

USAI's BONNIE LITTMAN ON TUNABLE-WHITE LIGHTING

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I recently had the pleasure of interviewing Bonnie Littman, President, USAI Lighting, on the topic of tunable-white lighting. I'm happy to share her responses with you here. The interview informed an article I wrote for the May 2016 issue of tED.

DiLouie: Looking at LED sources and controls, what are the different technological methods used to produce tunable white light in commercial luminaires?

Littman: There are a variety of different methods to produce tunable white light. Simply stated, manufactures typically leverage a specific combination of all white LEDs and/or colored light LEDs to create the desired results. LED boards are basically an array of many miniature lights, and manufacturers can combine those different sources in various ratios to create differently colored white light sources. This could never be done before with previous lighting technologies – at least not well. One example from the past is using linear fluorescent tubes with colored gel sleeves on them – it was clumsy and took up a lot of space, but it did work. With LEDs today we can do this much better, and with much more impressive results.

DiLouie: What are the different effects that can be created, such as color stability/consistency, dim-to-warm, CCT selection?

Littman: Yes, yes and yes. Warm glow dimming technologies can provide warmth and glow once possible only in dimmed incandescent sources, with all of the energy-saving benefits of LED. Tunable white light, on the other hand, can recreate the look and feel of other popular traditional light sources, such as metal halide, without any of the maintenance headaches – and can also make possible the creation of custom light sources that you design. These lighting options are unprecedented before LED technology. While the coloring effects are numerous, at USAI, we're particularly proud of our promise to ensure consistent color from fixture to fixture, which is a significant challenge when providing tunable white light with LEDs.

DiLouie: What benefits do these effects offer to various applications?

Littman: Fundamentally, tunable white light makes lighting customizable and personalized. It gives users the flexibility to experiment with lighting within their environment in ways we were not able to do a decade ago, particularly with just one, singular light source. Personalized lighting technologies allow users to easily edit their own lighting experiences according to preference.

Additionally, more advanced technologies in tunable white light, like Color Select, offers users the opportunity to choose a color temperature from very cool to very warm and independently adjust the light's intensity. This type of technology has numerous benefits, including better support of our natural circadian rhythms (which improves health and wellness), simulating natural daylight, and offering a variety of interior design and functionality options.

DiLouie: What markets and applications do different tunable white lighting effects serve? What's the low-hanging fruit?

Littman: It's critical for many hotels, restaurants and entertaining establishments to find energy efficient halogen replacements to comply with the ever-increasing restrictions on energy codes. Warm Glow Dimming LED products can help provide that solution. In addition, tunable white light sources can improve the effectiveness of a flex space such as a hotel ballroom-establishments can quickly convert from a conference room to a colorful wedding reception at the touch of a button.

In healthcare, there has been a lot of research showing the positive effect tunable white light has on improving patient healing and recovery times. Like natural light, tunable white light sources can vary throughout a 24 hour cycle – with high color temperature, high output lighting provided in the day, and lower color temperature, lower output lighting used in the evening. This is far beyond what we could do with traditional lighting. Tunable white lighting can also be optimized to minimize circadian disruption for shift workers, patients, and visitors. And this is something commercial spaces and corporate owners will want to take advantage of as well, for a direct impact on employee satisfaction and their bottom line.

DiLouie: What new applications are being created by the availability of this technology?

Littman: People who don't typically have access to natural light can access the benefits of daylight by synchronizing circadian rhythms with LED lighting and control technology. This can lead to improved productivity, better moods and overall happier workplaces.

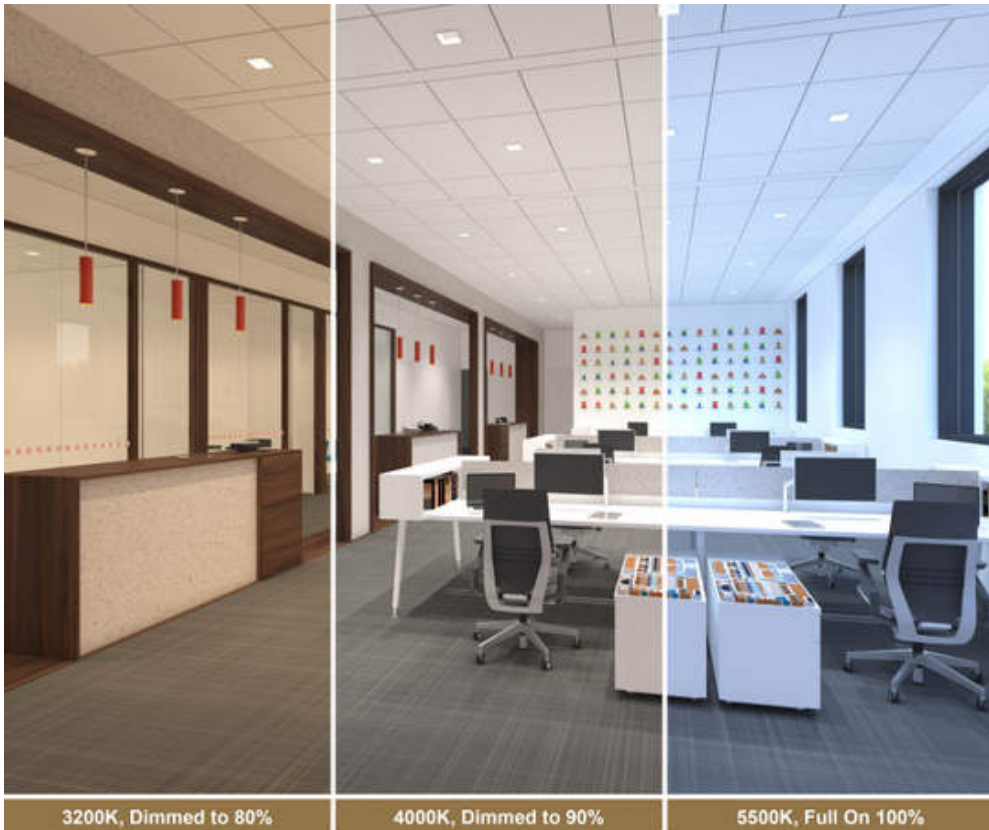
For retailers, art galleries and museums, the visual appearance of a product or a work of art can be greatly enhanced by this type of lighting. Traditionally, we were dependent on the product in order to determine what light bulb would create the best display; now, you can install tunable white light technologies like Color Select + that can customize the lighting effect for any product, and then can change with the season, color, or painting – all in one fixture.

DiLouie: How would you characterize demand for tunable white lighting?

Littman: We're very excited by the response to our broad range of our color technologies and the interesting ways people are applying them. For example, we've had requests from major art galleries for products to help better enhance the quality of their art displays. These galleries leverage different color temperatures for different pieces of art made at different time periods in order to replicate the environment the pieces were created. We've also had projects in healthcare, residential, and hospitality sectors where the customer is looking for LED lighting technologies to optimize the way people look and feel in a space.



Tunable-white lighting offers the ability to dramatically change how a space appears. Shown here are three different dim levels and color outputs for three applications: a healthcare environment (a), a kitchen (b) and an office space (c). Images courtesy of USAI Lighting.



DiLouie: Are there any pitfalls or areas where further development and improvement is needed?

Littman: Controls and compatibility testing is critical to the success of tunable white light products. USAI, along with architectural control manufacturers, have made a commitment to testing our lighting fixtures' compatibility with architectural lighting controls. This allows us to provide high-quality, industry-approved products. We want to make the experience as smooth and seamless as possible for our customers. When our customers install a solution from us, they know it is going to work.

DiLouie: Color temperature has been linked to circadian lighting. What is the link, what research supports it, and how should distributors be selling it?

Littman: We know that the right lighting at the right time is critical to people's health and wellness. Maximum exposure to high amounts of blue light in the morning helps us feel productive and awake, and entrain our natural intrinsic circadian rhythms to the natural light/dark cycle. This is important for overall health and wellness. By contrast, lower light levels and warmer color temperatures in the evening helps signal to our body that is time to prepare for sleep. Circadian-appropriate lighting is able to help us sync our circadian rhythms with these light-dark cycles and prevent associated problems like depression, hormone imbalance, exhaustion and more.

There is a tremendous amount of research to support this and the body of peer-reviewed published studies is growing all of the time. When selling tunable white lights, it's important for distributors to partner with a fixture manufacturer that is well informed and understands the scientific importance of circadian rhythms. We, at USAI, believe that the link between lighting and health and wellness is the next frontier of lighting design and technology.

DiLouie: What lighting controls enable tunable white lighting? Are these typically packaged with the luminaires or paired by control manufacturers?

Littman: This is a new technology so there isn't really a "typical" answer – what we are seeing occur as a trend, however, is that some manufacturers provide tunable white lighting products that can only be operated with a proprietary controller. We at USAI don't buy into this approach, because that's simply not the way the world works. An open source control mechanism is the best solution.

Ultimately, one of the most important considerations when determining how to pair controls is ensuring they can complement and work in sync with the entire building's main controls system. Demonstrating how the control system, the luminaire and the user

interface integrate and coordinate seamlessly with one another will serve as the biggest advantage to a distributor and user.

DiLouie: What should distributors be doing right now to sell tunable white lighting products most effectively?

Littman: Everyone wants the latest technology without understanding the true value and benefit that a different type of lighting can provide them. Users are now turning to distributors for help with that. A distributor who is well informed with the latest products, uses and information will easily differentiate itself from competitors. It is critical for distributors to develop a network of reputable partners, manufacturers and resources that can help keep current with the human benefits of tunable white light – what users are most interested in understanding today.

DiLouie: If you could tell the entire electrical industry just one thing about LED tunable white lighting, what would it be?

Littman: LED is going to continue to absolutely, positively change the way we use, see, and engage with light. It is the way of the future and the sooner we are able to master and harness all of the possibilities, the sooner we'll be able to provide our customers with the very best in LED lighting solutions. At USAI, we are constantly immersing ourselves in the latest research and information to innovate our products and provide additional information and value to each of our stakeholders. Tunable white light, in particular, can provide a solution for many of our modern-day challenges, and staying informed with this cutting-edge technology can help prevent costly mistakes, both in the field and in design.

DiLouie: Is there anything else you'd like to add about this topic?

Littman: There has been increasing research done on the effects of tunable white light on health, productivity and more – and our knowledge base keeps expanding and improving. Visit USAI Lighting's website at usailighting.com/research to learn more.