

# Sports and Recreational Area Lighting



## **IES RP-6-15**

# **Sports and Recreational Area Lighting**

Publication of this Recommended Practice  
has been approved by IES.  
Suggestions for revisions  
should be directed to IES.

Prepared by:  
The Sports and Recreational Area Lighting Committee of  
the Illuminating Engineering Society of North America

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## 1.0 INTRODUCTION

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Over the years, there have been increases in the demand for both indoor and outdoor sports facilities. To meet the increase in demand, lighting is a cost effective way to extend hours of play during hours of darkness. Lighting is also required for indoor sporting facilities during the day. With increasing power and operational costs, energy efficiency should be a key consideration when designing a lighting system.

The purpose of *IES RP-6-15 Sports and Recreational Area Lighting* is to provide the reader with recommendations to aid in the design of sports lighting systems. Popular sports, such as baseball, tennis, basketball and football as well as recreational social activities, such as horseshoe pitching and croquet are covered. Venues for spectators of amateur, collegiate, and professional sports are complex facilities that should provide not only for the spectators, but also the equipment used in modern sports broadcasting. This document does not address those needs, so the reader should look for guidance from the sports league or the project consultant.

There are some sports activities which are purely social or recreational and may not require even the minimum Class IV light levels needed (refer to **Section 4.4**), published in this document. The facility's owner can use discretion to provide adequate lighting for safe and effective participation in those activities.

*IES RP-6-15* consists of several sections. They include:

- Lighting Fundamentals and Principals
- Design Factors and Considerations,
- Power, Wiring and Controls,
- Indoor Lighting Applications
- Outdoor Lighting Applications,
- Appendices describing methods of calculation, equipment installation, measurement, maintenance, economic analysis, a glossary of lighting terms, and a bibliography that pertains to sports lighting design

Sports lighting systems consume power which over time can be significant, and *IES RP-6-15* defines methods for maximizing energy efficiency.

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## 2.0 LIGHTING FUNDAMENTALS AND PRINCIPALS

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The goal of lighting for sports is to provide an appropriate luminous environment that contributes to the visibility of the playing target (ball), the competitors and the surrounding backgrounds. To achieve this objective, both quantitative and qualitative factors of illumination should be considered:

- Quantity of Illumination - The recommended quantity of illuminance is defined by the maintained average horizontal and/or vertical illuminance levels.
- Quality of Illumination - The recommended quality of illuminance is defined by factors such as Uniformity Ratio (UR), Uniformity Gradient (UG) and Coefficient of Variation (CV). In addition the designer should also consider direct and reflected glare; Color Rendering Index (CRI), Color Contrast (CC) and modeling.

Lighting needs are determined by two distinct criteria; the needs of the players/participants, and those of the spectators at the farthest distance from the field of play.

The illuminance levels recommended in *IES RP-6-15* are based on a majority age population of the players and spectators, i.e., between 25-65 years of age, unless otherwise stated (for additional details on vision and illumination, refer to the *IES Lighting Handbook, 10th Edition, Chapter 4 Perceptions and Performance*).

### 2.1 Illuminance

Horizontal illuminance ( $E_h$ ) is a measure of luminous flux density (lumens per square meter) reaching a horizontal surface, normally taken in a plane 1 meter above or at the playing surface. Horizontal illuminance is the normal design criteria for two main reasons. First, horizontal illuminance values are easy to compute and to measure; second, there is usually only one selected horizontal plane, whereas there could be several vertical planes.

Vertical illuminance ( $E_v$ ) is a measure of luminous flux density (lumens per square meter) reaching the plane of a vertical surface. It should be noted that for most aerial sports the playing object is played and viewed in the air rather than on the ground.

Average Illuminance - is the arithmetic average of a set of calculation points or readings taken over a specified area at a specific time. Illuminance values