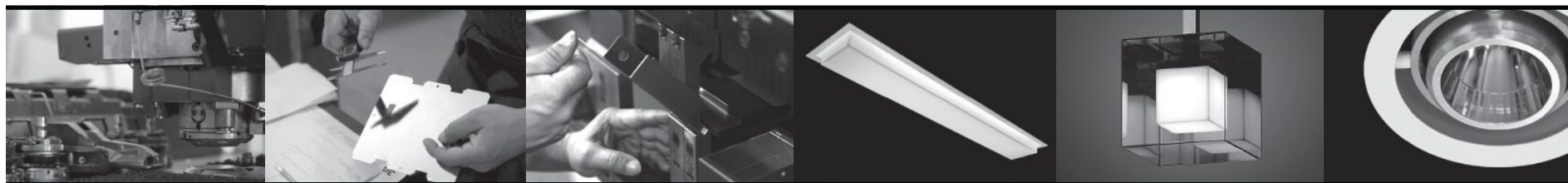


Zinnia 1300i, Journée Lighting • The Zinnia 1300i is a 3"-diameter luminaire with more than 140 square inches of heat sink. It contains a field-replaceable GE Infusion LED module that comes in a wide variety of beam angles (15, 25, 35, and 60 degrees) and color temperatures, and is compatible with standard line-voltage H-Track and J-Track installations. The luminaire features a center beam candlepower of 14,325 and 59 lm/W at 3000K. • journeelighting.com • Circle 278



Hako, Reggiani Lighting USA • Hako, whose name means "cube box" in Japanese, is an adjustable projector luminaire that has both a metal halide (20W to 50W, 3000K) and an LED (14W to 26W, 3000K to 4000K) version. The housing is made of die-cast aluminum and available in matte white, metallized gray, and matte black finishes. Hako can be adjusted up to 356 degrees in the horizontal axis and 140 degrees in the vertical axis. • reggianiusa.com • Circle 279

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LumeLEX Series, Lighting Services Inc • The LumeLEX Series was created for museum and retail accent lighting applications and includes fully die-cast fixtures that are thermally efficient for LED modules up to 2,250 lumens. The series, which includes the LX2060, LX2062, LX2065, and LX2067, encompasses Narrow to Wide beam spotlights, asymmetrical wallwashing, and general floodlighting fixture types in both normal (80-plus) and high (90-plus) CRI ranges. • lightingservicesinc.com • Circle 280



OB1, Intense Lighting • This LED track luminaire features a narrow 11-degree spot optic and delivers up to 1,200 lumens at 20W with active thermal management. It is capable of a full range of dimming options and has multiple color temperatures (2700K, 3000K, 3500K, and 4100K) with CRIs of 82 or 92. The luminaire measures 6³/₄" to the stem mount and 5⁹/₁₆" wide. • intenselighting.com • Circle 281



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OUTDOOR



FCW8050, FC Lighting • Designed for ceiling, wall, and surface mounting in commercial applications, this round-shaped luminaire is composed of marine-grade, corrosion-resistant, heavy-walled die-cast aluminum. Finish colors are black, bronze, silver, white, or custom. It is available in 3000K and 4000K and in three lumen packages: 1,100, 2,200, and 3,000. IP-65 rated for wet locations. ADA compliant. • solidstateluminaires.com • Circle 282



Parscoop LED, Erco • Designed for outdoor architectural lighting, the Parscoop LED floodlights can be floor, wall, or ceiling mounted. They can be lamped with several different sources: LEDs (24W to 48W); tungsten halogen (120W to 1,000W); metal halide (35W to 400W); or compact fluorescent (42W). Optics provide Wide and Deep beam distributions. The corrosion-resistant cast aluminum housing is optimized for reduced accumulation of dirt, while the mounting plate allows for up to 240 degrees of rotation. • erco.com • Circle 284



Centro LED, Hess America •

The Centro LED columns are designed for landscape, pathway, accent, and wayfinding lighting applications. The pedestrian-scaled fixture is available in two heights: 8' or 10' and with a 6.3" diameter. The luminaire is available in 3000K or 4000K with a CRI of 80-plus. A translucent acrylic lens provides glare-free illumination. Housing finish options include matte silver gray metallic, dark gray, or graphite gray. • hessamerica.com • Circle 283



Lab, Mørset USA • Designed by Francesc Rifé, Lab is an LED wall lamp that measures 4.9" square and 3.1" deep. It comes in two versions: Lab 1 (shown) has a downlight-only lighting element and uses one 3W LED; Lab 2 has an uplight and a downlight component and uses two 3W LEDs. The outside housing is composed of injected aluminum and the front lid comes in metal, wood, or stone. The housing is available in white, gray, or black; the lid is available in white, gray, black, dark iroko, light iroko, or stone. It is IP-65 rated and ADA compliant. • morsetusa.com • Circle 285



Vetrinella, Tivoli • Vetrinella is an LED wall light created for low-level interior or exterior pathway illumination. It fits on a standard back box and measures 6¹/₂" square. It is available in warm white, cool white, and neutral white color temperatures that range from 3000K to 4000K. Finish options include nickel, black, and white. ADA compliant. • tivollighting.com • Circle 286



Tube, Modern Forms, a WAC Lighting Company • This cylindrical LED wall sconce uses 18W, has a lumen output of 875, a color temperature of 3000K, and a CRI of 82. It measures 4½" wide by 5" tall. Finish options are black, bronze, graphite, and white. • modernforms.com • Circle 287



Washington Series LED, Acuity Brands/Holophane • Designed for outdoor settings such as city streets, urban plazas, campuses, walkways, and parking lots, the Washington Series LED features an acorn-style glass globe, giving it a traditional look. It comes in 4000K; is available in 40W, 60W, 80W, or 100W; and has both asymmetric and symmetric optics options. The driver is located in the pole base for easy access. • holophane.com • Circle 288



Illumipanel 40 IP, Illuminarc • This exterior washlight is designed to uplight walls, trees, or statues. It has 40 3W RGB LEDs and a 30-degree lens, as well as an impact-resistant glass cover. The luminaire also features built-in automated programs and 11 customizable color temperature presets. It measures 14.6" wide by 12" tall by 3.5" deep and runs on 100V or 240V AC power. • illuminarc.com • Circle 289



Suspense, Modern Forms, a WAC Lighting Company • This contemporary-style outdoor LED lantern is available in two sizes: 8" wide by 11" tall, which extends 10" from the wall, and 10" wide by 15" tall, which extends 12" from the wall. It has a mouth-blown clear glass optic and a housing element composed of aluminum that is finished in either brushed aluminum or bronze. It has a color temperature of 3000K and a CRI of 82. Dimming is possible with an electronic low-voltage dimmer. • modernforms.com • Circle 290

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Possini Euro Design Matte Silver Gray LED Outdoor Wall Light, Lamps Plus • The Possini Euro Design Matte Silver Gray LED Outdoor Wall Light comes with a matte silver-gray finish with clear glass and has both an uplight and a downlight component. It uses eight 1W LEDs, is available in 2900K to 3100K, and has a lumen output of 455. It is not dimmable. The luminaire measures 8" high by 4¹/₄" wide, and projects 4" from the wall. • lampsplus.com • Circle 291



AR-FLD8120, Aurora Lighting • Designed for lighting buildings, parking lots, plazas, signs, and trees, the AR-FLD8120 aluminum floodlights are available in 25W, 48W, 83W, and 120W packages. LED options are either white (4200K) or blue. The fixture has a 45-degree beam angle and a mounting bracket that can be adjusted up to 90 degrees in both directions. The IP-65 rated housing measures 14.2" long by 3.1" wide by 21.7" tall and has a safety glass cover lens with silicon gasketed seals. • auroralight.com • Circle 292



Eon LED Bollards, Cooper Lighting, Lumiere • These low-profile, dimmable LED bollards, which exclusively provide downlight, have three beam spreads—Forward Throw, Lateral Throw, and Flood—achieved with Cooper Lighting's AccuLED Optics. The luminaires are available in three color temperatures: 2700K, 3000K, and 4000K. They can be specified with a single head on one side or two fixture heads with one to either side. It is IP-66 rated for wet locations. • cooperlighting.com • Circle 293



LED Brick Step Lights, Nora Lighting • Designed to be the size of a standard brick (8⁵/₈" by 3¹⁵/₁₆" by 3" deep), the LED Brick Step Lights were designed for pathway and step lighting. Each fixture has 24 4W LEDs and is available in 2925K. The die-cast aluminum faceplates can be specified as louvered, lensed, or shroud. Finish options are brushed nickel, bronze, and white. • norlighting.com • Circle 294

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D-Series LED Flood Luminaires, Acuity Brands/Lithonia Lighting • The D-Series LED Flood Luminaires are designed to replace 50W to 400W metal halide floodlights in outdoor lighting applications. The series is available in three sizes: 8⁷/₈" wide by 12" overall, 12⁷/₈" wide by 12" overall, and 13" wide by 17¹/₂" overall; and in three color temperatures: 3000K, 4000K, and 5000K. The luminaire's reflector system provides low field-to-beam ratios for minimal spill light. • lithonia.com • Circle 295

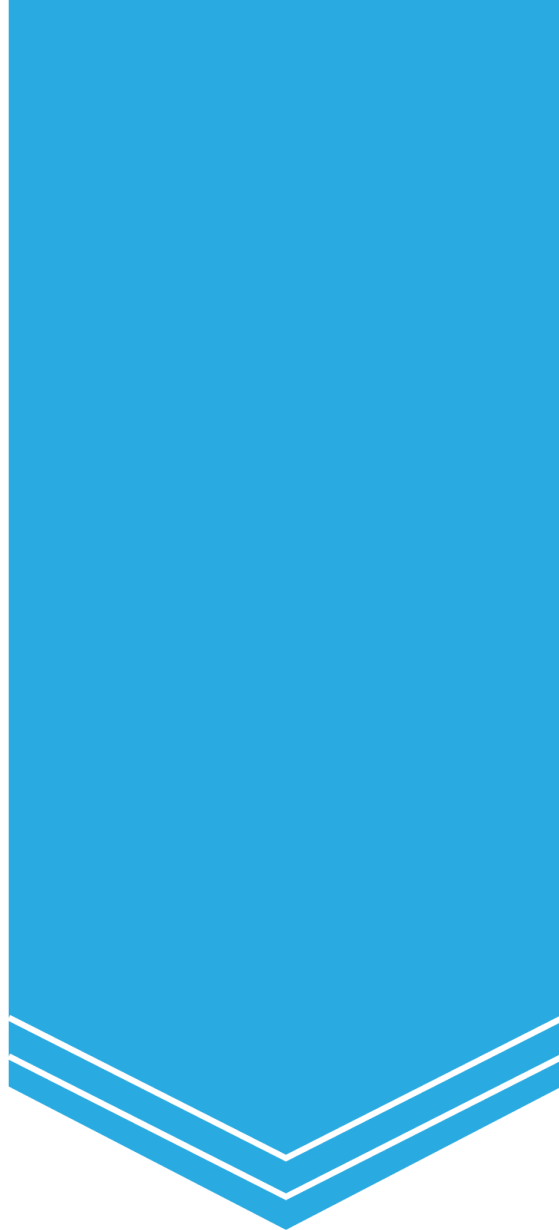


Galleon LED Area/Site Luminaire, Cooper Lighting/McGraw-Edison • Designed for walkways, parking lots, roadways, building areas, and security lighting, the Galleon LED Luminaire is available in 4000K (standard). Optional 3000K and 6000K color temperatures can also be specified. An extruded aluminum driver enclosure is thermally separated from the LEDs, which use AccuLED Optics to provide consistent light distribution. The fixture is IP-66 rated for wet locations. • cooperlighting.com • Circle 296

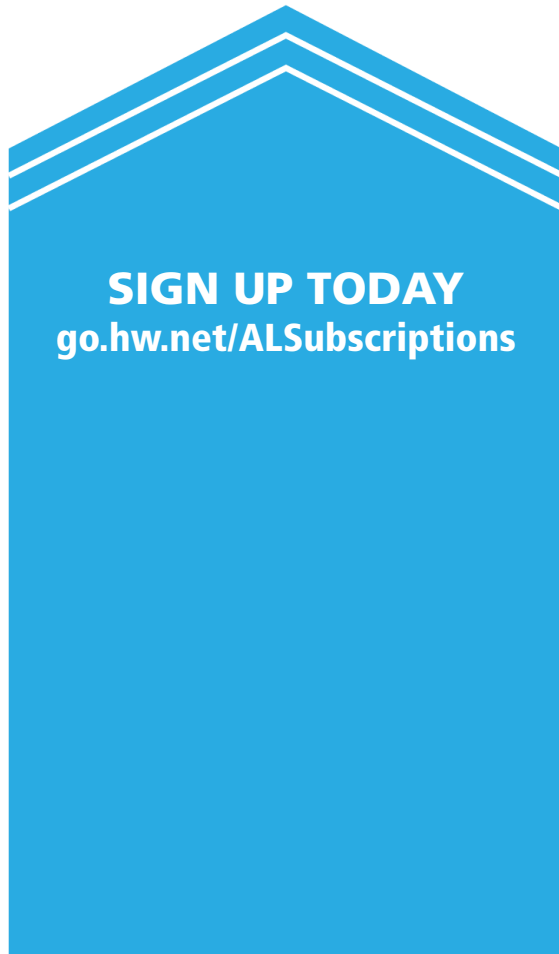
Illumipod 18g2 IP, Illuminarc • This outdoor luminaire is designed for wallwashing as well as uplighting trees, columns, and building façades. It uses 18 3W RGB LEDs and has a 30-degree lens, as well as an impact-resistant glass cover. The Integrated Cooling Enhancement (ICE) technology aids in the fixture's cooling efficiency. An integral driver with an auto-switching power supply automatically detects the input voltage ranging from 100V to 240V. The fixture measures 12.3" tall by 6.6" wide by 9.8" deep. • illuminarc.com • Circle 297



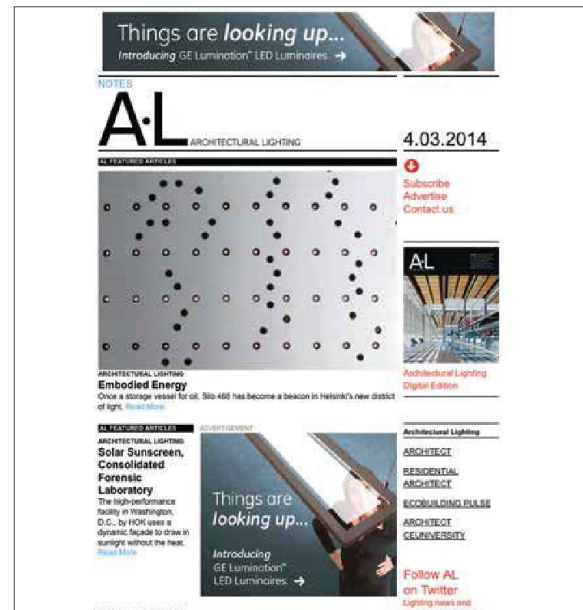
Little Harbor, Troy Lighting • Little Harbor is an outdoor fixture made of solid brass and composed of a forged black finish and glassware in a clear antique color. The luminaire is offered in wall-mount, pendant, and post-mount versions. Its designers were inspired by the seafaring communities of the East and West coasts. • troy-lighting.com • Circle 298



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Edge HO, Cree • The Edge High Output Area and Floodlight LED luminaires feature more than 20 optical configurations and were designed to replace 1,000W metal halide outdoor fixtures. The Edge HO has a minimum CRI of 70 and is available in 4000K or 5700K. Available in either an adjustable arm or direct arm version with four (279W and 426W) or eight arrays (557W and 851W), the patented NanoOptic technology precisely distributes the light. • cree.com • Circle 299

Forefront Area, Lighting Science Group • This LED luminaire is designed for exterior lighting applications including parking lots, pathways, and city streets. It is available in multiple optical distributions (Type II, Type III, Type IV, and Type V); two color temperatures: 4000K or 5000K; and a wattage range of 75W to 390W. It has a clear lens and the housing is composed of low copper die-cast aluminum. • lsgc.com • Circle 300



Forefront Pedestrian, Lighting Science Group • The Forefront Pedestrian light was created to provide better visibility in pedestrian areas. The luminaire is available in 4000K or 5000K, has a CRI of 70, and a lumen output of 75W. Optical distributions include Type II, Type III, Type IV, and Type V. The fixture has a clear lens and the housing is composed of low copper die-cast aluminum. Finish options include gray, black, bronze, white, silver, and metallic gray. • lsgc.com • Circle 301

Patriot Series, LSI Industries • LSI Industries has expanded its Patriot Series LED luminaire family to include the XPTS3, a pedestrian-scaled fixture designed to serve as an alternative to 175W metal halide fixtures. Available in a small or large version, both use 63 LEDs; can be specified in either cool white or neutral white; meet Type II, Type III, and Type V optical distributions; and work with 120V or 277V universal voltage. • lsi-industries.com • Circle 302

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Laredo Wallpack, Hubbell • The Laredo LNC2-18LU is an expansion of the Laredo LNC2 Series and is now available in a 45W configuration that delivers an output of up to 3,306 lumens and an efficiency of 74 lm/W. The expanded series includes three color temperatures (3000K, 4200K, and 5100K), additional beam distributions, expanded photocontrol options, and additional finishes (dark bronze, black, white, and platinum). • hubbell-ltg.com • Circle 303

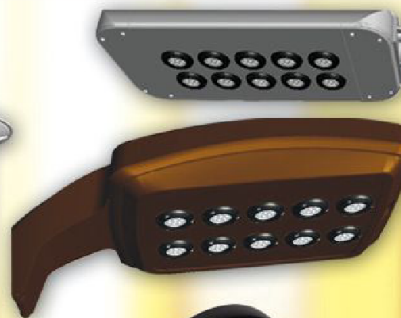


TLS-RTLM and TLS-RTLS LED Roadway Luminaires, Toshiba • The TLS-RTLM and TLS-RTLS LED Roadway Luminaires were designed to replace conventional 70W to 400W HID roadway lighting. There is a small body and a large body version. Both have automatic dimming capabilities. Available with 24 to 72 LEDs, the luminaire operates in ambient temperatures of -40 C to 50 C. • toshiba.com/lighting • Circle 304

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PermaLED Low Profile Canopy Luminaire, Osram Sylvania • The PermaLED Low Profile Canopy luminaires were created for use in entryways, parking garages, and stairwells. Offered in 42W and 54W, the luminaires were designed to operate through 120V or 277V AC universal and include lighting surge protection in each unit. Each is available with a color temperature of 5000K as well as a CRI of 70-plus. • sylvania.com • Circle 305



Kitty Hawk, DuraGuard • This outdoor pole-mounted luminaire has a die-cast housing and front frame finished in a textured bronze powder coat. It comes in two sizes: small with six LED modules, and large with 10 LED modules. Both are available in 9W or 12W and three color temperatures: 4000K, 5700K, and 6500K. The LED module has an IP-67 rating for wet locations. • duraguardproducts.com • Circle 306



Shark LED Street Light

Shark LED Street Light adopts intelligent control system, thus it can realize self-check and remote detection, which makes the maintenance and monitoring more convenient from far away distance. It adopts streamlined design, very elegant and fashionable. This item fully considers bad ambient conditions such as cold temperature and heavy snow.

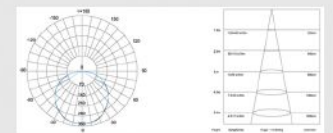


Model no.	Watt	CCT	Flux	EF	CRI	Dimmable	Beam angle*	Size	PF	IP	Work temp*	N.W
	w	k	lm	lm/w			°	mm			°C	kg
JZSL-1L1-750035AU00	35	5K	3000	90	70	timer task, signal, PLC option	140°x60°x45	632x338x143	0.9	IP65	-40-50	6.8
JZSL-1L1-750045AU00	45	5K	3800	85	70	timer task, signal, PLC option	140°x60°x45	632x338x143	0.9	IP65	-40-50	6.8
JZSL-1L1-750065AU00	65	5K	5000	80	70	timer task, signal, PLC option	140°x60°x45	632x338x143	0.9	IP65	-40-50	6.8
JZSL-1L2-750085AU00	85	5K	5400	90	70	timer task, signal, PLC option	140°x60°x45	768x338x143	0.9	IP65	-40-50	8.2
JZSL-1L2-750085AU00	85	5K	7000	85	70	timer task, signal, PLC option	140°x60°x45	768x338x143	0.9	IP65	-40-50	8.2
JZSL-1L2-750125AU00	125	5K	10000	80	70	timer task, signal, PLC option	140°x60°x45	768x338x143	0.9	IP65	-40-50	8.2
JZSL-1L3-745095AU00	95	5K	8000	90	70	timer task, signal, PLC option	140°x60°x45	903x338x143	0.9	IP65	-40-50	9.5
JZSL-1L3-745130AU00	130	5K	11000	85	70	timer task, signal, PLC option	140°x60°x45	903x338x143	0.9	IP65	-40-50	9.5
JZSL-1L3-745175AU00	175	5K	14000	80	70	timer task, signal, PLC option	140°x60°x45	903x338x143	0.9	IP65	-40-50	9.5
JZSL-1L4-745125AU00	125	5K	10000	90	70	timer task, signal, PLC option	140°x60°x45	1037x339x143	0.9	IP65	-40-50	10.8
JZSL-1L4-745165AU00	165	5K	14000	85	70	timer task, signal, PLC option	140°x60°x45	1037x339x143	0.9	IP65	-40-50	10.8
JZSL-1L4-745230AU00	230	5K	18000	80	70	timer task, signal, PLC option	140°x60°x45	1037x339x143	0.9	IP65	-40-50	10.8



LED Panel Light

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Model no.	Watt	CCT	Flux	EF	CRI	Dimmable	Beam angle*	Size	PF
	w	k	lm	lm/w			°	mm	
JZPL1206-B1	84	4K	7100	85	70	Dali as option	120	1198x598x45/51	0.9
JZPL1203-B1	42	4K	3400	85	70	Dali as option	120	1198x298x45/51	0.9
JZPL0606-B1	42	4K	3400	85	70	Dali as option	120	598x598x45/51	0.9



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INDUSTRIAL

I-Beam, Acuity Brands/Lithonia Lighting • Designed for large indoor spaces, such as manufacturing facilities, warehouses, and gymnasiums, the I-Beam LED High Bay can be mounted at heights ranging from 15' to 40' and can withstand temperatures up to 131 F. A replacement for conventional High Bay systems, the luminaire incorporates Narrow and Wide Beam distributions, has a standard driver for zero-to-10V dimming, and can be integrated with factory-installed digital controls, such as occupancy sensors or daylight photocells. • lithonia.com • Circle 307



BAYLED78 and AISLED78, Rab Lighting • Well-suited for large open spaces such as warehouses, supermarkets, auditoriums, and gymnasiums, the 78W High Bay (BAYLED78, shown) and Aisle Lighter (AISLED78) were created to replace 250W metal halide fixtures in high ambient environments of up to 55 C (131 F). Each fixture, which contains three multichip, 26W high-output LEDs, can be mounted in damp or wet locations with a cord, hook, or a 3/4" pendant stem, respectively. Both luminaire types are available in cool, neutral, or warm color temperature options. A commercial-grade motion sensor can be integrated into the luminaire. • rabweb.com • Circle 308



Forefront High Bay, Lighting Science Group • Designed for commercial spaces such as warehouses, distribution centers, retail spaces, manufacturing facilities, storage and utility areas, and general area lighting, the Forefront High Bay luminaire is available in three sizes ranging from 16.10" to 29.84" long. The luminaire features a modular optical design and has three beam distributions: Aisle, Medium, and Wide. Lumen output varies depending on the wattage and beam distribution. Color temperature options are 4000K and 5000K with a CRI of 70 and 65, respectively. • lsgc.com • Circle 309



HBL Series LED High Bay, Hubbell Industrial Lighting • The HBL Series LED High Bay is an industrial lighting system that delivers 5000K and up to 100 lm/W. It was designed for heavy industrial settings, warehouses, gyms, churches, and shopping malls. Featuring a cast-aluminum housing with finish options in black, gray, and white, and a radial fin design for thermal efficiency, the HBL Series contains six individual LED light engines with LED count ranges from 48 to 60 to 72, driven at 700mA. The fixture measures 18" wide by 6" deep. • hubbellindustrial.com • Circle 310



FA1 LED, Cooper Lighting, Fail-Safe • The FA1 LED luminaire is designed for a variety of nonhazardous applications including food-processing, marine, waste-water treatment, heavy manufacturing, car washes, and general wash-down areas. It uses modular LED LightBar technology and is available in one- or two-LightBar configurations. The LED driver mounts to a stainless steel housing back with an aluminum heat sink. The luminaire provides 4000K with a CRI of 70 and is UL/cUL wet-location listed. It can operate in a temperature range of -30 C to 50 C in ambient environments. • cooperlighting.com • Circle 311



LED EG3, LSI Industries • The LED EG3 features a vapor-tight and high-impact, reinforced fiberglass housing making it well-suited for utility, back room, and cooler applications. It uses medium-power, high-brightness diodes for uniform luminance in three color temperatures: cool white (5300K), neutral white (4100K), and warm white (3500K), while providing a light output of 4,890 lumens at 55W. A choice of lenses and symmetrical distributions provides high-lumen output while reducing brightness. • lsi-industries.com • Circle 312



Essentials Bay Series, Lusio Commercial & Industrial • The Essentials Bay Series includes six models (2-Module, 2-Module Short, 4-Module, 4-Module Short, 6-Module, and 6-Module Short) that are designed for use in dry or damp locations and also have preventive measures to deter heat buildup. These LED luminaires offer 92 to 103 lm/W (depending on the model), and can be controlled and dimmed with third-party daylighting and occupancy-sensing control systems. Five light distributions (High Bay, High Bay Narrow, Low Bay Medium, Low Bay Wide, and Aisle Lighter) address glare control across a range of mounting heights from 10' to 60'. The series also supports 120V, 227V, 347V, and 480V inputs. • lusiolighting.com • Circle 313



HB LED Series, Cooper Lighting, Metalux • The HB LED Series, designed to replace high intensity discharge and linear fluorescent High Bays, has a proprietary low-power, low-brightness LED module. It is available in 4000K and 5000K, has a CRI of 80-plus, and three lumen packages: 9,000, 18,000, and 23,000. The HB LED Series also has an optional occupancy sensor and provides 600 to 1,250 square feet of coverage, with a maximum mounting height of 40'. The luminaire can operate in temperature fluctuations from -40 C to 50 C in ambient environments. • cooperlighting.com • Circle 314

LAMPS, BALLASTS, AND CONTROLS



LED BR30 and BR40 Lamps, MaxLite • The LED BR30 is designed to replace a 65W incandescent lamp, while the BR40 is meant to replace a 90W incandescent lamp. Designed with aluminum folded into a fin shape, the BR30 measures 4.1" wide and 5.7" tall, while the BR40 measures 4.9" wide and 6.3" tall. Both lamps are available in 2700K and a CRI of 80-plus. • maxlite.com • Circle 315



Hue, Philips • Hue is a Web-enabled LED home lighting system available exclusively through Apple stores. The starter kit includes three LED lamps that fit any standard light fixture and a bridge that connects to existing wireless routers. The system can be controlled by any iOS or Android device and can achieve a CRI of 90-plus in the white range and provides more than 16 million color customizations. • usa.lighting.philips.com • Circle 316



Definity MR16 Hi-Output, Lighting Science Group • The Definity MR16 Hi-Output is designed to replace 50W MR16 halogen lamps. The 8W lamp does not require fans to optimize thermal dissipation and is available in four color temperatures: 2700K, 3000K, 4000K, and 5000K, with CRIs of 83 except for the 5000K model, which has a CRI of 67. It can be specified with either a Narrow Flood or a Flood beam distribution, and is compatible with a wide array of AC, DC, and magnetic or electronic transformers. • lsgc.com • Circle 317



Acculamp S-Series PAR LED Lamps, Acuity Brands • The Acculamp S-Series PAR LED Lamps are PAR-style lamps designed for accent lighting applications. Constructed with cast aluminum and a faceted reflector, the Acculamp has a lumen output of 600 to 2,000 lumens; color temperature options of 2700K, 4000K, and High R9; with respective CRIs of 82, 85, and 94. Beam angles include 25 and 45 degrees. Its operating temperature ranges from -22 F to 113 F. • acuitybrands.com • Circle 319



Definity BR20, Lighting Science Group • The Definity BR20 was designed for general illumination applications that use 50W incandescent BR lamps. Dimmable to 5%, the 8W LED lamp is available in four color temperatures: 2700K, 3000K, 4000K, and 5000K, with CRIs of 80, except for the 5000K model, which has a CRI of 67. The optical design offers a smooth beam pattern. • lsgc.com • Circle 318



B11 Candelabra, Toshiba • The B11 Candelabra LED Lamp provides 3.8W at 2200K (82 CRI) or 2700K (85 CRI) and mimics the glow of candlelight. Meant to replace 15W incandescent lamps, the B11 reaches full brightness instantly, but dimming is an option. The lamp comes with either a frosted or a clear finish. • toshiba.com/lighting • Circle 320



MR16 GU5.3 35W Equivalent LED Lamp, Toshiba • Toshiba's MR16 GU5.3 is meant to replace 35W halogen lamps and comes with an updated ANSI Form that fits more applications. The 7W LED dimmable lamp is available in three color temperatures, 2700K, 3000K, and 4000K, with a CRI of 82. It has Flood and Narrow Flood beam distributions and is rated for both damp locations and enclosed fixtures. • toshiba.com/lighting • Circle 321



Definity PAR30 Short Neck, Lighting Science Group • The Definity PAR30 Short Neck lamp is made of aluminum, is suitable for damp locations, and contains no mercury or lead. The 13W lamp is dimmable to 5% on most dimmers and is available in warm white (2700K and 3000K, 85 CRI), neutral white (4000K, 85 CRI), or cool white (5000K, 67 CRI) light with Flood, Narrow Flood, or Narrow Spot beam distributions. • lsgc.com • Circle 322



LM16 LED Replacement Lamp, Cree • Cree's LM16 LED Replacement Lamp is designed to take the place of a 50W halogen MR16 lamp. It works with a broad range of transformers and dimmers, delivers between 425 and 620 lumens, and has a color temperature of 3000K. The lamps are also available in a variety of beam angles (17-degree Spot, 25-degree Flood, and 40-degree Wide Flood.) It can be dimmed to 5%. • cree.com • Circle 323



Unison Paradigm Responsive Controls, ETC • Unison Paradigm Responsive Controls, the latest addition to ETC's Unison Paradigm family of architectural lighting controls, use passive infrared sensors to detect room vacancy and automatically shut off lights. The occupancy/vacancy sensors are available with masks to prevent trips or false triggers, and can be accessed for easy maintenance by depressing the microlens dome on the sensor housing. The sensors are available in three versions to address a range of square footages (300 to 7,000) and ceiling heights of 8' and 10'. • etcconnect.com • Circle 324



Vivid LED MR16 Lamp, Soraa • According to the manufacturer, this is the first full spectrum LED MR16 lamp designed to replace 40W and 50W halogen MR16s. It is available in 2700K and 3000K with a CRI of 95-plus and features Soraa's gallium nitride on gallium nitride diode architecture. The lamps are available with several beam distributions including Flood, Spot, and Narrow Flood. • soraa.com • Circle 325



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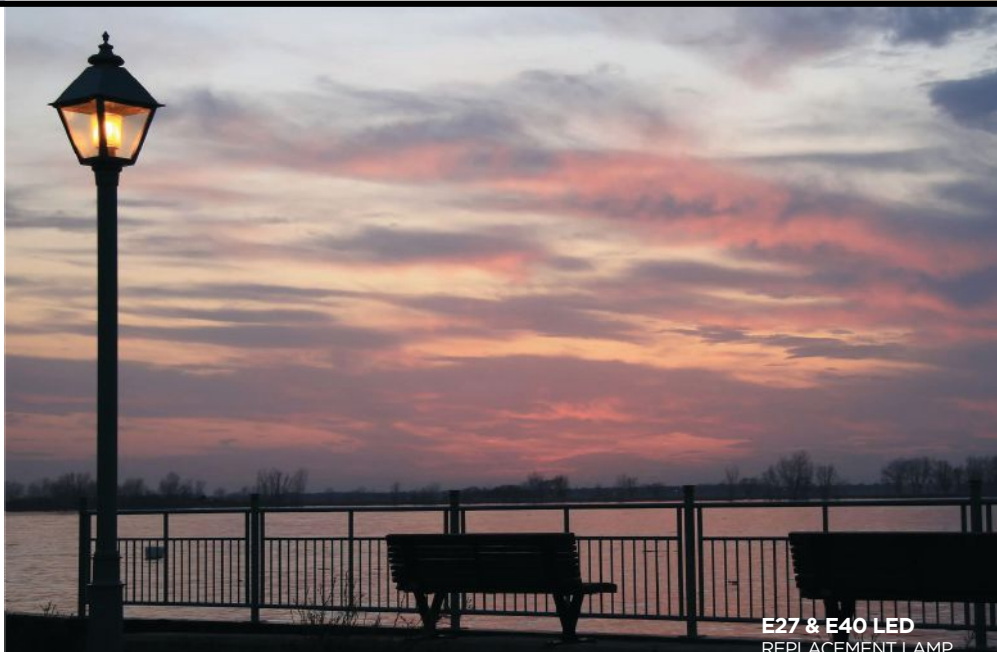
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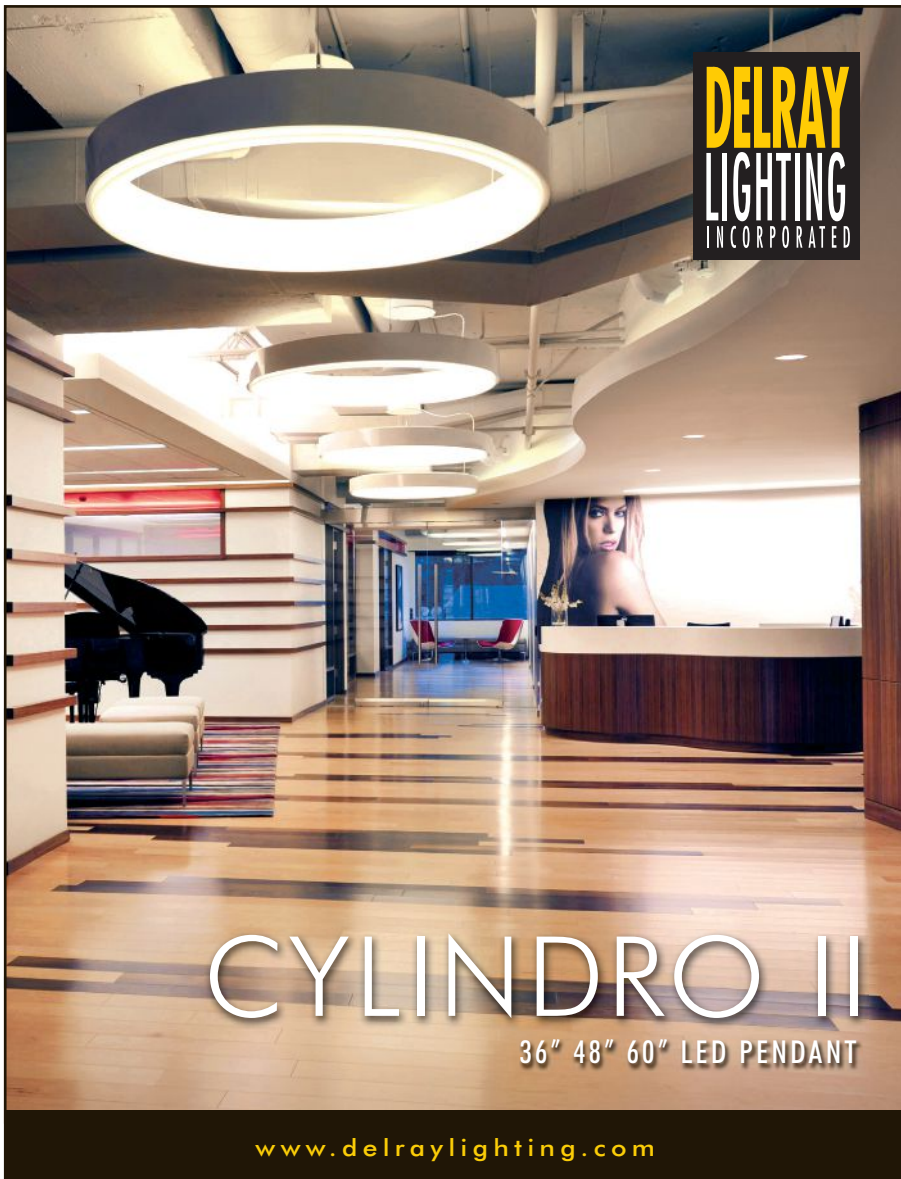
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ULTIM8 HEH, Universal Lighting Technologies • The ULTim8 HEH Programmed Start Ballasts are designed for high ambient temperature applications for retrofit or new construction. The ULTim8 has a start time of less than 700 milliseconds, parallel lamp operation for easy troubleshooting, and lamp replacement when one lamp fails. It also has anti-striation control for F32T8/ES (25W or 30W) or F28T8 (28W) lamps. • unvlt.com • Circle 326



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Equinox 4 LCD Keypad, Vantage Controls • Allowing complete control of lighting, audio, and home climate, the Equinox 4 LCD Keypad is compatible with global installation and electronic standards. Measuring 4.72" by 3.45" by 1.49", the glass-to-the-edge keypad has auto presence detection, which allows the device to auto dim to a power-save mode when no presence is detected and to turn back on when a room is occupied. • vantagecontrols.com • Circle 327

LAMPS, BALLASTS, AND CONTROLS



LMLS-600, WattStopper • The LMLS-600 is a dual-loop photosensor that provides daylighting control for applications with skylights. The device automatically switches or dims one zone of lighting based on ambient and daylight levels. An open-loop sensor detects daylight contribution while a closed-loop sensor reads the ambient light level. The LMLS-600 operates on Class 2 power. • wattstopper.com • Circle 328



HorseSense Lighting Control System, Fulham • Fulham's lighting control system for fluorescent and LED luminaires offers energy savings, dimming, and multiscene control. With the controller and a minimum number of occupancy sensing components, software commissioning of large areas can easily be achieved. The system allows for control of single rooms, nonadjacent rooms on the same floor, or an entire multifloor building. The system also incorporates scheduling and energy monitoring functions. • fulham.com • Circle 329

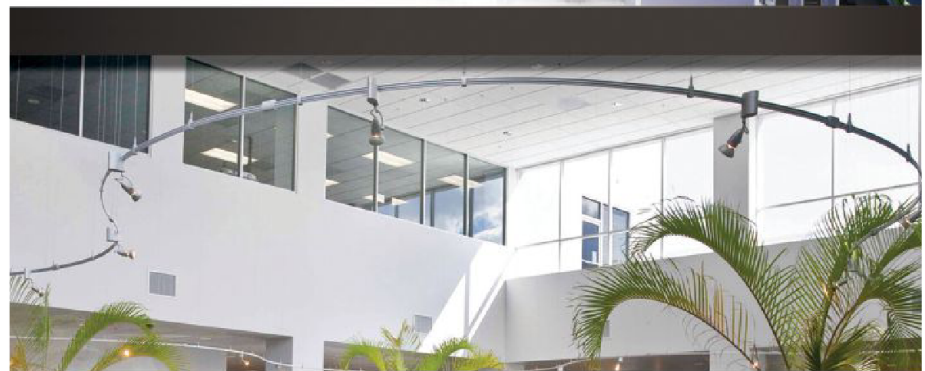
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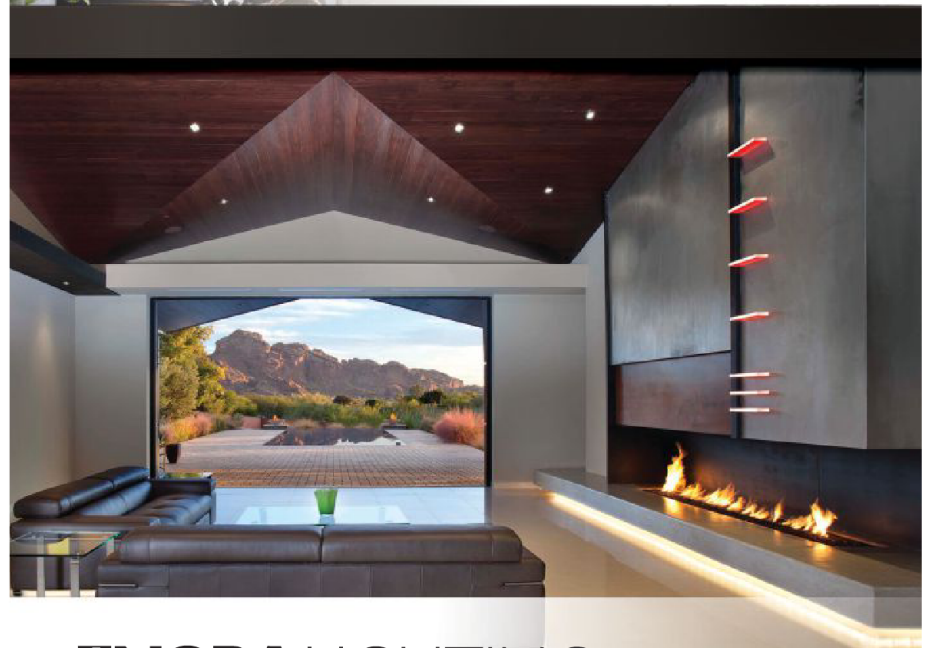


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LEDs AND DRIVERS



XPM 80 Series LED Module, Xicato •
The XPM 80 Series incorporates Xicato's Corrected Cold Phosphor Technology and measures 1.77" in diameter and 0.67" in depth with a 0.24" optical aperture. The module's housing is constructed of die-cast aluminum with a sealed-glass aperture. It features a CRI of 80 and a color temperature of 3000K. It is IP-66 rated. • xicato.com • Circle 330



Nano Linear Allegro AC XB, Traxon e:cue • This AC line-powered high-brightness luminaire is available in four lengths (12", 24", 36", and 48") and comes with nine, 18, 27, or 36 LEDs. It has a tempered glass cover and can be daisy-chained to form long runs up to 50' (120V) and 80' (230V). The series is phase-cut dimmable and is available in 3000K, 4000K, or 6500K. It is IP-66 rated for outdoor environments. • traxontechnologies.com/us • Circle 331



Polyoptik, Heico Lighting • Designed for architectural lighting applications, the 3500K Polyoptik LED modules are part of Heico's Contactless LED System and feature Narrow to Wide beam angles for uniform illumination. The modules are inserted on one electrical circuit connected to the LED master power supply, which has AC power conveyed by electromagnetic induction, eliminating electrical contacts and corrosion risk. • heicolighting.com • Circle 332



SLD, XLD, and XLA Series Drivers, ERG Lighting, Endicott Research Group • Designed for architectural lighting applications, these drivers are available with power options from 18W to 200W. They are IP-65 rated for wet locations and operate from -40 C to 60 C. The XLD and SLD Series can operate in extremely humid conditions, while the XLA line offers flicker-free AC line dimming. • erlighting.com • Circle 333



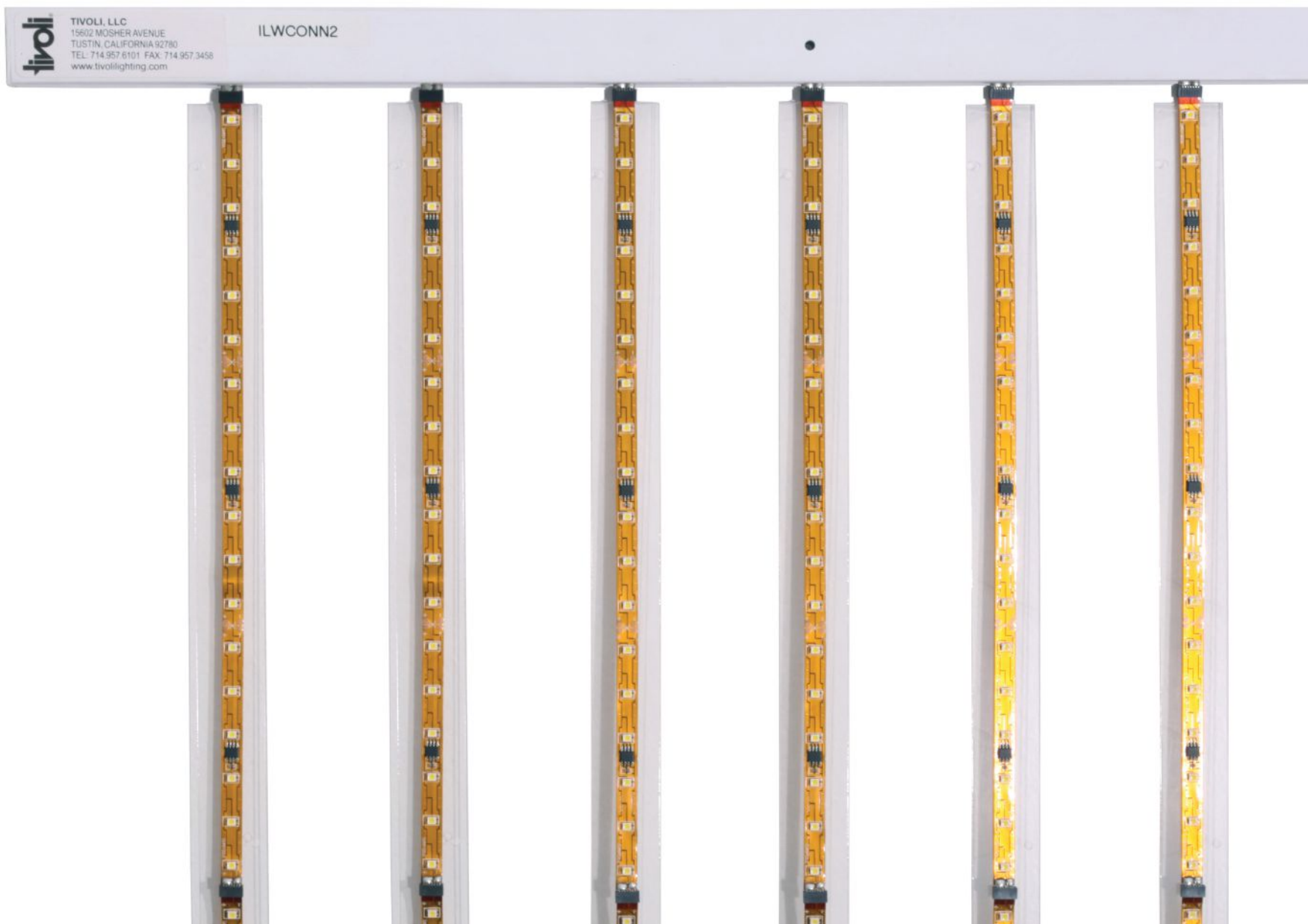
Solodrive 561/M, eldoLED • The Solodrive is a zero-to-10V dimmable, constant-current LED driver that offers smooth dimming all the way down to zero. It can be used for a variety of lighting applications including architectural, retail, signage, and street lighting. It offers two LED outputs to drive very high-power 50W LED arrays connected to a single output or two strings of 15 LEDs at 350mA. For use in dry and damp locations. • eldoled.com • Circle 334



Butler XT2, Traxon e:cue • The Butler XT2 controls up to 1,024 DMX/RDM channels, is scalable up to 65,536 channels, and supports RDM protocol for bidirectional communication. The DMX/RDM engine can be used either in stand-alone mode to replay and loop lighting shows previously uploaded using e:cue's software suite on a PC, or it can be controlled by another of the company's engines. • traxontechnologies.com/us • Circle 335



XLM Artists Series LED Module, Xicato • This XLM series is designed to replace conventional sources in both exterior and interior applications, such as wallwashing, accent lighting, and general ambient lighting. The module, which measures 3.31" long by 1.77" wide by 0.73" deep, features the company's Corrected Cold Phosphor Technology. It is available in 3000K, 3500K, and 4000K with a CRI of 90-plus. It is IP-66 rated. • xicato.com • Circle 336



Illumiwall, Tivoli • Illumiwall is a low-voltage LED backlighting solution for acrylic and glass panels. It uses 18 LEDs per foot ($1\frac{1}{16}$ " o.c.) on installation-ready clear strips that each provide 0.14W. Illumiwall comes standard in 1', 2', and 4' lengths, but can also be customized for any application. It is available in three color temperatures (3200K, 4100K, and 6500K) and with full-range dimming options. A Class II 24V DC power supply is required for operation. • tivolilighting.com • Circle 337



Powerdrive 6060/R, eldoLED • This rackmount LED driver is designed for installations that require the driver to be mounted up to 300' away from the light source, such as entertainment, façade, or retail display lighting. It can be used for both dynamic full-color and white lighting applications and is DALI, zero-to-10V, and DMX512A/RDM compatible. It uses 600W of power (max.), has full dimming control from zero to 100%, and every LED output is programmable from 200mA to 1,050mA. • eldoled.com • Circle 338



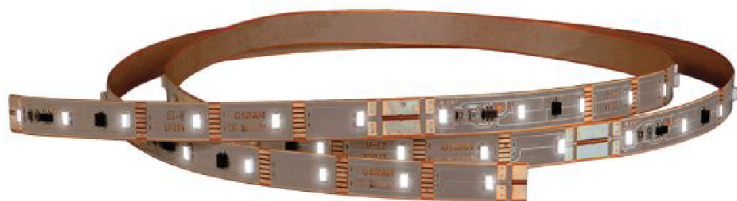
Cove Light AC HO, Traxon e:cue • Designed for general lighting, wallwashing, and cove lighting, the Cove Light AC HO is controlled by leading/trailing edge phase-cut dimmers and has dimming capabilities up to 5% without flickering. It is available with nine, 18, or 27 LEDs, and in a color temperature range from 2400K to 6500K. It has a diffused PC cover lens and four beam angles: 120 by 120 degrees, 120 by 55 degrees, 10 by 50 degrees, and 40 degrees. • traxontechnologies.com/us • Circle 339



D-LEDbar, Heico Lighting • The D-LEDbar was designed for general lighting, cove-lighting, and retrofit applications. Compatible with several LED master power supplies (LMPS), it is available in warm white (3500K), white (6500K), as well as red, blue, green, and amber. The D-LEDbar can be used in dry and damp locations and can be used with LMPS-Dimmer Controllers or LMPS-Dimmer Extenders. • heicolighting.com • Circle 340



Hive, d-LED • Hive is an LED wallwasher that can be wall- or ceiling-mounted above-grade, either indoors (IP-40) or outdoors (IP-67). It features a high-grade aluminum anodized housing and is controlled by a d-LED or third-party controller using one to four channels. It operates at 500mA and has a maximum power consumption of 40W using 24 Rebel ES LEDs. • d-led.net • Circle 341



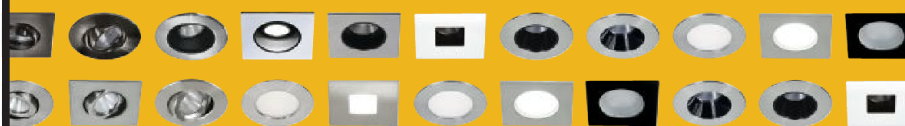
LinearLight Flex LED Module Family, Osram Sylvania • The LinearLight Flex LED linear modules are offered in 2700K, 3000K, 4000K, 5000K, and 6500K with a CRI of 80-plus. The Advanced Family has an output of 119 to 129 lumens per foot with an efficiency of 81 to 88 lm/W, while the Short Pitch Family has an output of 238 to 258 lumens per foot with an efficiency of 81 to 88 lm/W. The modules can be field-cut and feature a flexible circuit board with a self-adhesive backing for ease of installation. • sylvania.com/led • Circle 342

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Virgolite, Heico Lighting • These LED modules were designed for architectural lighting applications and are available in 3500K and 6000K. They feature Heico's Contactless LED system, which allows greater flexibility when combining modules of different color temperatures and intensities. • heicolighting.com • Circle 343



24V Hy-Brite, Nora Lighting • The 24V Hy-Brite LED tapelight can be used for a variety of applications including coves, undercabinet lighting, and backlighting. It has a maximum range length of 16' with magnetic dimmable drivers and a length of 32' with electronic drivers. It includes 2.7W (12 LEDs) per foot, comes in three color temperatures (2700K, 3000K, and 4200K), is dimmable, and is IP-44 rated for damp locations. • noraaighting.com • Circle 344



Push, d-LED • Push is a four-channel constant-current LED driver that enables high-power LED lighting applications of up to 48 (4x12) LEDs. It measures 4.7" deep by 4.1" wide by 7.3" tall and can be installed on either Din-Rail or directly on structure. It can be controlled by DALI protocol, zero-to-10V, or DMX-512 signals. It also has an active thermal protection feature. • d-led.net • Circle 345



Coveline, FC Lighting This LED cove luminaire is available in 1', 2', and 4' nominal lengths and three color temperatures: 2600K, 3000K, and 4000K. It also has seven beam distributions: 25 degrees, 40 degrees, 60 degrees, 80 degrees, 120 degrees, 30 by 60 degrees, and 67 by 140 degrees. Its housing is constructed of extruded aluminum with tooled end-caps. The luminaire is rated for interior use only and features plug-and-play connectors to aid in installation. It is dimmable to 5% brightness. • solidstateluminaires.com • Circle 346



TivoTape, Tivoli • This low-voltage light strip has a tape adhesive backing and is field-cuttable for a wide range of indoor and outdoor applications. It is available in 1', 2', 4', 8', 12', and 16' nominal lengths and has a full range of dimming options. Color temperature options are red, yellow, blue, green, cool white, neutral white, warm white, and delux warm white. It uses either a Class II 12V DC or 24V DC power supply. • tivolilighting.com • Circle 347



Hi-Lume LED Driver, Lutron Electronics • An expansion of Lutron's A-Series, this LED driver offers higher power to control LED downlights in areas that need more light, such as spaces with high ceilings. It is designed for use with higher power LED modules, such as the Philips Fortimo 3000lm and Xicato 3000lm. The 50W driver offers flicker-free operation, dimming to 1%, and a calibration point temperature of 70 C, so that a fan is not required. • lutron.com • Circle 348

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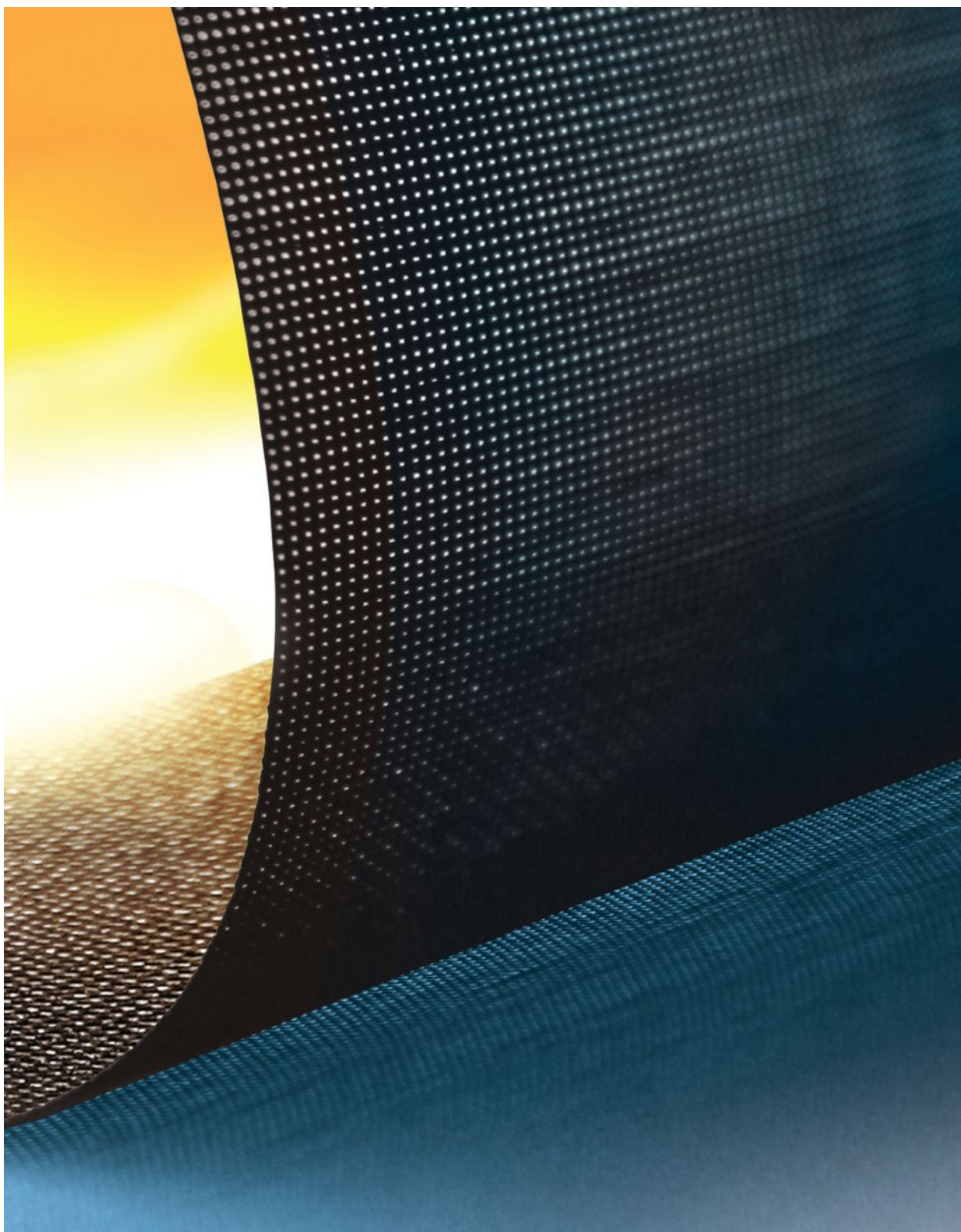
SPECIALTY



● THEATRICAL

Ovation E-190WW, Chauvet Professional

• This is the first luminaire in Chauvet's new Ovation line of fixtures designed for theatrical lighting. Modeled after ellipsoidal spot fixtures, the E-190WW is driven by 19 10W LEDs and delivers more than 2,600 lux at 5m (26 degrees). The E-190WW comes equipped with standard beam shaping shutters, separate gobo and effects slots, and lens barrels that are interchangeable with other ellipsoidal reflector spotlights. The luminaire has a color temperature of 3100K and a flat-field 16-bit dimming curve, which allows for smooth fades at the lowest lighting levels. • chauvetlighting.com • Circle 349



● DAYLIGHTING AND SOLAR CONTROL

Basketweave E Screen, Lutron

• In conjunction with solar-screen manufacturer Mermet, Lutron has released Basketweave E Screen with Koolblack Technology. The dark solar-shade fabric features heat-reflecting properties that enable it to reduce solar heat gain coefficients by up to 23%. E Screen is constructed in a 2x2 basketweave pattern, provides glare control, allows view through, and is available in a wide array of colors. • lutron.com • Circle 350



● **OPTICS**

Saturation and Hue Mode, Lumenetix • Lumenetix's Saturation and Hue Mode for its Araya line of products allows designers to choose color temperature as well as a specific color in increments of as little as 1%. To use these two new functions, Lumenetix has also developed a tunable, correlated color temperature range (1600K to 4000K) that uses proprietary color model software and works with the company's Light Commissioning Tool. • lumenetix.com • Circle 351



● **DAYLIGHTING AND SOLAR CONTROL**

LightFlex, Acuity Brands/Sunoptics • Available in 21" tubular as well as 2'-by-4' and 4'-square configurations, the LightFlex toplighting system uses Acuity Brands' Sunoptics Signature Series prismatic skylight and is suited for suspended-ceiling applications. The system also uses Alanod's Micro-Silver reflective aluminum to achieve 98% light reflectivity. LightFlex features adjustable elbows, comes with various lens options, and is designed to integrate with several control solutions from Acuity Brands. • sunoptics.com • Circle 352



● **DAYLIGHTING AND SOLAR CONTROL**

Solatube Smart LED System, Solatube • Similar to Solatube's other daylighting systems, the Smart LED harvests sunlight during the day, but then uses a patented daylight sensor to switch to an LED lighting system at night. According to the manufacturer, this saves up to 94% on energy costs. The Smart LED System is suggested for use in hallways, bathrooms, closets, and entryways. • solatube.com • Circle 353



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EXIT/EMERGENCY



EVC Series, Dual-Lite • Flame-rated and adjustable, the EVC Series has a temperature range of 20 C to 30 C (68 F to 86 F) and is mounted in a die-cast aluminum lamp head. Using a lithium iron phosphate battery, these emergency exit signs and emergency lights offer extended life that lasts up to 50% longer than models using traditional lead-acid batteries. The EVC Series is available in self-test/self-diagnostics, damp location, and remote capacity options. • dual-lite.com • Circle 355

Emergency Lighting Control Panelboards, Schneider Electric

Available in both 240V Square D NQ and 480V Square D NF configurations, these panelboards integrate with a centralized emergency power source and automatically bypass all control devices until normal power is restored. Available in flush- or surface-mount, the panelboards are equipped with lockable covers as well as an onboard test switch for each relay. • schneider-electric.com/us • Circle 354



PathLinx, Cooper Lighting, Sure-Lites

This LED emergency lighting line includes both interior units and indoor/outdoor single- and double-head remote egress lighting options. Designed for commercial spaces, the Sure-Lites PathLinx line features expanded remote capability and a slim 2" depth, along with Cooper Lighting's EZ Click Ethernet connection, EZ Key power disconnect, and EZ Hang installation. The series consumes less than 2W with a lumen output comparable to a 5.4W incandescent. • cooperlighting.com • Circle 356

APPS

Con-Tech Lighting App, Con-Tech Lighting

Available on the iPad and iPhone, this free app allows users to browse and search Con-Tech's entire lighting catalog. It features more than 600 pages of specification-grade lighting product information, an LED-specific product catalog, and a Lighting Guru section that includes lighting-industry terms. The app requires iOS version 5.0 or later. • contechlighting.com • Circle 357



Lusio iPad App, Lusio Commercial & Industrial

Access the Lusio Solid-State Lighting catalog with this free app that includes the company's product line and most recent cut sheets. The app also calculates energy costs and savings achieved by using Lusio fixtures instead of T5 fluorescent and HID luminaires. It is compatible with an iPad and requires iOS version 4.0 or later. • lusiolighting.com • Circle 358



Solitude Mobile App, ThermaSol

Remote control of ThermaSol's ProSeries and AF Series steam shower systems developed after 2007 is possible with this iOS and Android app. Users can control light, music settings, and generator maintenance and temperature. The app, which needs to be synched with an add-on module, is available for use on iPhone, iPad, and Android devices. • thermasol.com • Circle 359



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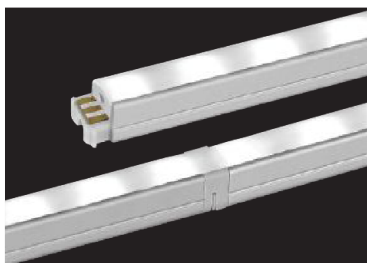
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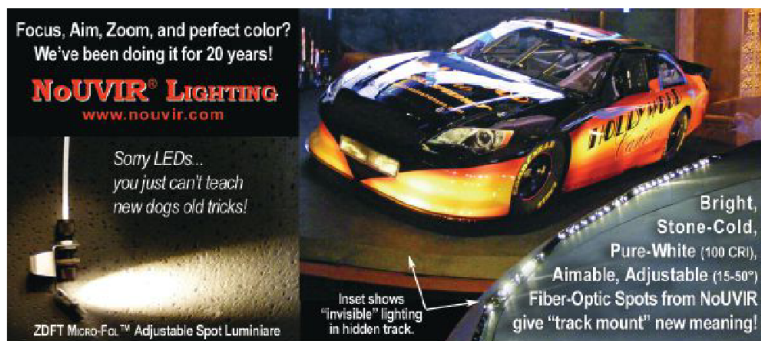
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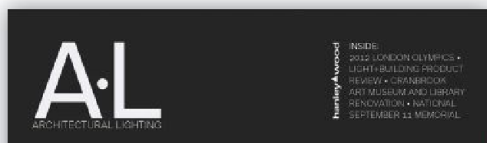
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Ron Naus

interview by Elizabeth Donoff
photo by Andy Scott

“The next great development in outdoor lighting is dimming and controls. To date, outdoor lighting hasn’t had to contend with these issues on a large scale, but now we are seeing requests to create effective communication happen over the power lines so that LED products out in the landscape space can interface with sophisticated lighting controls.”

With a career in lighting that has spanned more than 25 years and a trajectory from sales agent to manufacturer, Ron Naus, president of B-K Lighting and Teka Illumination, has witnessed the industry’s evolution from many different perspectives. What has stayed with him throughout his career is the complex and critical connection between lighting manufacturer and lighting designer. One of his first specification calls, to legendary lighting designer Lesley Wheel’s office, was transformative. “It wasn’t about just showing her a product,” Naus says. “She wanted a manufacturer who would respond to her design and luminaire needs for the project.” It’s this knowledge base—the ability to learn from industry veterans both in design and manufacturing—that Naus fears is the victim of the industry’s present transformation. It is also what makes Naus’s no-nonsense approach, as a lighting manufacturer and a member of the IALD Education Trust’s Board of Directors, all the more valuable in an industry where change is the new constant.

What fascinates you about light?

Light is transformative. Light is powerful. It changes your mood. We take it for granted because it’s embedded in our DNA, but it controls everything.

Has a text impacted your thinking about light?

There are several, but the one that comes to mind, given the focus of our business in outdoor lighting, is *Garden Lighting* (1958) by F.B. Nightingale, who founded Kim Lighting. There are techniques outlined in his book that lighting designers still use today.

What makes a great piece of lighting equipment?

It depends in part on the application, but it’s one that doesn’t draw attention to itself, unless that is its purpose. Ultimately, though, the number one job of a light fixture is to turn on and emit light.

What traditions or legacies do you want both B-K Lighting and Teka Illumination to be known for?

That we are staunchly independent lighting companies that provide quality, innovation, service, and value.

What do you consider innovation in lighting?

Innovation is risk. Innovation is putting a new tool in your hands that you didn’t think you needed before.

As a business owner, are there industries outside of lighting that you look to as models of innovation for manufacturing and research?

In terms of the specifics of outdoor lighting, I look to see what’s new in the sprinkler and irrigation industries. There are a lot of affinities there—small parts that have to be embedded in earth and work on demand. From a technology standpoint, and because we are so close to Silicon Valley, I also keep an eye on new developments in user interfaces. Of course, I’m still always looking at what’s going on in the lighting industry, from new products to evolution in the sales channel.

How has the business of lighting changed during your tenure in the industry?

The technology of communication has become more complicated. People are less likely to pass along knowledge that they have acquired. Time lines are compressed. There’s no development cycle anymore. Everything is last minute with no time to properly react.

What’s the most misunderstood aspect of lighting?

Lighting isn’t cookie cutter; it isn’t a set of rules. It’s called the *art* of manufacturing and the *art* of design for a reason—and that gives us a glimpse of what’s next.

Music to Your Eyes



Point Perfect™



Color Harmony™



Color Curve Dimming™



Warm Glow Dimming™



Color, Optics, and Performance in Perfect Harmony

With USAI Lighting, you don't need to sacrifice beautiful, consistent color or precise beam spreads for energy efficiency. Our advanced LED recessed downlights are indistinguishable from incandescent, halogen, or compact fluorescent light sources, while meeting strict energy codes. With unprecedented color control, precise 10-degree beam options, unique color choices that warm as they dim, and perfectly balanced color from fixture to fixture, USAI Lighting gives you the freedom to express your vision—without compromise.

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Circle no. 87 or <http://archlighting.com/productinfo>

Lutron systems help the Empire State Building achieve sustainability goals.

Lutron lighting controls and sensors **save up to 65% of lighting energy.***

- **Wireless** – simplifies installation and minimizes disruption
- **Flexible** – for easy retrofits or new construction
- **Expandable** – add to a system or reconfigure at any time

“Lutron products are state-of-the-art, cost effective, and architecturally beautiful. We worked with Lutron to develop wireless solutions for the Empire State Building — now you can buy our choice for energy-saving light control.”

Anthony Malkin

Empire State Building Company

Empire State Building sustainability goals

Building energy reduction	38%
Building carbon emission reduction (over the next 15 years)	105,000 metric tons
Annual building energy bill reduction	\$4.4 mil
Lutron contributions toward overall goals	
Projected lighting energy reduction	65%
Projected lighting controls installed payback	2.75 years**

For more information please visit www.lutron.com/esb or call 1.800.523.9466 for 24/7 support.

* Compared with manual (non-automated) controls, up to 65% lighting energy savings is possible on projects that utilize all of the lighting control strategies used by Lutron in the ESB project (occupancy sensing, high-end trim, and daylight harvesting). Actual energy savings may vary, depending on prior occupant usage, among other factors.

** Estimates based on Lutron controls installed in ESB pre-built tenant space. Payback claims assume 65% reduction in energy costs and energy rates of 22 cents per kWh. Actual payback terms may vary.

The Empire State Building design is a registered trademark and used with permission by ESBC. Empire State Building sustainability goals are provided by ESBC and contain energy-saving strategies in addition to lighting control.

Visit us at **LIGHTFAIR, booth #1345.**

