

# PROFESSIONAL SPORTS VENUES

Ephesus Solution  
Features and Benefits

## I. SPORTS VENUES - CURRENT STATE

### Typical Problem Scenario

There are five main issues generally associated with the current legacy lighting systems.

- The venue experiences event disruption when a power loss occurs, taking 30 minutes to restrike the lights
- Maintenance costs continue to escalate due to the continuous need of replacing bulbs and ballasts.
- No operational flexibility for the lights. They were either all on or all off.
- The current system is highly inefficient from an energy perspective.
- Significant light degradation occurs resulting in inconsistent levels of light throughout the facility and poor light uniformity on the playing surface created a sub-par fan and player experience.

## II. EPHEBUS LED SOLUTION

The Ephesus LED sports solution addresses three key aspects:

- **Best in Class Operational Performance** - Consistent foot-candles delivered in the most uniform manner designed to operate consistently over long period of time.
- **Simple Install** - Entire system including controls, mounting and fixture installed is a simple plug and play eliminating the need for wiring and costly expense.
- **Control Flexibility** - Integrated control solution (wired / wireless) with maximum flexibility to convert the "house" lights into performance lights, control a full range of light temperature and create high amounts of color light to flood the arena.

Our fixtures and wireless control system were designed to ensure a simple installation. Our experience has been that the complete Ephesus lighting and control solution, including aiming, can be installed in 80 – 100 total hours.

The LED solution can be designed to generate any level of required foot-candles with experience of over 300 FC from 50 – 500 feet heights and maintaining an average to minimum uniformity of a very low 1.1 to 1 on the field of play, which will eliminate shadowing and is significantly better than the IES sports requirement of 1.7 to 1.



Our approach to providing a total LED solution is to include a full range of services to support our customers before, during and after installation.

Our total solution includes the following services:

- Engineering support before and during installation,
- Photometric analysis with lighting locations and foot-candle measurements (including field support for final aiming of the fixtures)
- Coordination and support with the contractor for installation
- Setting up scenes for wireless control
- Integration with house control system
- Annual visit to site to check system performance and adjust as necessary
- Warranty covering 135,000 hours of use
- Post site visit for photometric analysis

Additionally we have designed the system to maximize the functionality of solid-state technology and our system can be upgraded in the future.

Because of the operational flexibility of the new LED system there will no longer be a need for maintenance lighting. The Ephesus system can be set up to provide lighting to efficiently support non-performance requirements.

To provide flexibility for controlling color temperature in addition to high outputs of color lighting we developed the Prism fixture. The Prism provides the flexibility to create between 8 - 15 FC of blended color light on the playing field to create additional excitement among the fans as well as change the color temperature within a wide range. Additionally the Prism solution is controllable through the Ephesus wireless control system.

To improve controllability we developed the Ephesus wireless control system to operate the lights. The control system provides flexibility for dimming, adjusting color temperature, scene management and a wide range of light performance patterns that will be a value added to the fan experience. The control system can also be fully integrated into any current house system.

### III. PROJECTED RESULTS OF EPHEBUS SOLUTION

The Ephesus LED sports system was designed to provide the following results/benefits:

- Reduce energy consumption up to 90% (due to a combination of highly efficient LED lights and ability to control the amount and levels of light on demand) while eliminating all maintenance costs saving and eliminating the need for disposing of hazardous (mercury) materials.
- For indoor venues, generate significant savings in energy from reduced BTU requirements for cooling of the ice due to significant reduction in ambient heat from the LED fixtures. Additionally the quality of ice improved as a result of less heat output from the new lights.
- Generate consistent FC's (in any range required) with a light uniformity min max ratio of 1.1 to 1, which will eliminate shadows and dark spots on the playing surface and improve player performance and fan visibility.
- Provide ability for instant on/off capabilities eliminating start up time and the need for emergency lighting.
- Provide ability to broadcast in HDTV with high quality results.
- Provide ability to control individual and groups of lights for various activities using a wireless control system and established preset scenes.
- Fully integrated solution including mounting options provides ease of installation whereby reducing costs.
- Provide ability to adjust color temperature between the ranges of 5,700K – 3,000K.
- Provide ability to generate 8 -12 FC of color light throughout the venue.
- Improved quality, consistency and amount of light in seat areas.
- Qualifies for energy incentives from utility company.
- Provide a warranty for 135,000 hours of use.
- Typical results are a payback period of less than 4 years (after energy rebate)

#### IV. BENEFITS OF EPHEBUS LED SOLUTION

Ephesus applied the best design principles maximizing the benefits of solid-state technology to develop the LED sports lighting solutions. The company focuses on a complete system solution with an experienced team of electrical, mechanical, software, and optical engineers. Unlike legacy lighting companies who are retrofitting LEDs into conventional mechanical fixtures, there are many significant benefits to Ephesus LED lighting products.

Some of the key features and associated benefits are summarized below:

Feature	Benefit
Proprietary controller integrated into the fixture	Drives fixture performance extending useful life; software provides flexibility in operational performance
Universal Mounting Options	Reduces installation time
Pulse Width Modulation	Maintains light consistent throughout dimming and allows for slow motion high definition broadcasting
Integrated Power Supply	Reduced installation time
Solite Glass / Lens Guard	Reduces glare
Proprietary Fixture Design	Extends useful life of fixture through improved thermal management
Reduced Fixture Weight	Easy installation and brightest per square inch LED output on the market
Proprietary Lensing	Highest uniformity standard in the market (1.1 to 1.0) creating better consistency of light eliminating shadows on playing surface
Wireless Control System	Ability to control all fixtures (up to 300) over a proprietary FCC band using a complete broadcast approach. Provides wide range of flexibility to control and use lights for enhanced performance improving fan experience and reduced operating costs. Eliminates additional costs for DMX or lighting control wiring.
Fully Integrated Wireless Control System Installation	Reduced installation time
DLC (Design Lights Consortium) Certified	Qualifies for energy rebates
Independent Lab Certification	Provides confidence to support fixture performance; Highest rating for temperature range (-40°C to 60°C); fixture LM79 rated life 135,000 hours; 93 lumen/watt; >70 color rendering index. Results in longer useful life, higher efficiency, higher natural light rating and best performance in higher temperatures. Best in class for highest light output.