

# SNOW-BRIGHT™

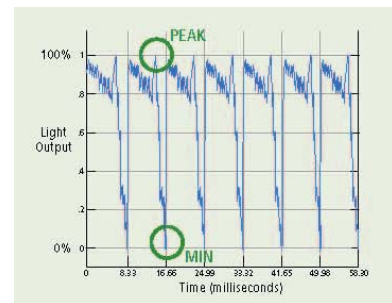
## MAGNETIC INDUCTION LIGHTING VERSUS LED

Snow-Bright™ lighting is the **only technology** specifically designed to illuminate snow while reducing energy consumption by 75% to 85% over conventional metal halide and sodium fixtures. However, many ski area managers are considering using generic LED lighting for slopes, tubing parks, and other snow recreation venues. There is **no LED technology specifically designed to match the reflective properties of snow**. An LED that is measured to emit 30,000 lumens at a color temperature of 5,000K will be less effective than a Snow-Bright™ lamp at 10,000 lumens. Moreover, the higher intensity of LED and the blue spectral bias will actually flatten the snow's appearance while creating a high glare level. LEDs are inherently **more expensive** and do not offer the same level of performance. Snow-Bright™ lighting has a 100,000 hour lifecycle rating which is more than double the best LEDs.

### FACTS YOU SHOULD KNOW –

#### 1) Flicker

High speed skiing under LED lighting **can be dangerous due to flicker** (strobe) between 60 and 120 cycles per second. High frequency flicker is associated with significant health hazards including strobe epilepsy, migraine headaches, nausea, impaired visual acuity, poor concentration, sleep disorders, mood swings, eye strain, and a lack of eye/hand coordination. The problem is serious enough for the IEEE Standards Working Group, IEEE PAR1789, to take up “Recommending practices for modulating current in High Brightness LEDs for mitigating health risks to viewers.”

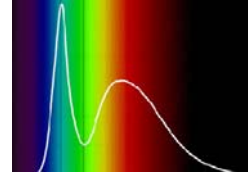


A skier traveling at 30mph covers 44 feet per second. A 60 cycle strobe will generally **remove .7333 feet per second** from a static object at a viewer's conscience acuity of 60 frames per second. At 45mph, the conversion is 66 feet per second causing a **loss of 1 foot**. Unfortunately, most ski area managers and lighting engineers do not take this into consideration. LED salespeople never mention flicker. **The results can literally be disastrous**. Even on an easy practice race course or beginners slope, LEDs can cause **visual inaccuracies and accidents**.

**Snow-Bright™ lights have absolutely no flicker**. There is no strobe effect. None of the dangers associated with LEDs exist with Snow-Bright™ technology.

## 2) Glare/Intensity

The LED spectrum and intensity causes excessive glare off the snow surface. The lights may register well on a light meter and look great from the base area, but *they create significant visual inaccuracies* that can lead to discomfort and eye fatigue as well as misjudgment on distance, contours, and terrain. *LEDs cannot be pointed uphill, making lighting plans difficult..*



*LEDs have high localized intensity* that has fooled many lighting specialists into believing they can use fewer LEDs to achieve the same results as metal halide and sodium. *This is wrong and can lead to very big mistakes in lighting design and implementation.*

Only Snow-Bright™ lighting refracts through the snow to reduce intensity and glare while increasing visually acuity. A 300-watt Snow-Bright™ fixture will easily replace a 1,000-watt metal halide and 1,200-watt sodium. When using LEDs for the same substitution, a 30% increase in intensity (foot candles on the ground) is required.

## 3) Cold Temperature Performance

Snow-Bright™ bulbs and ballasts are designed to operate at the same levels down to negative 30°F and generate enough heat to shed snow and ice. LEDs do not generate heat at the light source and can become snow-bound. This problem has plagued LED traffic lights that become obscured by snow accumulation. Unless cold temperature LED arrays are specified, modules can lose lumen output below zero degrees. In fact, refrigerated warehouse applications require specialized arrays. Many ski area managers are uncomfortably surprised when their slope lighting *fails to works properly in snow and ice.*

## 4) Eye Damage

In 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 desensitivity. Ski area managers who use LED lighting are open to *legal liability for eye damage claims* since ski lighting is likely to be directly viewable.



### Don't Make a Mistake!

Snow Bright™ was developed to address snow area lighting. It is the most cost effective and safest lighting you can buy for your applications. Find out more.



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