



## FEATURED ARTICLE

# 100 Year Anniversary for UL 48: The UL Standard for Safety for Electric Signs

By: Randy Wright, Owner, RKW Consulting and Electrical/Neon  
Consultant for the US Sign Council

In this article Randy reminisces about his involvement with UL 48 over the past 40 years.

The electric sign industry and UL have collaborated to provide a reasonable safety standard to fabricate electric signs.

During the mid-1980's, the powers that be at the National Electric Sign Association (NESA) decided the association should begin collaborating on the electric sign standard. In those days, the industry advisory group was relatively small. Members of the sign association represented a small portion of the UL sign subscriber members. The sign association did some research and found that there was an opportunity to better align the standard with current sign types, installation practices and NFPA 70 the National Electric Code (NEC). My credentials as a regional electric sign company doing neon and fluorescent illuminated signs, my field installation experience, and my activities in the fire service positioned me as a good candidate to bridge requirements between UL 48 and the NEC. The association then approached me to apply for a position on Panel 18 of the NEC. I was appointed to the code panel during the comment stage of the 1987 code cycle. During the meeting it was a time to make friends, instill some confidence with the panel about the sign industry, and answer questions about the high voltage neon installations and how these installations could be safe from fire and electric shock.

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## Spotlight: Letter From Roberto



*For several reasons, 2017 was slightly different from last year.*

*The market is changing quickly with the constant push towards connected products and systems, greater efficiency, and long-life LED products. In addition, we are seeing the development of new technologies such as Li-Fi, the penetration of LED technology in Agri & Horti business, and LaaS.*

*LaaS is an acronym that stands for “Lighting as a Service”, but it also means that the actual business model has changed. Rather than shelling out the capital investment for a lighting upgrade at the beginning of the project, the lighting service provider will come out to install and warranty your new long-life, high-efficiency lighting system on their dime. LaaS eliminates the need to make a CapEx decision for a lighting upgrade, so these offerings can begin with the installation of a lighting system, continue through maintenance and management, and even include the recycling or disposal of equipment at the end of its life.*

*The installation of a new system has to be done while allowing for the communication with products or other systems already installed in the field. For this business model, I think interoperability and interchangeability will be key elements to success.*

*We are all curious to see what 2018 will bring to the industry but, in the meantime, I wish you a great Christmas and a bright New Year.*



Roberto Inclinati  
Global Commercial Leader for  
the Lighting Industry



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# The Evolution of Sign Safety

By: Lee Hewitt / UL Principal Engineer for Signs 2002-2015

## UL48 IN THE BEGINNING

The foundation of electrical product safety and the genesis of the UL organization itself began at the end of the 19th century with the development of electricity as a source of energy for nearly all products and, in particular, lighting and lighting related products, including electric signs. Since the publication of the first edition of UL 48, “Standard for Electric Signs,” in 1917, the document has been an amazing example of a living UL safety standard that has continuously adjusted to new technology, building and usage changes, and installation demands while maintaining its relevance and importance to public safety.

As a UL safety engineer for over 40 years and Principal Engineer for Signs (UL 48) for over a decade, I witnessed firsthand the challenges UL and the sign industry faced and how that was embodied in the evolution of UL 48. Specifically, I noted the following challenges that had to be continuously addressed by UL 48 and accounted for by changes in the applicable US and municipal installation codes.

## I. TECHNOLOGY CHANGES

Signs covered by UL 48 began with incandescent lighting sources and progressed through the years with multiple adaptations of other forms of lighting such as fluorescent, neon and, most recently, LED. These changes were a particular challenge in keeping sign component requirements up to date to support the basic sign standard. Of particular interest was UL’s commitment to insuring an equivalent level of safety was maintained while helping facilitate design flexibility by sign shops. LED technology required rethinking of power source requirements as well as adjustments in determining other safety factors that were

different in thermal considerations for the new illumination technologies. This meant changes to UL and the companion sign component safety standards.

## II. INSTALLATION AND USE CHANGES

As business and product/services marketing evolves, there is a continuous stream of new sign applications that must be evaluated and accommodated by UL48. These include such applications as interactive signage, vehicle signage, video signage, in-floor signage, and many other unique applications. This meant constant review and adjustment of UL48 to insure new safety considerations were properly addressed. UL worked closely with the UL 48 Standards Technical Panel, the National Electrical Code (NFPA 70) Panel 18 covering Signs and Lighting, and sign industry groups including the International Sign Association, the World Sign Association, and the US Sign Council. The dedication of these groups was an essential factor in the continuing success of the requirements in UL 48

## III. TECHNOLOGY TRANSITION

This challenge relates to technology but is being called out separately because it relates to special issues associated with the transitions from one technology to another and some of the interim adaptations, such as retrofit kits, that help facilitate interim installations that transition from one technology to another. This issue of transition is particularly applicable to signs and lighting in general. While the transition issue is not necessarily a long-term situation, for business and economic reasons it was a factor in interim constructions involving signs transitioning to new technology. Again, the stakeholders in US safety worked together to address these issues in the standard and in appropriate sections of the US installation codes.

## SUMMARY

As principal engineer for signs at UL and the UL Representative on the NEC Code Panel 18 for multiple code cycles, I had the privilege of working closely with many dedicated members of the sign industry and other UL safety and standards engineers and experts. These also included sign manufacturers, sign component manufacturers, sign installers, sign users, and members of the electrical inspection community. Through UL’s work with those members and participants in UL’s Standards Technical Panel for UL 48, necessary adjustments and additions to UL 48 were made to keep it up to date and help it function effectively as a key industry and US safety standard for the last century. We fully expect these efforts will continue to maintain the integrity of UL 48 into the bright future of electric signs.



*(cover story continued)*

## 100 Year Anniversary for UL 48: The UL Standard for Safety for Electric Signs

The major concern at the time was with neon and the high voltage required to operate it. The original neon signs were built with steel and metal covered with porcelain and open connections made inside the sign all insulated by porcelain stand offs or free air connections. The sky scrapers and roof signs were built on angle frames with the neon on glass tube supports, transformers bolted to the steel structure with free air wire connections.

Fluorescent lamps and plastic faces were taking over a lot of the neon market. These systems were thought to be safer to build and install. Listing was always required for these types of signs. The ballast for fluorescent lighting provided secondary output that could reach 600volts ac exposing plant workers and service personnel.

Discussions about article 600 of the NEC started during the 1990 comment period and continued during the 1993 code cycle where it was determined the entire article needed to be rewritten. A task group of code panel members and UL representatives was assembled to accomplish this task. The first meeting was hosted at the UL facility in Santa Clara, California. During the meeting an outline of the proposed new article was completed. The first revised article was proposed and accepted in the 1996 Code.

This again created opportunities for the sign association and UL to collaborate on revising UL 48.

In 1994, a bi-national committee was established to harmonize UL 48 Electric Signs and CSA 22.2 portable and electric signs into one document. The committee was made up of sign industry members from the US and Canada, UL and CSA representatives and a few other interested industry members. The committee

met about 4 times a year for 2-1/2 years at which time it was determined this harmonization could not be accomplished for two major reasons: First, UL 48 referenced several component standards that did not parallel CSA C 22.2; Second, there were a few voltage deviations.

UL and industry were now faced with creating two standards. UL 879, "Standard for Electric Sign Components," was created to house the components used in electric signs. With the components removed, UL 48 needed to be revised to exclude the component specifications and create the new UL 48 15th addition. Once complete and voted on by the newly created Standard Technical Panel (STP), the standard would become ANSI/UL 48 Electric Sign.

During the same time frame, UL 879 became ANSI/UL 879. This standard created a need to track new products and created the Sign Accessory Manual (SAM). Component manufacturers could have their products updated in the SAM for use upon publication. The SAM is now online, known as UL iQ, and is updated as needed.

To further collaboration between the sign industry and UL, the Sign Industry Business Panel (SIBP) was created to help develop certification programs that bring value to the market. This added a business relationship along with our technical relationship. The SIBP includes representatives of the International Sign Association, US Sign Council and World Sign Associates, as well as key stakeholders from UL.

Currently, the SIBP and UL are collaborating on revising UL 879A, "Standard for Safety for LED Sign and Sign Retrofit Kits," which is being worked on to better align with current industry practices.

## Recent Lighting Regulatory and Efficiency Program Updates

By: Austin Gelder / UL Lighting Performance Technical Advisor

In the ever-changing world of lighting regulations, it is difficult to find the time to monitor when a change is happening, and it is even harder to decipher the regulatory language to determine how it will impact a given set of products. Fortunately, UL can help do that for you with this quarter's Lighting Regulatory and Efficiency Program Updates.

### Regulations: California

#### California Title 20

Title 20 regulations are the minimum requirement to sell into the state of California and are necessary for anything within the scope. The impending California Title 20 changes were released late last year, and have an effective date of January 1, 2018. The basics of the legislation focus on State Regulated LED lamps and Small Diameter Directional Lamps, and these requirements will cover the majority of consumer focused LED Lamp products in the marketplace. Details on the requirements can be found in [our webinar](#) from earlier this year. The notable change from earlier this year is focused on the lifetime certification.

#### State Regulated LED Lamps

This covers white light E12, E17, E26 and GU24 based LED Lamps between 150 lumens and 2600 lumens, generating white light. Notably, California includes LED Downlight Retrofits with one of these bases to be an LED lamp, and must be tested (including lifetime testing) to meet the requirements.

The proposed change, released in late September 2017, addresses one of the more challenging and time consuming test requirements of lifetime testing. Title 20 has required several thousand hours of lifetime testing, which can take 9 months or more, which creates a problem that does not allow a manufacturer to immediately introduce the most recent products into California. The proposal, which has widespread support, is found in the 45-day language, which will allow estimated lifetimes to be used. This was adopted on November 14, 2017.

The impact of this legislation is significant for retailers, distributors, and manufacturers wanting to sell LED lamps into the state of California. There has been some concern that there are relatively few LED lamps certified for California, and the adopted changes could prevent potential supply issues and allow products to be introduced into California more quickly.

#### Title 24

California Title 24 is a constant source of confusion with many in the lighting world as it is not required to sell in California, but it is required for new construction or significant remodel work. For residential applications, the products will have to meet the requirements of a high efficacy light source, which includes an array of metrics including the infamous 90 CRI requirements.

In late September, California released drafts of the 2019 Title 24 Joint Appendices, which includes the lighting specific Joint Appendix 8 (JA8) containing requirements for "high efficacy light sources" to be used in residential interior situations, and Joint Appendix 10 (JA10) for flicker measurements. There are significant changes to the draft, including some which would relax testing and requirements and others that would add testing and requirements.

#### Proposed Changes to Joint Appendix 8 (JA8):

Highlights of proposed changes that relax requirements, increase flexibility, or simplify testing:

- Sample sizes are clarified to be a single unit or a sample group, rather than defined as 10 lamps or 3 fixtures in the existing standard.

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## Recent Lighting Regulatory and Efficiency Program Updates

- Start Time Testing continues references to ENERGY STAR, but allows for products that have a preprogrammed fade-in (soft start) system, and products that are controlled with an electronic signal rather than simply applying power.
- Lifetime and Lumen Maintenance testing is harmonized with ENERGY STAR Luminaires V2.0 and Lamps V2.1 Specifications. The changes in testing are not significant, as the CEC had very similar testing. It does bring the benefit of being easier to understand and allowing testing to be used for multiple products.
- Dimming and Flicker testing now allows testing to either JA10 or to NEMA 77. The additional flexibility to add NEMA 77 will allow further harmonizing between Title 24 and ENERGY STAR testing (which also references NEMA 77 for Lamps V2.1), without invalidating data from those already tested to JA10. Either Percent Flicker (the current metric) or PST and SVM (metrics from the NEMA 77 test method) can be used.
- The dimming requirement has changed to allow for non-dimmable products, which increases the flexibility for products in situations that do not need dimming.
- Power factor requirements have been harmonized with ENERGY STAR and allow a lower power factor for very low wattage products (under 5 watts) to be .70 or higher, rather than the .90 or higher previously required.
- Color Rendering, one of the more contentious requirements, has been harmonized with Title 20 regulations for LED lamps, but remains 90 or higher with an R9 of 50 or higher for other products.
- Lumen maintenance requirements have also been changed to allow for an “early qualification” at 3,000 hours if the lumen maintenance is 93.1% or higher. This would allow products to come to market earlier, in a manner similar to what has been proposed in Title 20.
- Highlights of proposed changes that involve more strict requirements or testing:
  - The required efficacy has been updated to harmonize with state and federal efficacy standards, or 45 lumens per watt, whichever is higher. This has effectively no impact, as the products covered (lamps) would need to meet the higher State and Federal requirements anyways.
  - Lamp Survival testing has been clarified to 90% if 10 or more units are used; if less than 10 units are used, all need to survive. This allows some flexibility for lower testing quantities, but increases risk of a failure.

Overall, the proposed changes applicable to lighting products could be considered more favorable to flexibility and the industry than not, which is good news for those trying to find products to sell and/or use in residential construction and remodel jobs.

### Regulations: Quebec

To the surprise of many who sell into Canada, the province of Quebec quietly introduced legislation in May 2017 that takes effect on January 1, 2018 and impacts general service lamps. The legislation requirements specify a minimum of 45 lumens per watt, CRI of 80 or higher, and a lifetime of 1000 hours or greater. These requirements, while easily achievable with LED and CFL technologies, will effectively eliminate incandescent and halogen lamps from the province of Quebec.

The scope of the program is lamps that have a screw base and can operate between 110V and 130V, including most A, G, and PS lamps. There are a large number of exemptions, which are nearly identical to the exemptions included in U.S. DOE Regulations. Notably exempt are reflector lamps, decorative lamps under 40W, rough/vibration service, shatter resistant, and three-way lamps. Also exempt are most non-medium based lamps.

For full details, find the full rule [online](#).

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## Recent Lighting Regulatory and Efficiency Program Updates

### Efficiency Programs: DesignLights Consortium

In October, the DesignLights Consortium (DLC) released a draft of Technical Requirements v4.3, which introduces some changes by expanding the specification to include additional products:

- **Field-adjustable products:** This primarily impacts products with field adjustable drivers that can be tuned to provide only the light needed, ensuring that the products can be dimmed but not raise the light level (and power level) above the needed level. This allows fewer SKUs to cover a wider range of lighting needs, and also allows for better customization for field needs.
- **Color Tunable Products:** Historically, DLC has not allowed color tunable products, and this proposal would allow color tuning in a limited range, specifically addressing white-tunable and dim-to-warm products (which mimic the CCT change that would be found in an incandescent or halogen source).
- **Adding 3 foot and 8 foot LED Tubular Lamps, and 2G11 base CFL:** This includes testing guidance for 8 foot lamps for distribution (using 4 foot versions, as most 8 foot lamps will not fit in a goniophotometers), but excludes replacements for T8HO lamps.
- **Comments were taken through December 1, 2017, and it remains to be seen which of these proposals will be adopted, but each is an expansion that could be beneficial to the industry.**

### Efficiency Programs: ENERGY STAR

The most significant change to the ENERGY STAR program in the latter half of the year has been the release of the updated guidance for using LM-80 data to support certification of products. The document expands on the 2011 document and adds some clarifications, definitions, and expands to allow for very low CCT (down to 2200K). The document also references IES LM-80-15 and the Addendum A to LM-80-08, both of which require consistent reporting intervals for Lumen Maintenance data, which helps the consistency of data and projections.

There are some additional reporting requirements (beyond what LM-80 requires), which includes total input power, average current and power density per die, color rendering, and minimum die spacing (for arrays). Any LM-80 reports to be used for ENERGY STAR purposes must meet the supplemental documentation requirements by May 27, 2019.

While the additional guidance primarily applies to LED manufacturers, it is important for all product manufacturers to ensure they are using LEDs that have appropriate LM-80 data for ENERGY STAR.

### Horticultural Lighting

While not currently integrated into any efficiency programs, horticultural lighting has seen the release of a document from the American Society of Agricultural and Biological Engineers (ASABE) which will support the further development of standards and programs. S640: Quantities and Units of Electromagnetic Radiation for Plants (Photosynthetic Organisms) was released in August, and is a foundation document for comparing horticultural lighting output, spectrum, and performance. Additional documents focused on test methods and performance characteristics are in the works.

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## Lighting and Architectural Lighting Design in a Process of Change

By: Joachim Ritter / PLDA Chairman

More than 125 years have passed since the first electric light bulb was invented, and it is only now that the world has begun to understand the importance of light for human beings. Up to just a short while ago, artificial light was part of a purely technical discipline. Over the last few decades, experts in the field have tried time and again to explain to the world at large that light is more than simply a matter of consuming energy and providing brightness, but these pioneers were not really taken seriously, or far too often ignored. Those days are finally over.

This year a Nobel Prize was once again awarded to a team of researchers – in Physiology or Medicine, I hasten to add – which underscores in scientific terms the significance of the biological clock for humans and other living creatures. The 2017 Nobel Prize in Physiology or Medicine went to Jeffrey Hall, Michael Rosbash and Michael Young, who “were able to peek inside our biological clock and elucidate its inner workings ... Their discoveries explain how plants, animals and humans adapt their biological rhythm so that it is synchronized with the Earth’s revolutions”, the Nobel jury explained. We all know that our biological clock is controlled, influenced and defined by light. We also all know that the quality of light plays a key role to the same extent. The natural rhythm of sunlight over the course of the day and the changing quality of the natural light are of central importance. This is what we refer to when we talk about the quality of light. Every artificial lighting scenario needs to align with this to be relevant for human users.

It is therefore a kind of mini-revolution to note that this year a light source was introduced onto the market which has a spectral composition and light quality that is even better than what has always been quoted as being the second best light source: the incandescent lamp, which is banned and despised when it comes to the energy balance.

Daylight is still the best light available. With this new development, the company set a new standard that the market cannot simply ignore. More than 125 years after Edison’s invention, the LED has now finally rendered the incandescent lamp obsolete and dispensable while leaving other conventional light sources in the shade. Even fluorescent lamps are rarely talked about nowadays.

The development of new artificial light sources is currently fast-paced. In the foreseeable future, there will not be anything on the market that is comparable to what we know from the past. This includes the digitalisation of light, the second significant change we are witnessing. Currently, we are still talking about media architecture as a part of the lighting field. Pretty soon, we could well see the term media architecture actually replacing the term lighting design, because that is what it is becoming. Every individual light source is now addressable and can be classified and used as part of the way communication is handled. Light is information. Natural light indicates the time of day or year and affects the temperature and user activity in a space. This is what lighting design will be about in the future.

On the occasion of the Professional Lighting Design Convention, PLDC 2017 in Paris, professionals and experts from the lighting field had the opportunity to learn about and discuss the latest findings and developments, and what consequences these will have for the market. It goes without saying that this sudden huge wave of knowledge on the effect of light on human health and well-being, and the wide range of new technological tools and opportunities available to define user requirements and to fulfil these using light, pose a real challenge for designers. This can only be addressed and mastered via structured Continuing Professional Development (CPD).

For this reason, a body of experts – designers, researchers, educators and key persons from the lighting industry – is currently being formed. Their task will be to provide guidance and input with regard to these new gaps in knowledge, and to endorse the value of the CPD programme within the lighting

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# Standards Corner

Standards information link [HERE](#).

Sign up for “What’s New” at [HERE](#) by selecting “Join Email List” on the What’s New site to receive email notifications twice a month listing the various UL, UL Environment, and ULC Standards documents published during that timeframe.

## Standards Update

### UL 48 – Electric Signs

- A proposal was issued for ballot March 3, 2017, closing April 3, 2017. [Link to summary of topics](#). The proposals relate to: 1) New Requirements for Shipment of Sign Sections; 2) Standard Reference for LED Components and LED Retrofit Kits; and 3) Revision title of Section 4.4.10.2. Topic 3 proposal was issued for recirculation on September 22, 2017 with ballots and comments due on October 23, 2017. However, the recirculated topic 3 proposal failed to achieve consensus; no further action will be taken on topic 3. Revisions were published on November 10, 2017 to incorporate requirements from proposal topics 1 and 2.

### UL 379 – Power Units for Fountain, Swimming Pool, and Spa Luminaires

- Revision pages to reaffirm the ANSI status were published September 19, 2017.

### UL 496 – Lampholders (Bi-National Standard)

- A new edition was published on September 5, 2017.

### UL 924 – Emergency Lighting and Power Equipment

- A revision to UL 924 was published on November 8, 2017. The revision updates emergency luminaries with flexible cord supply connections, restricts replacement of individual batteries and cells, exempts certain equipment from the Normal Operation Test extended ambient test conditions, and revision to use the Battery Discharge Test using current measurement rather than light output.

### UL 935-1 – Discharge Lamp Control Devices, Part 1 – General Requirements

- The draft 1st edition of UL 935-1 has not been issued yet. Expected to be balloted within the next month.

### UL 1598 – Luminaires (Tri-National Standard)

- The next revision cycle has started, which will be a 2-year cycle. Proposals received by the SDOs were issued for preliminary review on August 28, 2015. Comments are due on October 12, 2015. [Link to summary of topics](#). Proposals were issued for ballot on April 28, 2017. Ballots and comments are due on June 12, 2017. [Link to summary of topics](#). Comments received during ballot are now being reviewed by the Technical Harmonization Subcommittee. A recirculation proposal will be issued in the near future.

### UL 8750 – Light Emitting Diode (LED) Equipment for Use in Lighting Products

- A proposal relating to the expansion of UL 8750 scope to include LED controllers supplied from branch circuit achieved general support as a result of the Ballot that closed on May 23, 2017. The proposal opened in a Recirculation Work Area on October 27, 2017. Voting and comments are due on November 27, 2017. [Link to summary of topics](#).
- A proposal relating to adding requirements for conduit-connected enclosures achieved consensus as a result of the Ballot that closed on September 18, 2017. Modifications to the proposal to address comments received will appear in a Recirculation Work Area in December 2017. [Link to summary of topics](#).

### UL8752/ ULC-S8752 Organic Light Emitting Diode (OLED) Panels

- To be reaffirmed in the near future; no dates at this time.

### UL8753 / ULC-S8753, Field-Replaceable LED Light Engines

- To be reaffirmed in the near future; no dates at this time.



## Emergency Lighting – No Role for Portable Luminaires

By: Michael Shulman / UL Principal Engineer

Luminaires are addressed in several sections of the National Electrical Code (NFPA 70, the NEC), most specifically in Articles 410 and 411. Emergency luminaires are subject to additional regulations, not only in Article 700 of the NEC but also in Section 7.9 of the Life Safety Code, NFPA 101. These Codes require emergency luminaires to be maintained and periodically tested to validate that they are ready for service. The Standard for Emergency Lighting Equipment (UL 924) in turn requires the luminaire to have features that allow for this testing to occur. The basic premise is to ensure that, upon loss of the normal utility power, the emergency lighting will provide sufficient illumination to facilitate the orderly and efficient evacuation of the building's occupants. The regulations specifically ask the emergency lighting system to provide a minimum average level of illumination (1 foot candle, measured on the floor) between wherever people may be in the building and where they need to go (typically, outside the building to a public right of way). It covers hallways, stairwells, open office spaces, restrooms, and most everything in between; NFPA 101 defines this "Means of Egress" as "A continuous and unobstructed way of travel from any point in a building or structure to a public way."

To verify compliance with these regulations, emergency luminaires must be fixed in place. That doesn't mean that portable luminaires (with batteries) or even handheld devices like flashlights and cell phones cannot (or should not) be used to assist with a building evacuation, but the building will get no credit for them because there is no assurance that they will be available when needed. Only those luminaires that are part of the building infrastructure,

and that therefore can reasonably be expected to be operational (in part due to the code-required maintenance and testing protocols), can be used to establish building compliance with NEC Article 700 and NFPA 101 Chapter 7.9.

In combination with LED efficiency improvements, power capacity advances (primarily with lithium chemistries) have spurred the introduction of battery backup power within many types of luminaires. Referring to these battery-backup products as "emergency luminaires," however, may not be appropriate unless they comply with the applicable safety standard (UL 924) and are installed in accordance with the applicable codes. One such requirement in UL 924 is that the equipment is fixed in place.

An interesting recent development is tubular LED lamps (TLEDs) that can incorporate both driver electronics and a back-up battery. "Type A" TLEDs have standard ANSI pins to fit into legacy fluorescent bi-pin lampholders, and they are suitable for connection directly to a fluorescent ballast without any rewiring of the luminaire. A type A TLED with battery back-up would seem to provide a quick and easy way to upgrade an existing fluorescent luminaire to LED and "emergency luminaire" status. But ANSI-base lamps are considered consumables and are not part of the facility infrastructure. This type of lamp could subsequently be replaced, during normal facility maintenance and outside of any Fire Marshal regulatory oversight, by a standard fluorescent tube. There are several regulations within NEC Article 700 that speak to the concept of limiting access and control of emergency lighting to qualified and authorized

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## Lighting and Architectural Lighting Design in a Process of Change

design community for designers at different stages in their career. The PLD Alliance, a movement that represents all involved in all aspects of the lighting community, is currently attracting increased interest.

As of 2018, designers will be able to embark on their individual CPD efforts in a structured fashion and in accordance with the latest knowledge available. The project is being undertaken in the form of a cooperation between the international lighting design community, VIA-Verlag and UL. These three entities have taken the responsibility upon themselves to pursue this pioneering role and pave the way for the necessary great step forward into the future of lighting design.

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## Emergency Lighting – No Role for Portable Luminaires

personnel. While this new lamp type is not specifically addressed (yet), the ease at which required emergency lighting could be inadvertently undermined should not be lost on professionals working in this field.

UL 924 requires emergency luminaires to have “...means for permanent mounting” (clause 11.1) with an exception for equipment that weighs 100 pounds or more. A recently approved revision to the standard will allow a broader range of luminaires to be electrically supplied by cord-and-plug, to accommodate high bay (and similar) luminaires that are permitted to use such supply connection means and that can serve a constructive role in providing emergency illumination in certain facilities. Unit equipment (sometimes referred to as a “bug eye” luminaire that illuminates a space only when normal power is lost) is also permitted a cord-and-plug supply arrangement, but the supply receptacle is typically located high up on the wall where inaccessible to facility occupants. In both cases, the equipment is mechanically secured (fixed-in-place) to its approved location.

Like most regulations dealing with changing technology, this is an area that is subject to review during both the normal Code revision cycle (every three years) and whenever new and innovative products are submitted for certification. An understanding of the intent behind the regulations is vital when assessing whether a product can be certified within the existing requirements, or whether the requirements can (and should) be modified in ways that support their purpose while expanding the range of compliant product choices. This is where process transparency and the involvement of a broad stakeholder community in standard and code development are of great value. The UL 924 Standards Technical Panel is exactly such a community, with many members also actively participating in the work of the NEC and NFPA 101.

Emergency lighting is everyone’s business, and it is important that we are thoughtful and thorough when advancements in technology offer possibilities not previously available.

## Product Packaging Testing Helps Ensure Safe Delivery

By: Michael Shulman / UL Principal Engineer

To help ensure packages arrive safely, UL uses standardized tests to help assess a package's strength and durability before shipping.

The world is awash with boxes. Big boxes, small boxes, stacks and stacks of boxes waiting to be sorted, recorded and loaded onto cargo ships and freight carriers around the world. UPS alone delivered 4.9 billion packages in 2016 while FedEx says they receive over 125 million package status requests each day.

The advent of e-commerce has led to an increase in demand for transport services, be it planes, trains, trucks or ships, for a combined market total of \$237 billion in estimated revenues.

With so many packages shuffling around, how do the assorted conglomerate of stakeholders help ensure the safe delivery of the millions upon millions of boxes each day?

### Product Packaging

Smashed-up boxes and dented merchandise can result in costly returns to the retailer, plus the potential for additional losses due to product replacement and/or diminished consumer perception of brands. Fortunately, the hazards associated with product transportation are known and allow for the development of standardized tests to assess package strength and durability.

### Packaging Testing

UL tests packages in accordance with International Safe Transit Association (ISTA) procedures to help ensure the

packaged product is safe for transit. ISTA develops test protocols to simulate a variety of scenarios such as the rolling of trucks, the heavy stacking of boxes and the humidity inside a cargo container or warehouse.

According to Carissa Samonte-Cam, an engineering project handler with UL, tests are primarily performed on the finished package to see if the packing material is sufficient enough to withstand test protocols and to evaluate if damage occurs to the actual product during testing. The products tested could consist of anything from books or glassware to household items or medical devices.

"We have the capability to test to several series—Amazon, Sam's Club and FedEx, to name a few," says Samonte-Cam, who helped select the packaging test equipment for UL's packaging testing facility in Allentown, Pennsylvania.

The equipment includes an electrodynamic shaker, also known as a vibration table, which moves along three different planes, X, Y and Z.

"One test example is when a package is subjected to an abrupt 1 inch displacement, peak to peak, which could last up to 1 hours duration of time," says David Edwards, program manager for AHL Performance Testing. "It's a violent shaking motion similar to what you'll see out in transit conditions."

Many of the tests call for preconditioning of the product, which means the product is held for a specified timeframe under controlled temperature and humidity settings. The lab uses a chamber to simulate the high humidity and temperatures found in many of the shipments from manufacturing locations around the globe.

"Products typically sit in a container for about eight weeks so there could be a lot of damage to the cartons or the skid based on the type of packaging materials used," Samonte-Cam explains.

Other tests include a compression assessment that uses one clamp on top and one on the bottom of a carton to assess the force needed to crush the container.

"Freight carriers often stack packages in a truck to maximize their load, so there is a good chance that a package will be compressed between other boxes," says Edwards. "We need to determine how much compression load a box can withstand before it collapses," he adds.

In a world filled with boxes, effective packaging is an extremely important component to a product's success in the marketplace.

"Many manufacturers rely on packaging engineering as a critical part of their development process. UL's packaging test labs help to support this package development process by performing the actual testing to help the manufacturer assess packaging strength," Edwards concludes.

Learn more at [PerformanceSolutions@ul.com](mailto:PerformanceSolutions@ul.com) or by calling 610-774-1300

# Tradeshows & Events

## Strategies in Light & LED Show

February 13-15, 2018  
Booth #300

## Japan Lighting Fair

March 6-9, 2018  
Booth #LF1012

## LEDucation

March 13-14, 2018

## International Sign Expo

March 22-24, 2018  
Booth #3502



## Evaluating Sensors in Connected Lighting Products

*This UL white paper discusses the use of sensors in connected lighting products and presents a case for the standardization of sensor performance. Beginning with a review of sensor technology and an overview of their growing importance, the paper then examines a sampling of current sensor standards and identifies key considerations for future technical standards for sensors used in connected lighting products. The white paper concludes with information about UL's contributions to the current and future development of Standards and protocols for lighting sensors and other connected technologies.*

[Click here to download the white paper >](#)

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