

## GUIDELINES TO SPORTS LIGHTING

Increased leisure time, along with advancements in illuminating engineering design and technology, have brought about an increase in sporting events played and watched at night. Light source efficacies have more than doubled; drastically reducing the energy requirements of sports facilities in spite of increased illuminances to satisfy the elevated skill level of modern athletes.

Associated with the improved illuminance levels are increased problems of glare and color rendering for better visual performance and quality television broadcasting. Sports lighting has outgrown the design by approximation, it requires sophisticated computer programs for application. This requires a thorough understanding of illuminating engineering principles and associated computer programs by the lighting designer.

### Class of Play

As the skill level of play is elevated, players and spectators require a more critically illuminated environment. There is a correlation between the size of a facility and the skill level of play, i.e., the number of spectators is directly related to the skill level of play. To determine illumination criteria, facilities are grouped into four classes to satisfy the skill levels.

**Class I** - for competition play before a large group of spectators. Due to the complexity of design for major stadiums requiring special design consideration, the criteria presented for this class will be for spectator capacity of 10,000 or less.

**Class II** - for competition play with approximate spectator capacity of 4,000 to 6,000.

**Class III** - for competition play without specific provisions for spectators.

**Class IV** - for social and recreational play only.

**Table 1—Class of Play and Facilities**

Facility	Class			
	I	II	III	IV
International	X			
National	X			
Professional	X			
College	X	X		
Semi-professional	X	X		
Sports clubs	X	X		
Amateur leagues		X	X	
High schools		X	X	
Training facilities			X	X
Elementary schools			X	X
Recreational events				X
Social events				X

Class I—Facilities with spectator capacity of 5000 to 200,000.  
 Class II—Facilities with spectators of 5000 or less.  
 Class III—No special provision for spectators.  
 Class IV—Social and recreational, i.e., noncompetitive.

## TYPES OF SPORTS

Sports may be divided into two groups, aerial sports and ground-level sports, and within these two groups they can be divided into multi-directional sports and uni-directional sports.

**Aerial Sports...**Involves the playing of an object (ball) in the air as well as on the ground.

**Multi-Directional Aerial Sports...**Players and spectators view the playing object from multiple positions and viewing angles. They demand critical vertical illumination over the entire playing area as well as horizontal illumination at ground level. Control of direct glare is important by locating luminaires away from the most frequently viewing directions of players and spectators. Typical multi-directional aerial sports include badminton, baseball, basketball, football, handball, jai alai, soccer, squash, tennis and volleyball.

**Uni-Directional Sports...**where the playing object is viewed in the air from a fixed position on the ground. General horizontal illumination is required at the starting end and vertical illumination at the finishing end. Luminaires must be shielded from the players' view. Typical uni-directional sports include golf driving range, skeet and trap shooting, and ski jumping.

**Ground Level Sports...**are played on the ground or a few feet above ground. Players and spectators in the normal course of play do not look upward.

**Multi-Directional Ground Level Sports...**where the players and spectators view the playing object from multiple positions, normally looking downward, horizontally, and occasionally upward. These sports require well distributed horizontal illumination, although vertical illumination should be considered. Typical multi-directional ground level sports include boxing, curling, field hockey, ice hockey, skating, swimming (excluding high board diving), and wrestling.

**Uni-Directional Ground Level Sports...**where the object is aimed at a fixed target, usually in a vertical position near ground level. Vertical illumination is critical at the target end. Luminaires should be shielded from view of the players and spectators at the starting end. Typical uni-directional ground level sports include archery, bowling, pistol shooting and skiing.

### Questions guiding to a proper selection

- Class of play
- Light levels
- Basic field dimensions
- Number of poles
- Pole locations (including setbacks)
- Pole heights
- Floodlight beam types and number per pole
- Kilowatts in the proposed system

**Illumination Levels...**are suggested light levels based upon the Illuminating Engineering Society "Current Recommend Practice for Sports and Recreational Area Lighting," RP-6-88. Special design considerations are required for televised sports lighting. Requests should be directed through your local sales office to the Lighting Application unit at the factory.

**Floodlight Selection...**listed in the tables are specific recommendations for NEMA beam types per pole based upon the Day-Brite Sports Floodlight. These tables should not be used as a general guide for non-Day-Brite products as other manufacturers may not have the same beam characteristics even though they may have the same NEMA beam type.

**Design Accuracy...**of these recommendations are for nominal situations, and are accurate for the pole locations shown in the tables and a  $\pm 10\%$  variation in mounting height. Greater change may require a different combination of beam spreads for uniform lighting.

**Aiming Diagrams...**should be requested for a specific order at the time an order for sports lighting is placed.

**Illumination Test Stations...**are where the illuminance values are obtained for a specific installation. Each value represents the average value of illuminance of the area bounded by the grid lines. Typical illumination test station locations are shown for each sports listed in this section. Measuring light levels at these test stations are shown for each sport listed in this section. Measuring light levels at these test stations is a good way to check on a new installation or to evaluate an existing installation.