

# STORE-BRIGHT™

## MOOD ENHANCEMENT TECHNOLOGY

### Overview –

Effects of light upon brain chemistry and mood are well documented. High intensity light has been used to address several conditions including general depression, seasonal affective disorder (SAD), hyperactivity, hypoactivity, obsessive compulsive disorders, eating disorders, lethargy, circadian rhythm disruption and more. Additionally, the influence of particular colors and spectral intensities have been linked to behavioral modification that can impact impulsive tendencies, hunger, cravings, euphoria, anxiety, and even “flight or fight” reactions.

Ultra-Tech™ Lighting Store-Bright™ fixtures use light-induced mood enhancement technologies to increase shoppers’ propensity toward positive purchase decisions. Referencing science developed from numerous studies, spectral tuning can add as much as 20% to “positive mood,” translating into a 5% or greater top line increase. With a color rendition index exceeding .95, merchandise and labeling display in “true color” as intended and designed.

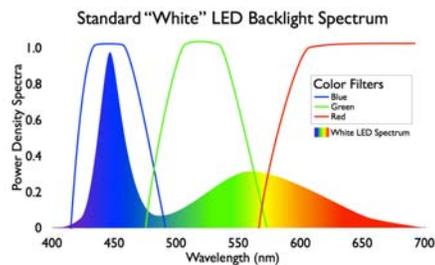
Additional advantages include up to 85% greater energy efficiency over metal halide lamps, 30% to 60% electricity reduction over conventional T8 and T5 fluorescent fixtures, and significant in-rush current reductions over LED, fluorescent, and metal halide. Store-Bright™ lights are flicker-free with a 100,000 hour lifecycle that can save up to 600% on maintenance. There is no dispersed mercury, allowing bulbs to be disposed of as ordinary glass and metal.

Store-Bright™ technology provides an holistic lighting solution that enhances top line performance while reducing energy overheads and your carbon footprint. Originally invented by world-renowned Nikola Tesla in the 1890s as “the Forever Bulb,” the modern Store-Bright™ implementation presents the most exciting lighting breakthrough in more than a century.

## The Science of Store-Bright™ Technology –

Technically, light intensity and spectral properties influence the production of, and reaction to neural transmitters like dopamine and serotonin. In addition, mechanisms that stimulate the pineal gland (third eye) that regulates melatonin are linked to a narrow range of blue light associated with controlling circadian rhythms and sleep. Highly specific studies actually associate different light wavelengths and intensities to psychological patterns that can alter behavior.

With the advent of light emitting diodes (LED), health professionals are voicing concern about the adverse effects of spectrally imbalanced high intensity light. In particular, most LEDs have a substantial blue bias falling within the ultraviolet (UV) and near UV range from 460 nanometers (nm) to 480nm. This is precisely the light that causes the pineal gland to shut down the “sleep hormone,” melatonin. Although most of the attention has centered around sleep disruption, expeditious use of blue light can increase alertness and raise other hormone levels and neural stimulators.



Ultra-Tech™ Lighting has developed **LUMENTEC®** proprietary gradient spectral tuning that combines various light wavelength intensities to more favorably present consumer products. There are five major lighting objectives:

- 1) Provide an exceptionally high color rendition index > .95 in a balanced full spectrum to enhance the appearance of merchandise;
- 2) Create just the right intensity within desired wavelengths to engender a positive buying mood;
- 3) Customize applications for a range of retail applications from food and groceries to clothing and gear, to artwork and even machinery/vehicle displays;
- 4) Produce a safe and healthful light without the flicker, glare, or UV of LEDs or the rapid lumen deterioration of fluorescents and metal halide;
- 5) Substantially reduce electrical overheads and lighting heat loads on HVAC.

All these objectives are met using a cutting edge implementation of magnetic induction lighting (MIL) that includes highly specialized ballasts and unique nano-reflector diffusion technology. Typically, a 1,000-watt metal halide high-bay fixture can be replaced by a 300-watt Store-Bright™ fixture for an 85% reduction in operating electricity including ballast overhead. A 260-watt LED equivalent is not as energy efficient as the 300-watt Store-Bright™ because of higher ballast overheads and LED in-rush current can be as much as 12X.

From a safety standpoint, the May 13, 2013 edition of *Live Science*, Assistant Editor Marc Lallanilla reported on the research of Dr. Celia Sánchez-Ramos of Complutense University



(Madrid, Spain) regarding potential dangers of directly viewing unshielded LED lighting. Simply put, the intense concentrated light of LEDs can permanently damage the retina, causing blind spots and color de-sensitivity. As the installed base of LEDs rapidly expands, more and more emphasis is being placed upon health risks associated with directly viewing LEDs. In fact, the problem has become sufficiently serious for CREE, one of the largest LED lighting manufacturers, to issue its own warning white paper.

Facility managers are increasingly faced with the tradeoff between installing energy efficient LED fixtures and potential liability associated with eye-damage claims. There is concern that children may fixate on LED lighting, resulting in permanent retinal damage. The most serious problem stems from high intensity ultraviolet and near-ultraviolet light as well as the small footprint of individual LED components. The uneducated public may have a propensity to admire an LED fixture. In the process, eye damage can occur.

### **Advantages of Mood Enhancement Technology –**

Particular forms of mood enhancement directly translate into predictable behavior. The science is well documented and readily available through the internet. Some examples include raising the “consumption emotion” to establish a more favorable buying environment. This is accomplished with a combination of display and lighting.

Unfortunately, many lighting designers incorrectly assume that “warm” lighting engenders



a more relaxed mood and willing consumer. Thus, stores may be illuminated with a low temperature (warm) orange/yellow spectrum while displays are “popped” with high intensity spot lighting. This actually *dulls* the consumption emotion causing lethargy and a reluctance to commit to a purchase. The picture reveals more emphasis upon the internal special design than the merchandise. Such lighting does not encourage buying.

When the right moods are evoked the desire to achieve satisfaction through a purchase is enhanced. Emotional surveys are dramatic with implications for up to a 20% increase in buying propensity. In turn, actual top line sales can increase by 5% or more. The significance of such an increase cannot be overstated. In most instances, payback on Store-Bright™ lighting can be as little as one to four months without any consideration for energy and maintenance savings.

Positive mood is also highly beneficial for staff. Studies indicate higher worker productivity with less down time and fewer sick days. There is a definitive link between positive mood and enhanced immune response. Again, this research is readily available through the internet. A \$10/hour worker earns \$20,800 per year exclusive of any benefits and government contributions. A 5% productivity increase yields \$1,040 per year per worker. A staff of ten represents \$10,400 per year in productivity gains. Ancillary benefits trickle down through the entire business structure... all by simply enhancing mood using lighting.

## Package and Merchandise Appearance –

Product packaging is a multi-billion dollar endeavor. In the end, a product can only display as presented by its lighting. In virtually every instance, colors and designs are examined, photographed, and displayed under a full spectrum of cool white lighting with a high color rendition index (CRI) above .80. In fact, a Google search on “package design” reveals hundreds of photographs *all taken under white high CRI lighting*. Yet, when these expensively designed packages reach stores, lighting is most frequently well below a CRI of .80 and can be as low as .60. The intended presentation is lost because of poor lighting conditions. Product vendors lose the intent of their package designs.



Clothing displays are frequently vulnerable to inappropriate lighting. The spatial design process often takes precedence over the appearance of the clothes. Rack mounted items displayed on the floor are overpowered by wall hanging spot lighting. The result is an incongruous visual appearance that fails to show the true colors and textures. Rack displays should be illuminated with the same color and intensity to uniformly display merchandise.



Grocery stores present unique challenges because of mechanical display requirements that include open produce sections, recessed shelving, meat departments, and freezer displays.



To achieve optimal results, lights should be evenly diffused and sufficiently intense to reduce eye strain, increase visual acuity, and encourage purchases. Although LED grocery lighting has become a popular replacement for traditional fluorescent and metal halide



fixtures, they are generic and incorporate a 4,100K color temperature with a low CRI. In addition, LEDs are notorious for glare as seen by the reflection off the floor surface. In “before” (left) and “after” (right) pictures of a retrofit from white metal halide to softer LED we see a distinct color change from white to yellow. Although the LEDs likely reduced energy consumption, product displays were significantly dulled.

## Summary –

Decades of scientific research have been devoted to studying the effects of light upon human behavior, yet lighting has mostly remained generic, with one type of fixture serving multiple purposes. Store-Bright™ technology represents a breakthrough in “*application specific*” lighting, using proprietary **LUMENTEC®** spectral tuning and nano-particle diffusion to achieve optimal results from energy savings to top line growth.

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