

DARK SKY COMPLIANCE

SHOULD YOU BE WORRIED?

Light pollution has become a major issue for communities across North America. Regulations and guidelines have been established, or are being considered to limit the amount of light that can be used for outdoor areas. These regulations and guidelines are called “Dark Sky” rules and regulations... pertaining to the level of “darkness” that is preserved or protected by ordinances. What started out with good intentions has become a nightmare for many businesses and public areas that rely upon nighttime lighting. This is because there is very little, if any accommodation permitting existing installations to continue without Dark Sky compliance (grandfathering).

For school, park, recreational facility managers, and outdoor venues including parking lots and commercial properties, glare and reflective light pollution has become a major issue. Sports fields, recreational areas, and parks want to maintain sufficient lighting to provide visual acuity, adequate enjoyment and safety, but traditional metal halide (MH) and high pressure sodium (HPS) lighting cannot provide enough usable light at lower powers (wattages) to comply with most Dark Sky provisions. Depending upon specific Dark Sky ordinances that may be adopted or in place, sports and park venues could be forced to eliminate existing night lighting.

LEDs provide a way to reduce wattage and save energy when retrofitting from MH or HPS, but the LED spectrum has a very high blue bias and significant glare. The usual LED spectrum bounces off surfaces into the sky, causing problems with compliance under many of the ordinances in place or being proposed. Equally important, LEDs cannot be effectively pointed uphill or at shallow angles to a sports field. This is because direct viewing of unshielded LED elements can be extremely harmful and dangerous to the eye. LED light travels like a flashlight.



Field-Bright™ lighting has been specifically designed to comply with Dark Sky guidelines while providing an enhanced visual experience for athletes. Using a specially tuned spectrum, Field-Bright™ maximizes Visually Effective Lumens (VELs) while lowering overall lux and power consumption. The Field-Bright™ spectrum actually diffuses across surfaces to provide exceptional clarity and visual acuity without glare and reflective “bounce” associated with MH, HPS, and even new LEDs.

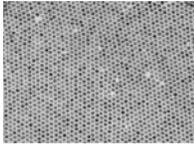
The effect is quite astounding. Although Field-Bright™ appears less bright than conventional lighting from a *distance* from the outdoor venue, the clarity within the “visual field” is actually **2.77 times the VEL lux** of MH and HPS. That means that a 300W Field-Bright™ fixture will represent the equivalent of 831W for a white MH lamp *without diffusion considerations*. Since HPS is monochromatic (orange), the equivalence is more than 1,000W. Equally important, a Field-Bright™ bulb has a large footprint compared with MH, HPS, and LED. This lowers the source intensity at the surface which reduces glare and increases



Bulb footprint disperses light

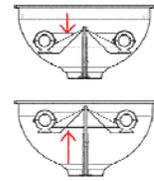
viewing safety. Thus, Field-Bright™ lighting can be pointed at any angle and direction toward the ground.

Equally important, Field-Bright™ uses proprietary nano-reflector technology that diffuses light from the source. Unlike conventional flood lighting that shines a defined beam, Field-Bright™ fixtures uniformly spread light from the source to eliminate “hot spots” and avoid excessive pupil adjustments when traveling from more intensely lit areas to darker sections. This is extremely important for sports fields.



Nano-reflector has millions of tiny particles with a reflective index > 97%.

Excessive brightness can cause night blinding when the contrast off the field surface is overly intense relative to the unlit background. In other words, “Less bright equals more sight!” In particular, standard MH, HPS, and LED lighting patterns fail to comply with ordinances that restrict the amount of reflective light generated from the source. Field-Bright™ fixtures incorporate Vari-Beam® technology that adjusts the lighting field by moving the entire bulb assembly up or down within the reflector shell. This eliminates the need for sky shields and allows a less dramatic angle to the ground for more uniform lighting.



Passing Inspection

The Snow-Bright™ version of this lighting is installed at Snowy Range in Wyoming, just 20 miles from the Wyoming University Observatory. The observatory was concerned that the lighting would adversely impact sky viewing. After the install, there was no measurable difference against general background light levels. Light levels were a concern at the Snow King installation in Jackson Hole, WY. Snow-Bright™ was acceptable in meeting National Forest Service Dark Sky compliance. Stars are viewable on the slopes of Steamboat Springs Ski Resort in Colorado where racers have clocked over 80mph.

Since Dark Sky compliance is generally a local issue, every municipality may have different rules, regulations, or guidelines. Even when in compliance, neighbors can file private actions if lighting is overly obtrusive. The low glare and high contrast of Field-Bright™ technology has passed every Dark Sky challenge for installations throughout the United States. This is an important consideration because outdoor lighting is being challenged by zoning and planning boards at increasing rates. There have even been stop-work orders for new LED projects that were deemed too bright for Dark Sky compliance.

There are enough challenges for outdoor area managers without dealing with the potential shut-down of nighttime operations due to new Dark Sky rules and regulations. Only Field-Bright™ lighting has been designed with this in mind while also saving 75% or more in electricity consumption and up to 600% in maintenance. Field-Bright™ fixtures have a 100,000 hour lifecycle rating... that's eleven years running 24 hours x 365 days. For outdoor areas, it's almost forever! Find out more.

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