officeinsight

Lumens Versus Lighting Codes: A Lighting Industry Shakeup

by Mallory Jindra

The lighting industry is seeing change on a tremendous scale. Energy conservation goals have manifested in new lighting code standards across the country – from California's *Building Energy Efficiency Standards* for residential spaces to New York's *Energy Conservation Construction Code* and its impact on commercial buildings.

While the sustainability end goals of these initiatives is positive and super important, lighting manufacturers are stumbling through these often-complex standards, understandably so, to try to make high quality products that comply.

We spoke to **Ann Schiffers**, senior VP of **USAI Lighting**, about the challenges lighting designers and manufacturers face in creating new products that provide interior designers with the finest quality lighting that also complies with new stringent lighting code requirements.

USAI® Lighting

ANSI/ASHRAE/IES Standard 90.1 is known as the benchmark for commercial building energy codes in the U.S.

"This standard provides the minimum requirements for energy-efficient design of most buildings, except low-rise residential buildings," according to the standard's ashrae.org website.

"It offers, in detail, the minimum energy-efficient requirements for design and construction of new buildings and their systems, new portions of buildings and their systems, and new systems and equipment in existing buildings, as well as criteria for determining compliance with these requirements. It is an indispensable reference

officeinsight

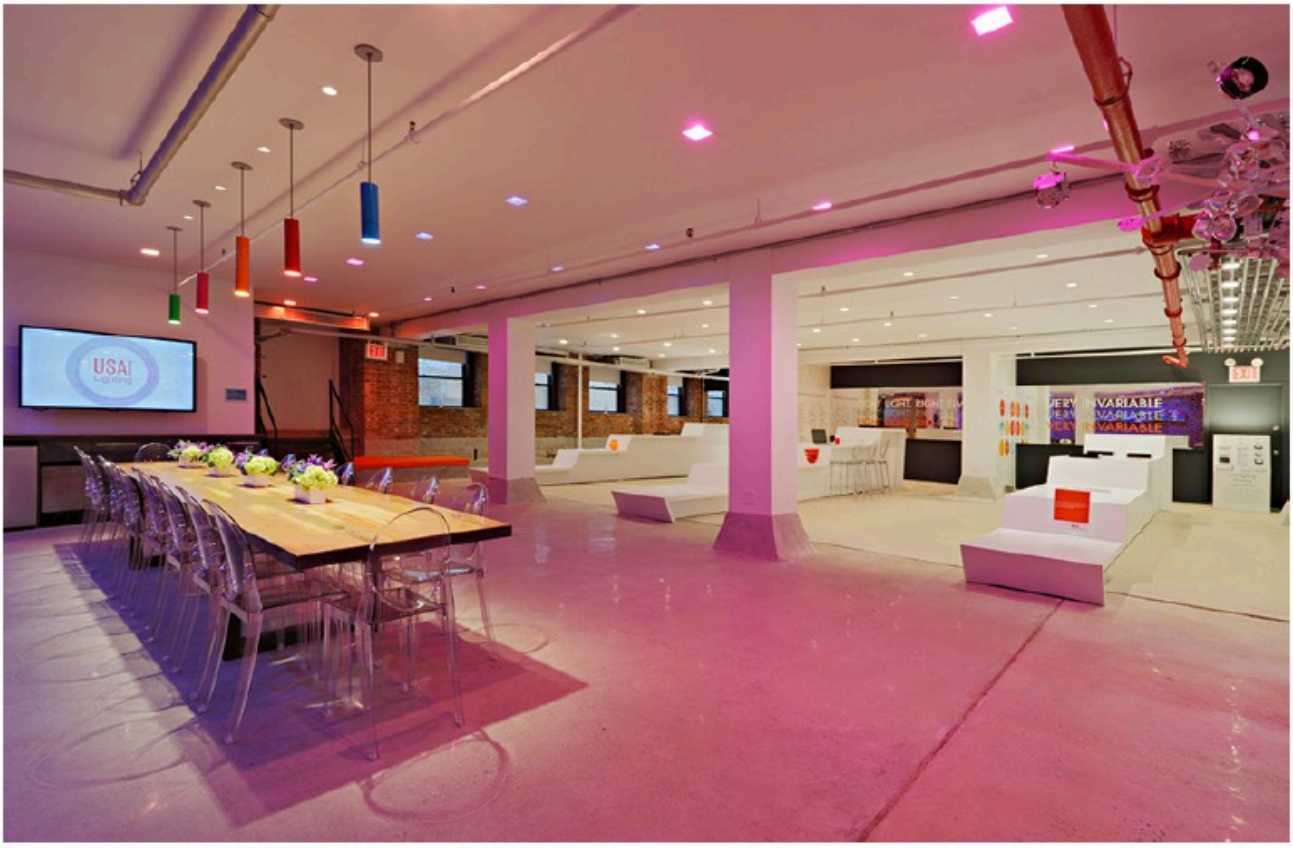
for engineers and other professionals involved in design of buildings and building systems."

Ms. Schiffers discussed the five biggest changes to lighting control requirements, detailed below. In a nutshell, these changes are dedicated to saving energy by turning off or reducing lights and plug-load equipment more quickly when unnecessary or not in use. The new standards also added a tabular format to its own literature to help clarify the specific lighting control requirements by space type, which will make it easier for architects and designers to understand the requirements.

>Respond sooner to unoccupied spaces. Previous versions of Standard 90.1 allowed lighting in a space to remain on for up to 30 minutes after the last occupant left. The new code trims the amount of time that a lighting system can illuminate an empty space by one-third, requiring that lights be automatically reduced or shut off within 20 minutes after occupants have left. Select vacancy sensors with a 20-minute time delay to satisfy this energy-saving addendum. (Occupancy sensors are sensors that turn lights on when a space is occupied; vacancy sensors cue lights to turn off when you walk away.)

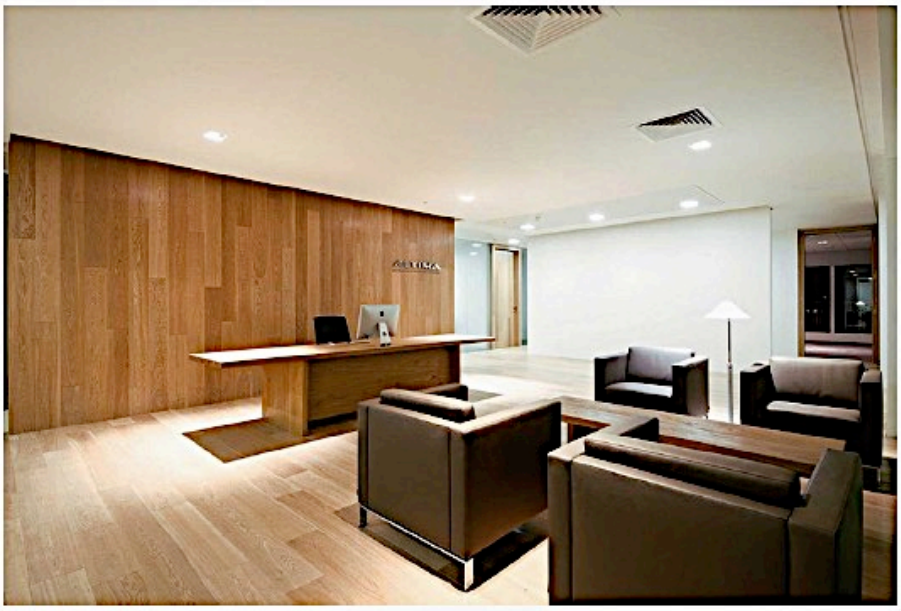
>Automatically reduce plug loads in more spaces. The growing energy consumption by equipment (computers, printers, etc.) at the receptacle is garnering more attention in the energy code. While Standard 90.1-2010 required automatic receptacle control in private offices, open offices and conference rooms, ensuring that devices did not draw power in these spaces when unoccupied, Standard 90.1-2013 has expanded the role of automatic receptacle control and now requires rooms that are primarily used for printing and/or copying, breakrooms, classrooms (other than computer classrooms) and individual workstations to be outfitted for receptacle control as well.

There are two additional changes to the receptacle control requirements that are important to note. Occupancy-based turn-off is required within 20 minutes of a space becoming unoccupied, instead of the 30 minutes allowed by Standard 90.1-2010. In addition, controlled receptacles must be visually marked to allow users to differentiate between controlled receptacles and those that are not.



USAI Lighting showroom – "The Collaboratory." Photo: USAI Lighting

officeinsight



Workplace lighting

>Automatic daylighting control is now required in secondary areas. Automatic daylight-responsive controls are now required deeper into the floorplate. Daylighting controls must be in secondary sidelighted areas where the combined controlled power in the primary and secondary daylighted areas is above 300 watts (W). Although the combined wattage of primary and secondary sidelighted areas is considered in determining where control is necessary, the code requires that the primary and secondary areas be controlled separately.

>Automatic partial-off in more spaces. There are many areas in a building that are often unoccupied, yet these might not be good candidates for an automatic off lighting control strategy due to safety concerns or the general needs and use

officeinsight

of the space. Standard 90.1-2010 recognized this type of space and reduced its energy use by requiring that lights be automatically turned partially off within 30 minutes of the space becoming unoccupied. The partially off functionality was further defined as light levels being reduced by at least 50%.

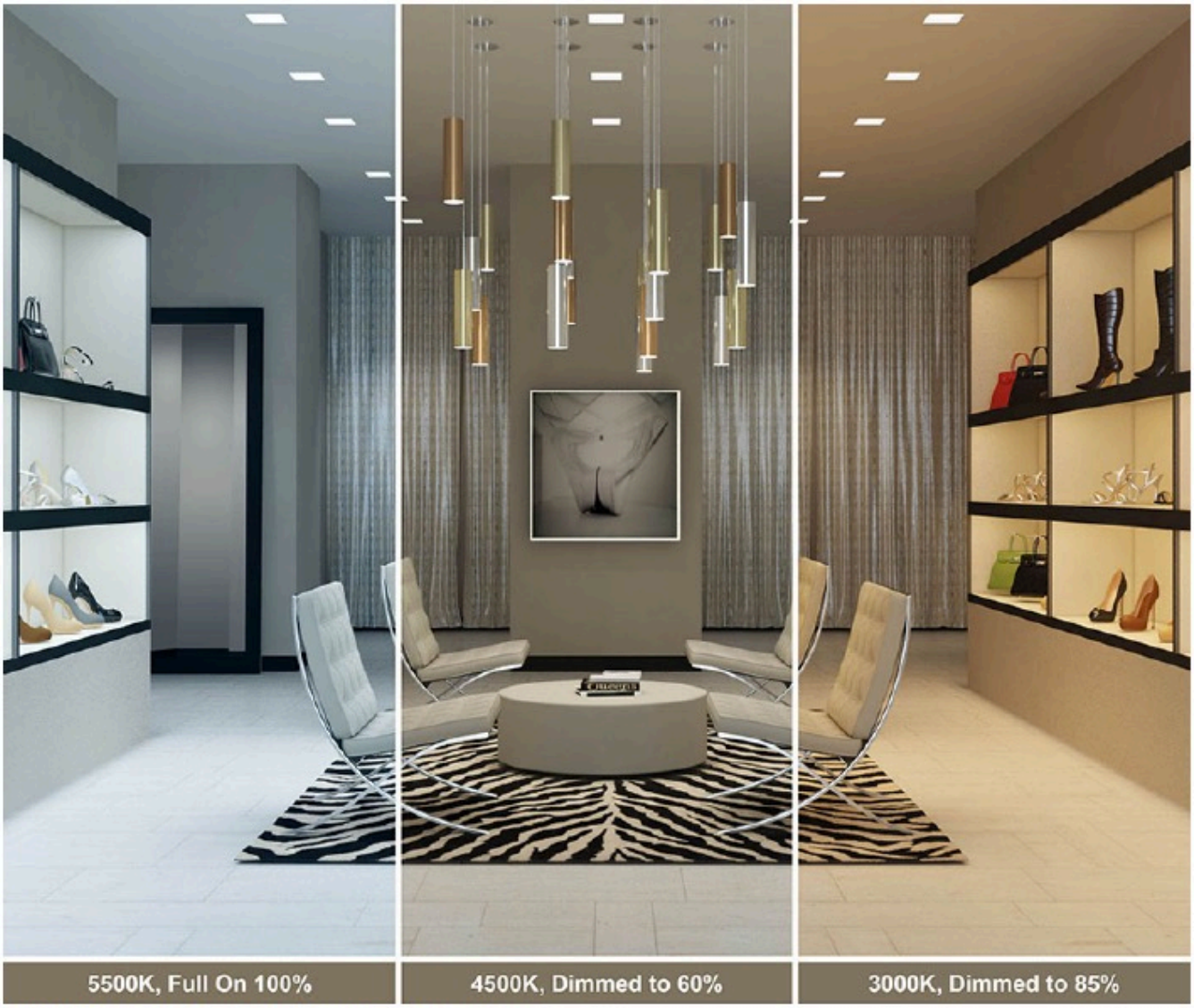
Standard 90.1-2013 requires that more spaces be equipped to turn partially off and mandates this functionality in stairwells, corridors, classroom laboratories, some lobbies, small storage areas, library stacks and warehouses. The requisite time delay has also been reduced to 20 minutes, instead of 30.

>New tabular format. Standard 90.1-2013 now includes a table that summarizes the minimum lighting control requirements by space type. The goal was to make the lighting control requirements in Standard 90.1-2013 clearer and easier to understand in the hopes that it would improve compliance and be easier to enforce.

In lighting design, color rendering index, or CRI, is super important; CRI is a measure of the ability of a light source to reveal the colors of various objects realistically or "naturally" in comparison with an ideal or natural light source.

The advent of LEDs provided people with a highly energy efficient light option, but the original LEDs were an awful, ugly royal cobalt blue color. And manufacturers have worked hard to develop LEDs with better CRI and many color quality options.

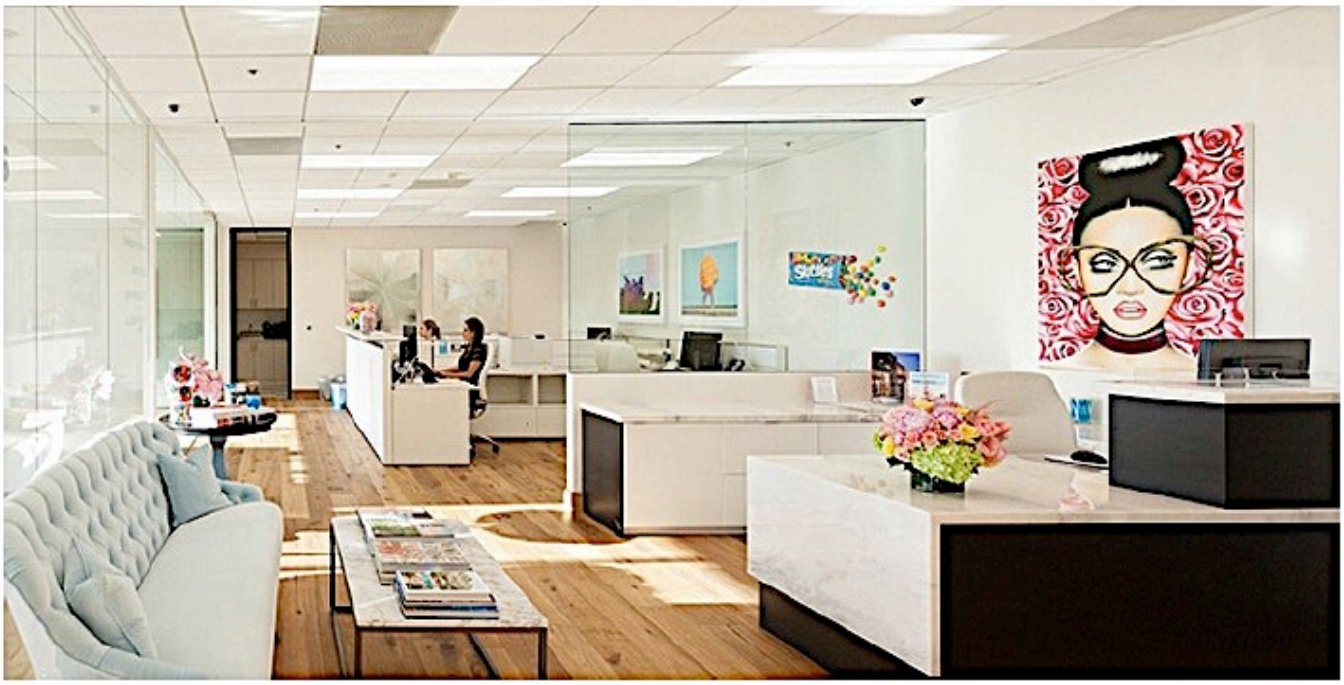
"In recessed lighting, architects always want the most lumens and highest quality light out of the smallest aperture possible."



USAI Lighting – Color Select retail light settings. Photo: USAI Lighting

officeinsight

Workplace lighting



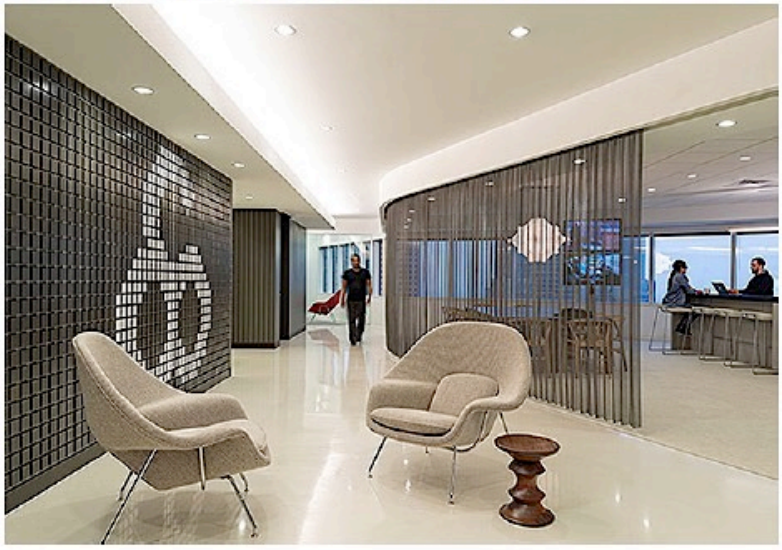
Hughes Marino Los Angeles offices

officeinsight

A typical LED is made with a chip that produces the light when electronically connected. To alter the light's color quality and produce a moredesirable white light color, lighting companies started applying a phosphor coating to their chips.

Ms. Schiffers notes that lighting manufacturers define much of their success, or failure, based on the chip manufacturer they choose to work with and the phosphor recipe they use. And just like anything else, they get what they pay for.

"We have a very high quality chip and a very high quality phosphor recipe that we make ourselves. Other manufacturers can beat our price, but the quality suffers."



Workplace lighting

Oktavilla offices by Elding Oscarson Architects

Lighting codes are making assumptions about people's (clients and specifiers) opinions and preferences in lighting. While trying to figure out how to comply with the codes and still offer customers lighting options they actually want, some manufacturers have gone out of business or now struggle with long lead times.

But, lighting codes are providing the lighting industry with valuable standards that were missing before.

"The real information is scarce, especially in what companies print on their product boxes," said Ms. Schiffers. "Not everybody is printing the same information. There are no standards in place, and manufacturers can mislead customers."

For example, many manufacturers list the "forced lumens" of a light on their box. Also referred to as raw lumens or total lumens, the term "forced lumens" describes the "total light output from the source." But the more accurate measure of light output in many lighting products is "delivered lumens," which describes how much useful light a light fixture can deliver to a given area, taking into account "lumen loss" – which includes things like lighting reflection within the fixture and lighting that is blocked or redirected by the fixture housing.

Ms. Schiffers says the U.S. Department of Energy is working to level the playing field, and the next iteration of standards will likely come out sometime in 2017. These standards will be more refined to accomplish energy efficiency alongside high quality color standards.

Even though the codes have gone and are going through trial-and-error changes, Ms. Schiffers says she sees it as a good thing.

"The codes are changing and becoming more balanced. They're learning more about color quality and how to work with it, which is a good thing." ■