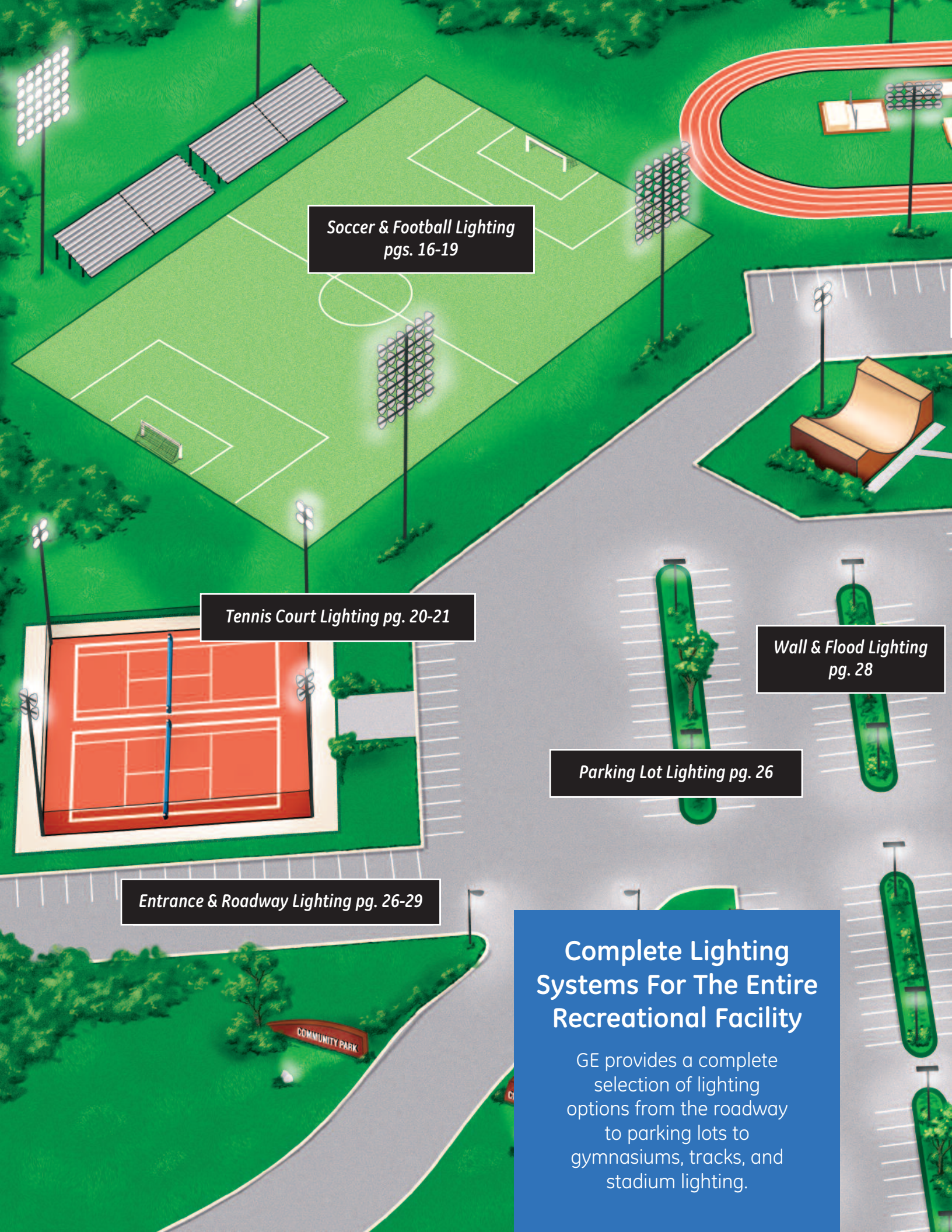
GE Industrial
Lighting Systems

sports lighting

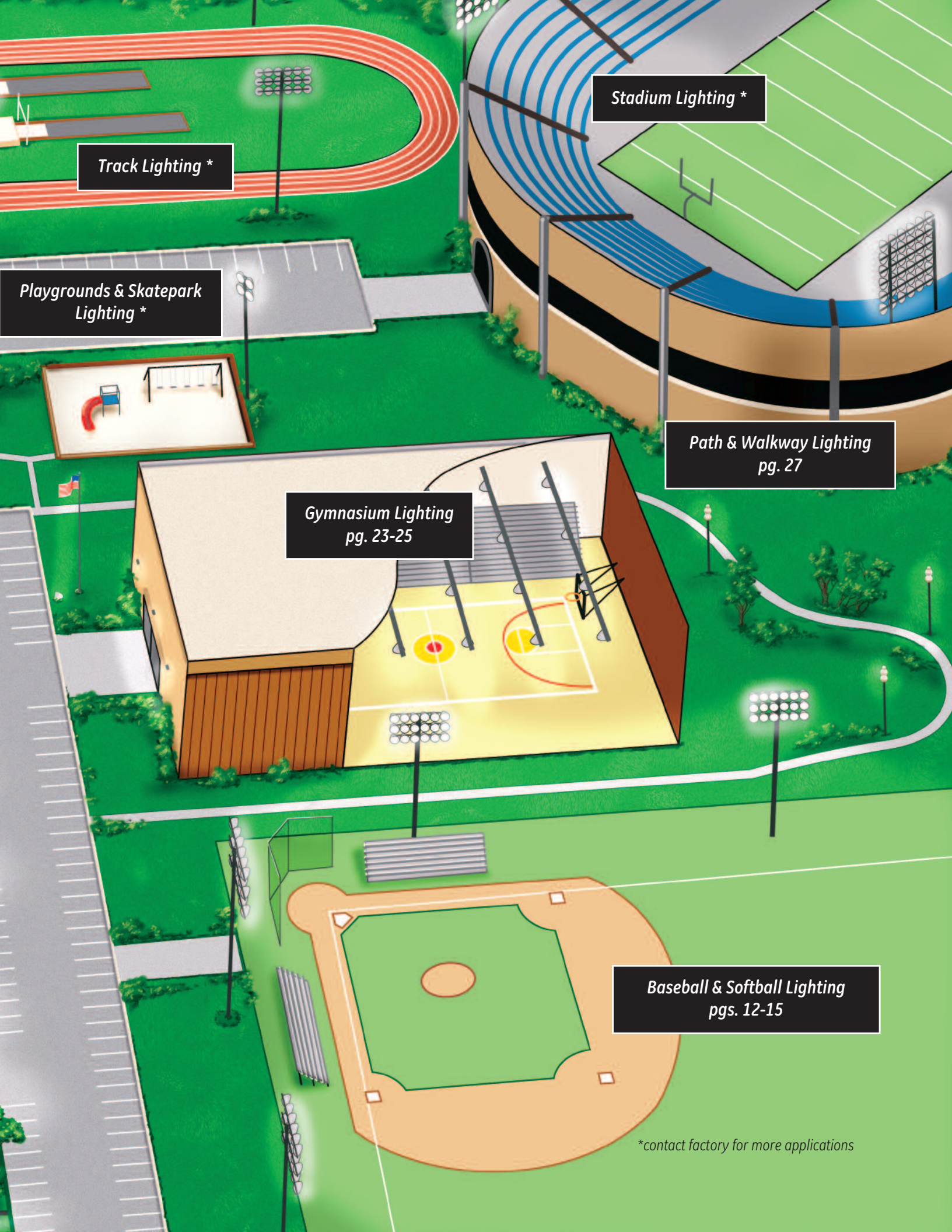
parks and recreational facilities

imagination at work



Complete Lighting Systems For The Entire Recreational Facility

GE provides a complete selection of lighting options from the roadway to parking lots to gymnasiums, tracks, and stadium lighting.


Stadium Lighting *
Track Lighting *
Playgrounds & Skatepark Lighting *
Path & Walkway Lighting pg. 27
Gymnasium Lighting pg. 23-25
Baseball & Softball Lighting pgs. 12-15
*contact factory for more applications

Sports Lighting

System Selection

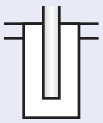
Its easy to determine the best solution to your sports lighting needs. Follow these steps to choose which elements of the Lighting System you prefer:

Select Pole and Base Combination

Flange Base
- ease of installation
- short cycle time for completion

Galvanized steel
- most economical
- aesthetically pleasing

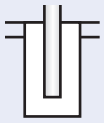
Anchor Base
(anchor bolts)
- most economical
- functional for majority of soil conditions



Direct Burial
- fast installation

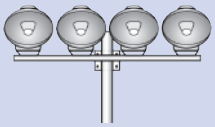
Slip Stub Base
- fast installation
- aesthetically pleasing

Concrete
(Direct Embedded foundation only)
- low maintenance
- durable

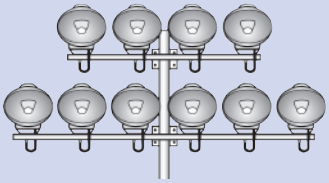


Select Ballast and Wiring Options

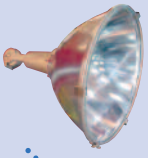
Integral ballast
- most economical
- ease of installation



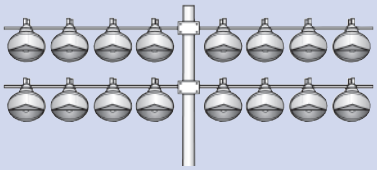
Field Wired



Prewired



Remote ballast
- ease of electrical modifications
- maintenance advantages



Prewired
Internal Cable Assembly

Select Optical

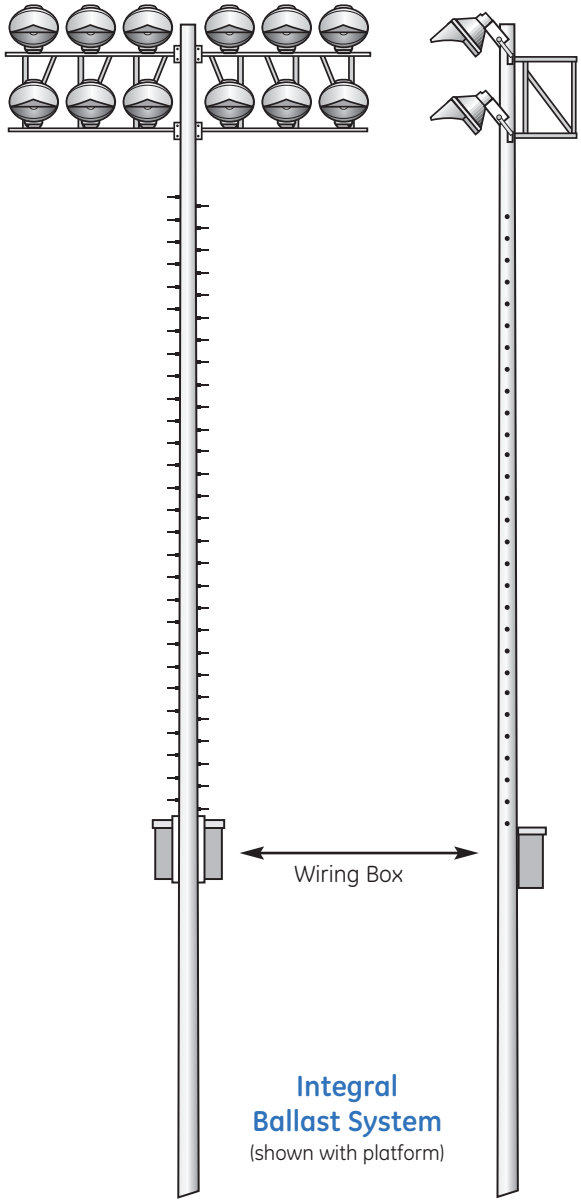
Powr•Spot® with ULC Optics
- ultimate glare and spill light control
- state-of-the-art technology

Powr•Spot®
- effective distribution of lumens
- time proven

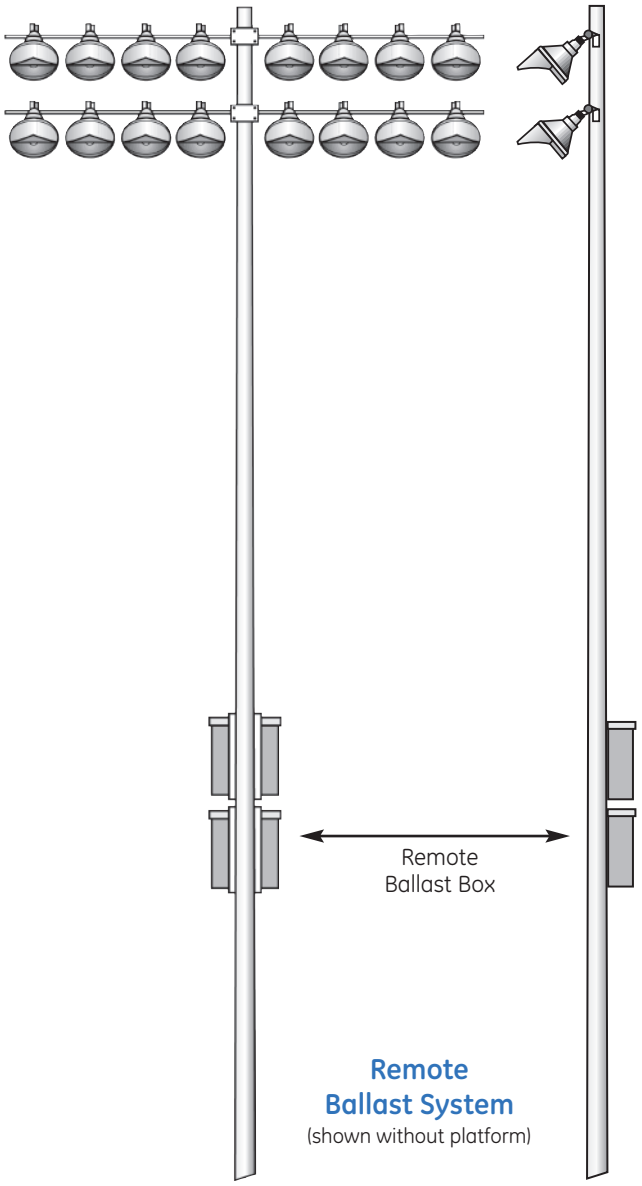
Ultra•Sport™
(integral ballast only)
- allows greater pole height and setback
- fewer fixtures and poles

Sports Lighting

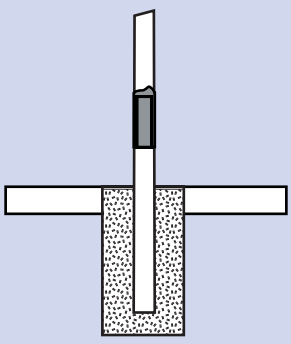
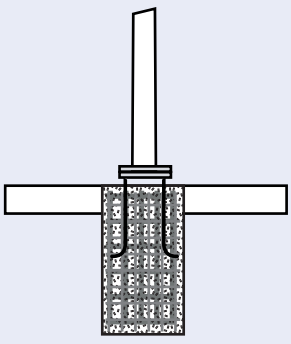
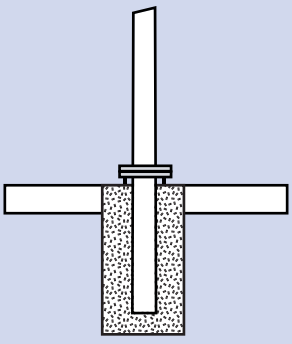
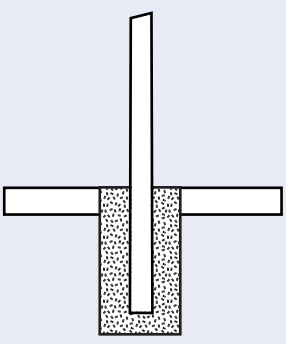
System Selection



Integral Ballast System
(shown with platform)



Remote Ballast System
(shown without platform)

Slip Stub Base	Anchor Base	Flange Base	Direct Burial
			

Sports Lighting

System Selection

POWR • SPOT® III Luminaire

- UL 1598 listed for Wet Locations.
- CSA/cUL certified. IP-55 construction.
- Die cast aluminum ballast housing.
- Enclosed, gasketed filtered optical with ALGLAS® finish on aluminum reflector, and tempered, impact resistant glass closure.
- Thermal separation of ballast from socket and lamp for longer component life.
- Removable front ballast cover with captive hardware for access to the ballast and wiring compartment.
- Built-in cable seal and strain relief bushing.
- Corrosion resistant hardware.
- Zinc rich powder polyester coated steel trunnion and lens frame.
- Stainless steel lens latches (3) and hinge.
- Available in General Purpose or Heavy Duty optical construction.
- Built-in aiming site for field adjustment.

POWR•Spot III

Standard Glare Control

POWR•SPOT® III Luminaire with Glare Control – (PSGN & PSGV)

- UL 1598 listed for Wet Locations.
- CSA/cUL certified. IP-55 construction.
- Die cast aluminum ballast housing.
- Enclosed, gasketed filtered optical with ALGLAS® finish on aluminum reflector, and tempered, impact resistant glass closure.
- Thermal separation of ballast from socket and lamp for longer component life.
- Removable front ballast cover with captive hardware for access to the ballast and wiring compartment.
- Built-in cable seal and strain relief bushing.
- Corrosion resistant hardware.
- Zinc rich powder polyester coated steel trunnion and lens frame.
- Stainless steel lens latches (3) and hinge.
- Available in General Purpose or Heavy Duty optical construction.
- Built-in aiming site for field adjustment.
- Internal louver assembly for lamp and optical glare control without increased EPA or wind loading of the fixture. (PSGN)
- External top visor for improved spill light control. (PSGV)

PSGN

PSGV

Ultimate Light Control

POWR•SPOT® III Luminaire with ULC® Optics

- UL 1572 listed for Wet Locations.
- CSA/cUL certified. IP-55 construction.
- Die cast aluminum ballast housing.
- Enclosed, gasketed filtered optical with ALGLAS® finish on aluminum reflector, and tempered, impact resistant glass closure.
- Thermal separation of ballast from socket and lamp for longer component life.
- Removable front ballast cover with captive hardware for access to the ballast and wiring compartment.
- Built-in cable seal and strain relief bushing.
- Corrosion resistant hardware.
- Zinc rich powder polyester coated steel trunnion and lens frame.
- Stainless steel lens latches (3) and hinge.
- Available in General Purpose or Heavy Duty optical construction.
- Built-in aiming site for field adjustment.
- External top visor with horizontal baffle with standard opticals for improved spill light and glare control.

ULGC

Sports Lighting

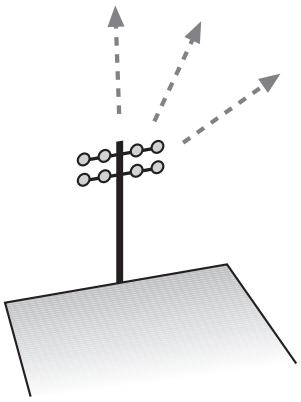
System Selection

Spare the Glare with Ultimate Light Control

GE Lighting Systems has numerous solutions to help you put light where you want and not on your neighbors' property. Unwanted spill light can be described in three ways:

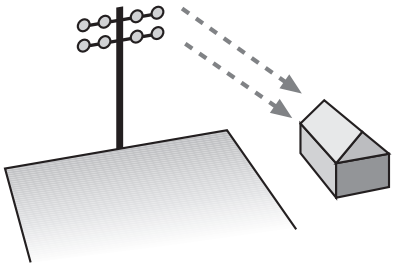
Skyglow

This form of light pollution limits our ability to see the stars and the night sky. Uplight, whether direct or reflected, brightens a dark sky.



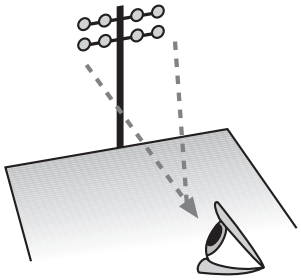
Light Trespass

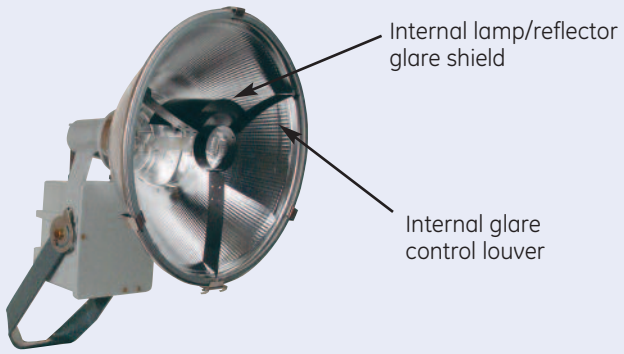
Sports lighting at Parks and Recreational facilities should be designed and aimed so as to minimize "spill light" which may illuminate neighboring property. GE systems often utilize ULC® (ultimate light control) shields to direct light where it is needed most.



Glare

Poorly aimed lighting and excessive light levels can temporarily distract players and spectators.





Sports Lighting

System Selection

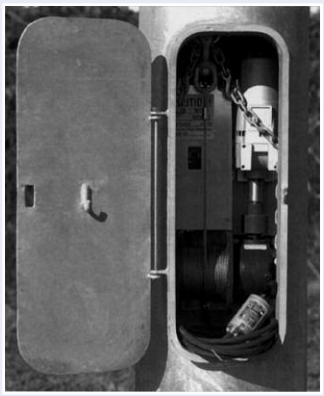
The System That Lowers Fixtures to You

SportStar is a mobile sports lighting service system. By "mobile", we mean the fixtures can be lowered from the top of the pole to ground level by means of a lowering device allowing easy access to fixtures for maintenance without the need for a bucket truck. The lowering device system contains a service hoist consisting of bracket crossarms, prewired ring, head frame, cover, hoist, winch cables, winch, internal or portable drive and top latching assembly.

The system comes as a complete package – fixtures, lamps, poles, lowering crossarm service platform and internal pre-harnessed wiring. Here's what the SportStar lighting system means to you:

- **Easy Installation:** Prewired with pre-aimed lighting applications. No climbing the pole; no having to grid the field.
- **Easy to Maintain:** Relamping and other maintenance can be done at ground level.
- **Easy to Aim:** Higher mounting heights up to 150 feet so fixtures can be aimed more downward rather than across the field as with lower mounting heights.
- **User Friendly:** No expensive rentals of bucket trucks or cranes. The SportStar system lowers the fixtures to you. No disruption of landscaping, fences, bleachers, etc.
- **Safe:** Fixtures, including ballast, lamps and all electrical components, are at the top of the post out of the reach of children.

Drive Options



Internal Drive

Portable Drive

Mobile Cart

Sports Lighting

System Selection

When it comes to lighting, GE knows the game. After all, the origins of sports lighting are the very origins of our company. In 1883 we lit the first night baseball game with a handful of open-face arc lights strung across a minor-league field. Thomas Edison, the famed inventor of the incandescent light bulb, was one of our company's founders. And we're responsible for many firsts in the field ever since.

Outdoor sports lighting is a specialized form of floodlighting. Pole locations, mounting heights, and luminaire aiming are selected to light the ball in play. There is also a need to minimize fixture brightness or glare in the eyes of the players and spectators. Selected areas such as the infield in baseball may be highlighted to insure sufficient light for the batter and the faster play in the infield. Pages 12 through 21 contain the lighting recommendations for each sport. Specific design considerations are given with each sports lighting consideration.

Luminaire Selections

Luminaires are available in a variety of beam spreads or NEMA beam types and construction types. In the standard layout sections, the proper NEMA beam spreads have been selected for each sports lighting system to insure the highest lighting efficiency consistent with uniform lighting. Luminaires from different manufacturers do not have the same performance characteristics even though they may have the same NEMA beam type. This book is based on GE luminaire characteristics and should not be used as a general guide for other manufacturers' products.

Lamp Selection

The basic lamp type used for sports lighting is high intensity discharge (HID). These HID systems primarily use 400W, 1000W and 1500W metal halide or 400W and 1000W high pressure sodium lamps. While mercury lamps have been used extensively in the past for sports lighting, they are no longer recommended because of their lower efficiency. The life of HID lamps varies from 1,500 to 24,000 hours. The most common lamps used today are the 1000 and 1500 watt metal halide lamps. The 1500 watt lamp has the best combination of lamp efficiency (110+ LPW) and life (3,000 hours) for use in most sports lighting venues. Where longer lamp life or lower mounting heights are desired, 1000 watt metal halide lamps are the standard. The disadvantage is that due to lower lumen output of the lamp approximately 50% more fixtures are required to achieve the same lighting levels as compared to 1500 watt lamps. This increases the cost of installation both by increased quantities and added structural requirements for poles and foundations.

Sports Lighting

System Selection

Warm Up & Restrike Time

HID lamps require 3-7 minutes to warm up and will not restrike immediately if there is momentary power interruption. Some form of instant-on lighting, usually one or two incandescent luminaries per pole, is recommended to provide lighting during the 1-15 minute restrike time. In addition, the incandescent (quartz) type fixtures should be used for emergency lighting of the fields when required. HID fixtures with optional "hot lamp restrike" capability are available but this option is "hot restrike" only and does not provide "instant light" when the fixtures are cold started.

Stroboscopic Effect

The light output of HID lamps tends to follow the 60-cycle current waveform. This will cause a moving object to appear to flicker or jump from position to position. This is most pronounced when the object is small and traveling over 50 feet per second. If the object is moving toward the player or the player is following the motion of the object, strobe will be less noticeable. This annoyance can be minimized by using three-phase power with HID lamps. Metal Halide lamps, do not produce as much stroboscopic effect and can be used successfully on single-phase power.

Design Criteria

The design information in this guide is based on published lamp and luminaire performance that are inherent in their design. Normal manufacturing tolerances cause changes in a lamp's electrical characteristics and lumen output. Light changes in reflector finish and lamp position can alter the photometric distribution of the luminaire. Changes in the ballast and line voltage will also alter the output of the lamp. As a result of these variations average illumination levels can be expected to vary within 10% of the design value. Individual point by point foot-candle values can vary more than this, especially when only a few luminaires are involved, resulting in little overlap between luminaires.

Aiming Diagrams

Aiming diagrams for each sport should be requested at the time the order is placed. The instructions for

Sports Lighting

System Selection

aiming should be followed closely especially if NEMA 2 or NEMA 3 beam types are used. A difference of a few degrees in aiming can make a significant difference in the resulting light level and uniformity. For special installations not covered by this book, individual aiming diagrams can be provided from Application Engineering department at the factory.

Illumination Levels

The suggested light levels in this book are based on the Illuminating Engineering Society of North America (IESNA) "Recommended Practice for Sports and Recreational Area Lighting," RP-6. Sports lighting for television requires special design considerations. Requests for TV sports lighting should be directed through your local sales office to the Application Engineering department at the factory.

FACILITY	CLASS			
	I	II	III	IV
Professional	X			
College	X	X		
Semi-Professional	X	X		
Sport Clubs	X	X	X	
Amateur Leagues		X	X	X
High Schools		X	X	X
Training Facilities			X	X
Elementary Schools				X
Recreational Events				X
Social Events				X

Class I – Facilities with spectator capacity over 5,000
Class II – Facilities with spectator capacity under 5,000
Class III – Facilities with some provision for spectors
Class IV – Facilities with no provision for spectators

* Reprinted with permission, Illuminating Engineering Society of North America. RP-6-01

Sports Lighting

Baseball

Typical Layouts

Pole Location

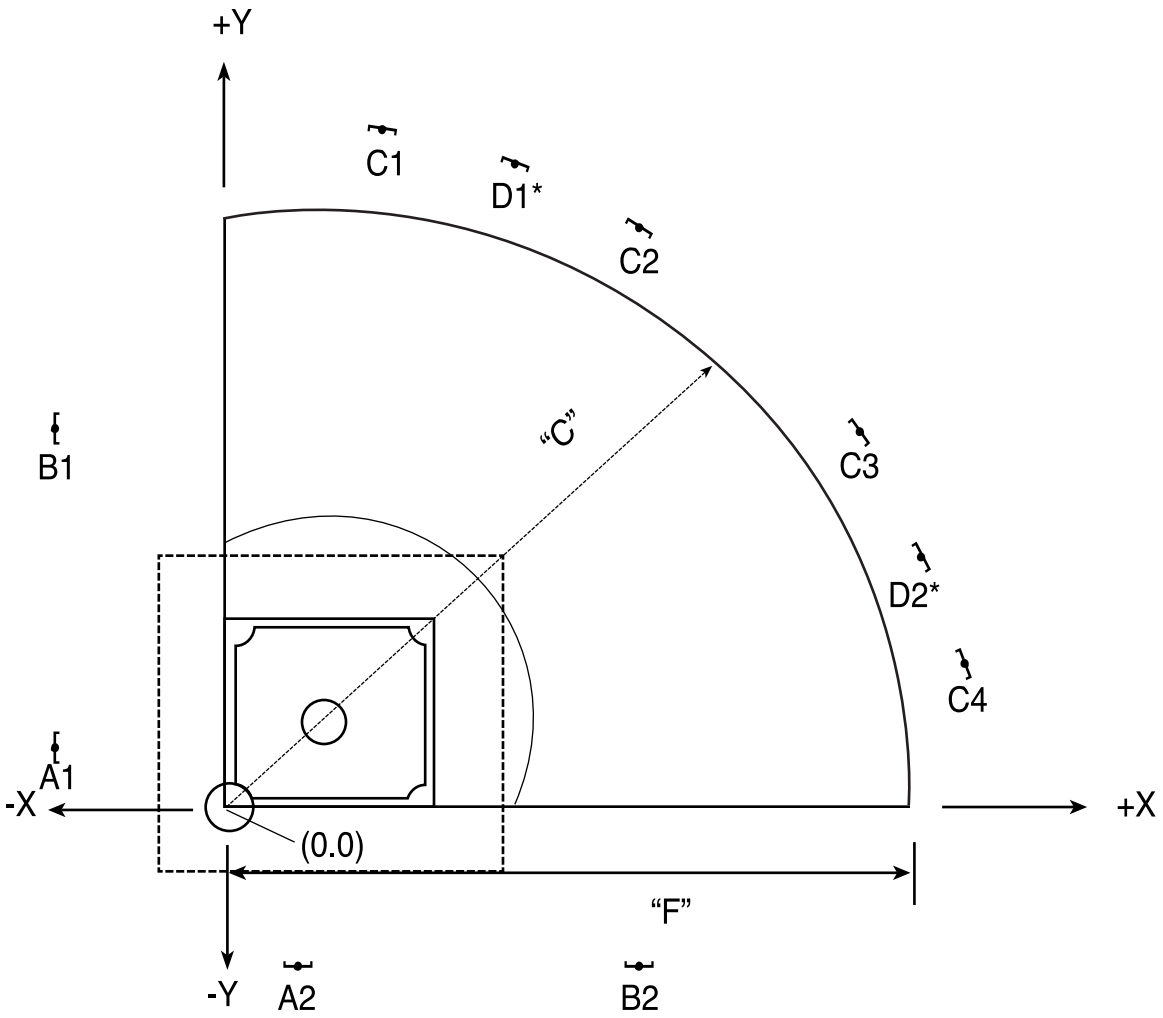
Baseball lighting is divided into the infield and outfield portions of the field. The infield lighting is supplied by luminaires on the "A" and "B" poles. The B & C poles light the outfield. Locating poles as shown on the diagram insures the ball will be lighted on both sides anywhere on the field. The illumination extends from the ground to the highest point reached by a hit ball. This insures that the ball will never pass between a player and the floodlights.

Luminaire Mounting Height

The mounting height is selected to keep normal play below the line of sight of the luminaires. This also depresses the floodlight aiming to avoid unwanted glare in adjacent areas. The larger the field the higher the mounting height must be to keep the same average aiming angles.

Aiming Diagrams

Aiming diagrams are available for each recommended system. If there is a change in lighting requirements or pole locations, it is best to leave the beam type and quantity to the Application Engineering department at the factory.



* "D" locations for 6 pole designs

Sports Lighting

Baseball

								Standard 1500 Watt Metal Halide (PSFA)							ULC Glare Control 1500 Watt Metal Halide (ULGC)						
Design Illuminance (maintained) infield/outfield	Field Dimensions		Poles				Layout #	Fixture Quantities						Layout #	Fixture Quantities						
	Infield	Outfield	ID	Mtg. Height	"X"	"Y"		Nema 3 (B0)	Nema 4 (C0)	Nema 5 (D0)	Nema 6 (E0)	Total	Power (KWA)		Nema 3 (B0)	Nema 4 (C0)	Nema 5 (D0)	Nema 6 (E0)	Total	Power (KWA)
50/30 FC (500/300 LUX) Class III	90'	285' Radius	A1	70'	-45	+30	BB15M6A3	-	2	3	-	5	8.1	BB15M6A3ULC	-	3	2	-	5	8.1
		285'F/285'C	A2	70'	+30	-45		-	2	3	-	5	8.1		-	3	2	-	5	8.1
			B1	70'	-40	+150		4	5	1	-	10	16.3		4	5	1	-	10	16.3
			B2	70'	+150	-40		4	5	1	-	10	16.3		4	5	1	-	10	16.3
			D1	70'	+111	+268		-	5	1	-	6	9.8		-	5	1	-	6	9.8
			D2	70'	+268	+111		-	5	1	-	6	9.8		-	5	1	-	6	9.8
TOTALS			6					8	24	10	0	42	68.5		8	26	8	0	42	68.5
30/20 FC (300/200 LUX) Class IV	90'	285' Radius	A1	70'	-45	+20	BB15M6B3	-	1	1	1	3	4.9	BB15M6B3ULC	-	-	2	1	3	4.9
		285'F/285'C	A2	70'	+20	-45		-	1	1	1	3	4.9		-	-	2	1	3	4.9
			B1	70'	-40	+150		1	3	2	-	6	9.8		2	3	1	-	6	9.8
			B2	70'	+150	-40		1	3	2	-	6	9.8		2	3	1	-	6	9.8
			D1	70'	+111	+268		-	3	2	-	5	8.2		-	4	1	-	5	8.2
			D2	70'	+268	+111		-	3	2	-	5	8.2		-	4	1	-	5	8.2
TOTALS			6					2	14	10	2	28	45.6		4	14	8	2	28	45.6
50/30 FC (500/300 LUX) Class III	90'	300' Radius	A1	70'	-40	+30	BB15M6C3	1	3	3	-	7	11.4	BB15M6C3ULC	1	3	3	-	7	11.4
		300'F/300'C	A2	70'	+30	-40		1	3	3	-	7	11.4		1	3	3	-	7	11.4
			B1	70'	-40	+165		4	4	1	-	9	14.7		4	4	1	-	9	14.7
			B2	70'	+165	-40		4	4	1	-	9	14.7		4	4	1	-	9	14.7
			D1	70'	+115	+280		1	4	-	2	7	11.4		1	5	1	-	7	11.4
			D2	70'	+280	+115		1	4	-	2	7	11.4		1	5	1	-	7	11.4
TOTALS			6					12	22	8	4	46	75.0		12	24	10	0	46	75.0
30/20 FC (300/200 LUX) Class IV	90'	300'Radius	A1	70'	-40	+30	BB15M6D3	-	2	2	-	4	6.5	BB15M6D3ULC	-	2	2	-	4	6.5
		300'F/300'C	A2	70'	+30	-40		-	2	2	-	4	6.5		-	2	2	-	4	6.5
			B1	70'	-40	+200		-	4	2	-	6	9.8		-	4	2	-	6	9.8
			B2	70'	+200	-40		-	4	2	-	6	9.8		-	4	2	-	6	9.8
			D1	70'	+118	+286		1	3	2	-	6	9.8		1	3	2	-	6	9.8
			D2	70'	+286	+118		1	3	2	-	6	9.8		1	3	2	-	6	9.8
TOTALS			6					2	18	12	0	32	52.2		2	18	12	0	32	52.2
50/30 FC (500/300 LUX) Class III	90'	300'F/350'C	A1	70'	-40	+60	BB15M6E3	2	3	3	-	8	13.0	BB15M6E3ULC	2	4	2	-	8	13.0
			A2	70'	+60	-40		2	3	3	-	8	13.0		2	4	2	-	8	13.0
			B1	70'	-40	+185		6	3	1	-	10	16.3		3	7	-	-	10	16.3
			B2	70'	+185	-40		6	3	1	-	10	16.3		3	7	-	-	10	16.3
			D1	70'	+155	+318		5	3	-	-	8	13.0		2	6	-	-	8	13.0
			D2	70'	+318	+155		5	3	-	-	8	13.0		2	6	-	-	8	13.0
TOTALS			6					26	18	8	0	52	84.8		14	34	4	0	52	84.8
30/20 FC (300/200 LUX) Class IV	90'	300'F/350'C	A1	70'	-40	+30	BB15M6F3	1	2	2	-	5	8.2	BB15M6F3ULC	1	2	2	-	5	8.2
			A2	70'	+30	-40		1	2	2	-	5	8.2		1	2	2	-	5	8.2
			B1	70'	-40	+200		1	5	-	-	6	9.8		1	5	-	-	6	9.8
			B2	70'	+200	-40		1	5	-	-	6	9.8		1	5	-	-	6	9.8
			D1	70'	+135	+320		-	5	1	-	6	9.8		1	5	-	-	6	9.8
			D2	70'	+320	+135		-	5	1	-	6	9.8		1	5	-	-	6	9.8
TOTALS			6					4	24	6	0	34	55.4		6	24	4	0	34	55.4
50/30 FC (500/300 LUX) Class III	90'	350' Radius	A1	70'	-45	+30	BB15M8G3	2	3	2	-	7	11.4	BB15M8G3ULC	2	4	1	-	7	11.4
		350'F/350'C	A2	70'	+30	-45		2	3	2	-	7	11.4		2	4	1	-	7	11.4
			B1	70'	-40	+170		8	-	1	-	9	14.7		8	2	-	-	10	16.3
			B2	70'	+170	-40		8	-	1	-	9	14.7		8	2	-	-	10	16.3
			C1	70'	+73	+346		3	2	1	-	6	9.8		2	4	-	-	6	9.8
			C2	70'	+194	+297		1	5	-	-	6	9.8		1	3	1	-	5	8.2
			C3	70'	+297	+194		1	5	-	-	6	9.8		1	3	1	-	5	8.2
			C4	70'	+346	+73		3	2	1	-	6	9.8		2	4	-	-	6	9.8
TOTALS			8					28	20	8	0	56	91.3		26	26	4	0	56	91.3
30/20 FC (300/200 LUX) Class IV	90'	350' Radius	A1	70'	-45	+30	BB15M8H3	1	1	1	1	4	6.5	BB15M8H3ULC	1	1	1	1	4	6.5
		350'F/350'C	A2	70'	+30	-45		1	1	1	1	4	6.5		1	1	1	1	4	6.5
			B1	70'	-40	+170		3	4	-	-	7	11.4		3	4	-	-	7	11.4
			B2	70'	+170	-40		3	4	-	-	7	11.4		3	4	-	-	7	11.4
			C1	70'	+73	+346		2	1	1	-	4	6.5		1	2	1	-	4	6.5
			C2	70'	+194	+297		-	4	-	-	4	6.5		-	3	1	-	4	6.5
			C3	70'	+297	+194		-	4	-	-	4	6.5		-	3	1	-	4	6.5
			C4	70'	+346	+73		2	1	1	-	4	6.5		1	2	1	-	4	6.5
TOTALS			8					12	20	4	2	38	61.9		10	20	6	2	38	61.9

Sports Lighting

Softball

Typical Layouts

Pole Location

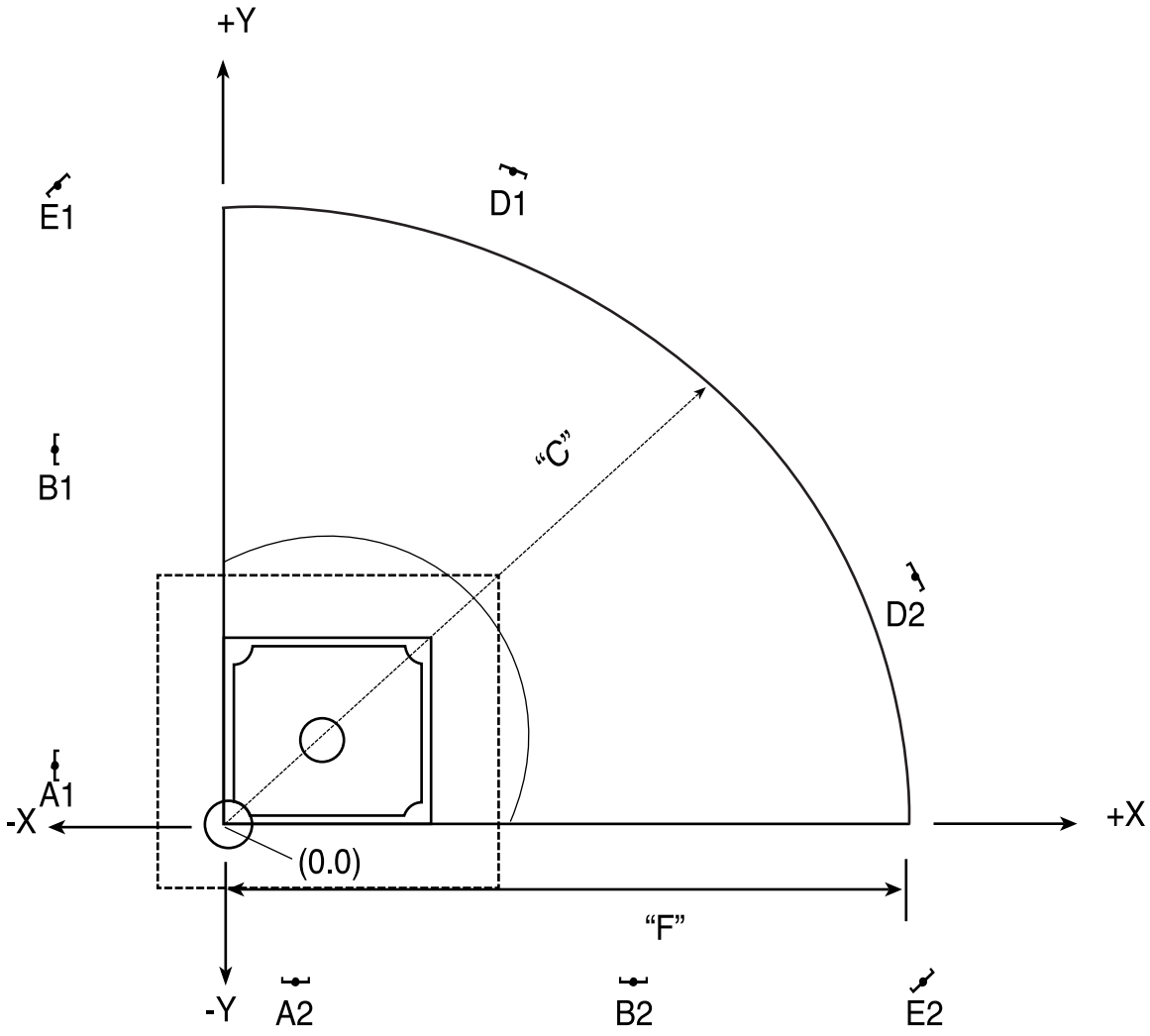
Softtball lighting is divided into the infield and outfield portions of the field. The infield lighting is supplied by luminaires on the "A" poles. The B & C poles light the outfield. "E" poles are optional pole locations when outfield "D" poles are not possible. Locating poles as shown on the diagram insures the ball will be lighted on both sides anywhere on the field. The illumination extends from the ground to the highest point reached by a hit ball. This insures that the ball will never pass between a player and the floodlights.

Luminaire Mounting Height

The mounting height is selected to keep normal play below the line of sight of the luminaires. This also depresses the floodlight aiming to avoid unnecessary glare. The larger the field the higher the mounting height must be to keep the same average aiming angles.

Aiming Diagrams

Aiming diagrams are available for each recommended system in format on. If there is a major change in lighting requirements or pole locations, it is best to leave the beam type and quantity to the Application Engineering department at the factory.



Sports Lighting

Softball

Design Illuminance (maintained) infield/outfield	Field Dimensions		Poles				Standard 1500 Watt Metal Halide (PSFA)						ULC Glare Control 1500 Watt Metal Halide (ULGC)						
							Layout #	Fixture Quantities						Layout #	Fixture Quantities					
	Infield	Outfield	ID	Mtg. Height	"X"	"Y"		Nema 3 (B0)	Nema 4 (C0)	Nema 5 (D0)	Nema 6 (E0)	Total	Power (KWA)		Nema 3 (B0)	Nema 4 (C0)	Nema 5 (D0)	Nema 6 (E0)	Total	Power (KWA)
50/30 FC (500/300 LUX) Class III	60′	200′ radius	A1	60′	-40	+35	SB15M4A3	-	2	2	-	4	6.5	SB15MA3ULC	1	1	2	-	4	6.5
			A2	60′	+35	-40		-	2	2	-	4	6.5		1	1	2	-	4	6.5
			E1	60′	-10	+205		3	4	1	-	8	13.0		4	4	-	-	8	13.0
			E2	60′	+205	-10		3	4	1	-	8	13.0		4	4	-	-	8	13.0
TOTALS			4					6	12	6	0	24	39.1		10	10	4	0	24	39.1
30/20 FC (300/200 LUX) Class IV	60′	200′ radius	A1	60′	-40	+35	SB15M4B3	-	1	-	2	3	4.9	SB15M4B3ULC	-	-	2	1	3	4.9
			A2	60′	+35	-40		-	1	-	2	3	4.9		-	-	2	1	3	4.9
			E1	60′	-10	+205		1	4	-	-	5	8.2		3	2	-	-	5	8.2
			E2	60′	+205	-10		1	4	-	-	5	8.2		3	2	-	-	5	8.2
TOTALS			4					2	10	0	4	16	26.1		6	4	4	2	16	26.1
50/30 FC (500/300 LUX) Class III	60′	225′ radius	A1	60′	-30	+20	SB15M6C3	1	1	-	2	4	6.5	SB15M6C3ULC	1	1	2	-	4	6.5
			A2	60′	+20	-30		1	1	-	2	4	6.5		1	1	2	-	4	6.5
			B1	60′	-30	+150		1	2	2	-	5	8.2		-	3	2	-	5	8.2
			B2	60′	+150	-30		1	2	2	-	5	8.2		-	3	2	-	5	8.2
			D1	60′	+85	+214		-	-	4	-	4	6.5		-	1	3	-	4	6.5
			D2	60′	+214	+85		-	-	4	-	4	6.5		-	1	3	-	4	6.5
TOTALS			6					4	6	12	4	26	42.4		2	10	14	0	26	42.4
30/20 FC (300/200 LUX) Class IV	60′	225′ radius	A1	60′	-30	+20	SB15M6D3	-	1	1	1	3	4.9	SB15M6D3ULC	-	1	1	1	3	4.9
			A2	60′	+20	-30		-	1	1	1	3	4.9		-	1	1	1	3	4.9
			B1	60′	-30	+150		1	-	2	-	3	4.9		1	-	2	-	3	4.9
			B2	60′	+150	-30		1	-	2	-	3	4.9		1	-	2	-	3	4.9
			D1	60′	+85	+214		-	-	3	-	3	4.9		-	-	3	-	3	4.9
			D2	60′	+214	+85		-	-	3	-	3	4.9		-	-	3	-	3	4.9
TOTALS			6					2	2	12	2	18	29.3		2	2	12	2	18	29.3
50/30 FC (500/300 LUX) Class III	60′	250′ radius	A1	60′	-30′	+20′	SB15M6E3	-	1	1	2	4	6.5	SB15M6E3ULC	-	1	2	1	4	6.5
			A2	60′	+20′	-30′		-	1	1	2	4	6.5		-	1	2	1	4	6.5
			B1	60′	-30	+145		2	3	1	-	6	9.8		2	3	1	-	6	9.8
			B2	60′	+145	-30		2	3	1	-	6	9.8		2	3	1	-	6	9.8
			D1	60′	+112	+229		1	-	4	-	5	8.2		-	3	2	-	5	8.2
			D2	60′	+229	+112		1	-	4	-	5	8.2		-	3	2	-	5	8.2
TOTALS			6					6	8	12	4	30	48.9		4	14	10	2	30	48.9
30/20 FC (300/200 LUX) Class IV	60′	250′ radius	A1	60′	-30′	+20′	SB15M6F3	-	1	1	1	3	4.9	SB15M6F3ULC	-	1	1	1	3	4.9
			A2	60′	+20′	-30′		-	1	1	1	3	4.9		-	1	1	1	3	4.9
			B1	60′	-30	+145		-	2	2	-	4	6.5		-	2	2	-	4	6.5
			B2	60′	+145	-30		-	2	2	-	4	6.5		-	2	2	-	4	6.5
			D1	60′	+112	+229		-	1	3	-	4	6.5		-	1	3	-	4	6.5
			D2	60′	+229	+112		-	1	3	-	4	6.5		-	1	3	-	4	6.5
TOTALS			6					0	8	12	2	22	35.9		0	8	12	2	22	35.9
50/30 FC (500/300 LUX) Class III	60′	280′ radius	A1	60′	-30′	+20′	SB15M6G3	-	1	1	2	4	6.5	SB15M6G3ULC	1	2	1	-	4	6.5
			A2	60′	+20′	-30′		-	1	1	2	4	6.5		1	2	1	-	4	6.5
			B1	60′	-30	+145		2	4	1	-	7	11.4		2	5	-	-	7	11.4
			B2	60′	+145	-30		2	4	1	-	7	11.4		2	5	-	-	7	11.4
			D1	60′	+127	+261		2	4	1	-	7	11.4		1	5	1	-	7	11.4
			D2	60′	+261	+127		2	4	1	-	7	11.4		1	5	1	-	7	11.4
TOTALS			6					8	18	6	4	36	58.7		8	24	4	0	36	58.7
30/20 FC (300/200 LUX) Class IV	60′	280′ radius	A1	60′	-30′	+20′	SB15M6H3	-	2	-	1	3	4.9	SB15M6H3ULC	-	1	1	1	3	4.9
			A2	60′	+20′	-30′		-	2	-	1	3	4.9		-	1	1	1	3	4.9
			B1	60′	-30	+145		-	4	1	-	5	8.2		-	4	1	-	5	8.2
			B2	60′	+145	-30		-	4	1	-	5	8.2		-	4	1	-	5	8.2
			D1	60′	+127	+261		-	2	3	-	5	8.2		-	2	3	-	5	8.2
			D2	60′	+261	+127		-	2	3	-	5	8.2		-	2	3	-	5	8.2
TOTALS			6					0	16	8	2	26	42.4		0	14	10	2	26	42.4
50/30 FC (500/300 LUX) Class III	60′	300′ radius	A1	60′	-30′	+20′	SB15M6J3	1	-	2	1	4	6.5	SB15M6J3ULC	1	-	2	1	4	6.5
			A2	60′	+20′	-30′		1	-	2	1	4	6.5		1	-	2	1	4	6.5
			B1	70′	-30	+145		5	3	2	-	10	16.3		3	7	-	-	10	16.3
			B2	70′	+145	-30		5	3	2	-	10	16.3		3	7	-	-	10	16.3
			D1	60′	+136	+279		1	2	4	-	7	11.4		1	5	1	-	7	11.4
			D2	60′	+279	+136		1	2	4	-	7	11.4		1	5	1	-	7	11.4
TOTALS			6					14	10	16	2	42	68.5		10	24	6	2	42	68.5
30/20 FC (300/200 LUX) Class IV	60′	300′ radius	A1	60′	-30′	+20′	SB15M6J3	1	-	1	1	3	4.9	SB15M6J3ULC	-	1	1	1	3	4.9
			A2	60′	+20′	-30′		1	-	1	1	3	4.9		-	1	1	1	3	4.9
			B1	70′	-30	+145		2	2	2	-	6	9.8		2	4	-	-	6	9.8
			B2	70′	+145	-30		2	2	2	-	6	9.8		2	4	-	-	6	9.8
			D1	60′	+136	+279		1	1	3	-	5	8.2		1	2	2	-	5	8.2
			D2	60′	+279	+136		1	1	3	-	5	8.2		1	2	2	-	5	8.2
TOTALS			6					8	6	12	2	28	45.6		6	14	6	2	28	45.6

Sports Lighting

Soccer

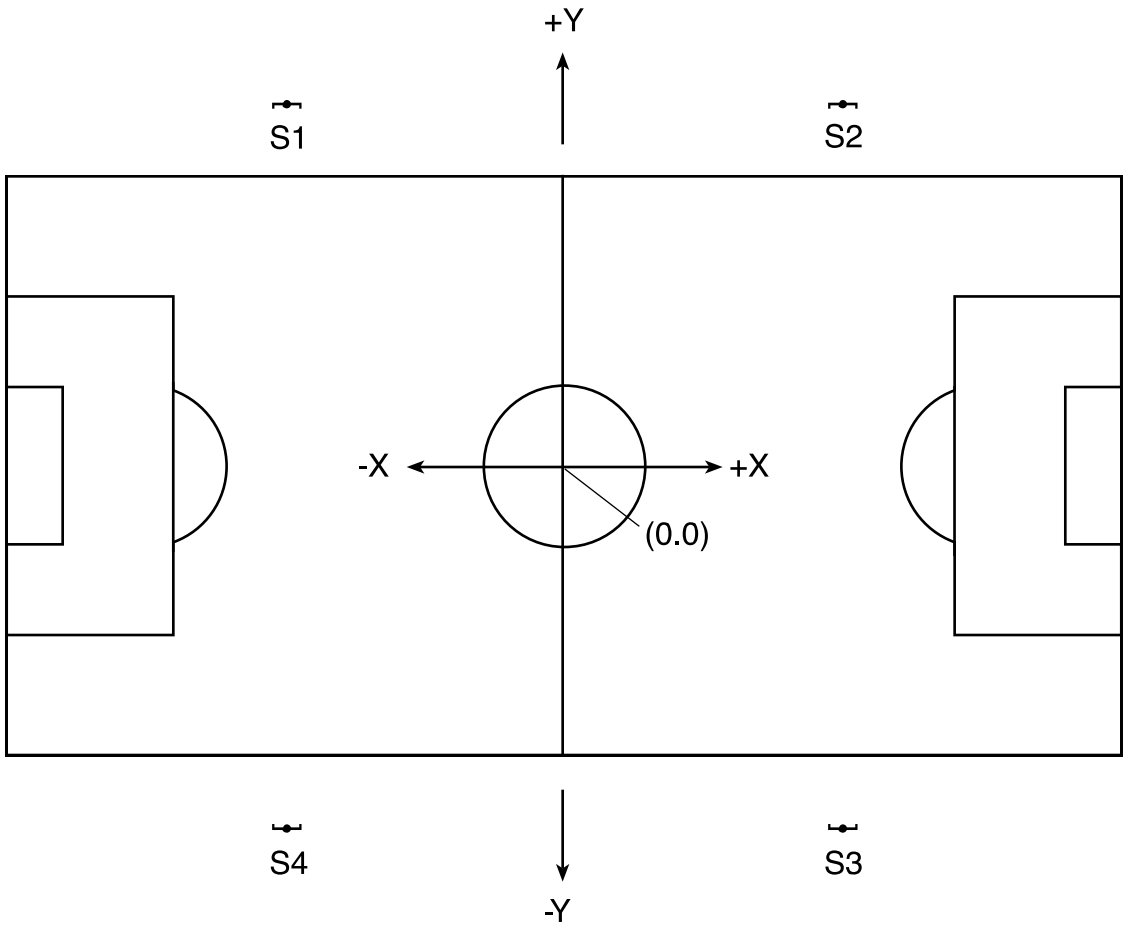
Typical Layouts

Pole Location

The number of poles and their locations are determined by the pole setback from the edge of the field. To prevent glare for the players (especially for pass plays), it is desirable to keep the floodlight aiming to less than 45 degrees either side of the pole. This requires that the pole quantity be increased as the setback decreases. The setback or pole quantities can change from one side of the field to the other.

Luminaire Mounting Height

The minimum mounting height is designed to keep the floodlights above the normal line of sight used in running and passing plays. A player will temporarily lose sight of the ball if it passes between him and the floodlights. All floodlights should be located above a line drawn 30 degrees above the playing surface from a point 1/3 across the field.



Sports Lighting

Soccer

Design Illuminance (maintained)	Field Dimensions		Poles				Standard 1500 Watt Metal Halide (PSFA)						ULC Glare Control 1500 Watt Metal Halide (ULGC)					
							Layout #	Fixture Quantities						Layout #	Fixture Quantities				
	Length	Width	ID	Mtg. Height	"X"	"Y"		Nema 3 (B0)	Nema 4 (C0)	Nema 5 (D0)	Nema 6 (E0)	Total	Power (KWA)		Nema 3 (B0)	Nema 4 (C0)	Nema 5 (D0)	Nema 6 (E0)	Total	Power (KWA)
50 FC (500 LUX) Class II	360′	225′	S1	60′	-90	+142.5	SS15M4A3	11	8	-	-	19	31.0	SS15M4A3ULC	19	-	-	-	19	31.0
			S2	60′	+90	+142.5		11	8	-	-	19	31.0		19	-	-	-	19	31.0
			S3	60′	+90	-142.5		11	8	-	-	19	31.0		19	-	-	-	19	31.0
			S4	60′	-90	-142.5		11	8	-	-	19	31.0		19	-	-	-	19	31.0
TOTALS			4	(30′ SETBACK)				44	32	0	0	76	123.9		76	0	0	0	76	123.9
30 FC (300 LUX) Class III	360′	225′	S1	60′	-90	+142.5	SS15M4B3	7	4	-	-	11	17.9	SS15M4B3ULC	11	-	-	-	11	17.9
			S2	60′	+90	+142.5		7	4	-	-	11	17.9		11	-	-	-	11	17.9
			S3	60′	+90	-142.5		7	4	-	-	11	17.9		11	-	-	-	11	17.9
			S4	60′	-90	-142.5		7	4	-	-	11	17.9		11	-	-	-	11	17.9
TOTALS			4	(30′ SETBACK)				28	16	0	0	44	71.7		44	0	0	0	44	71.7
50 FC (500 LUX) Class II	360′	225′	S1	70′	-90	+162.5	SS15M4C3	17	3	-	-	20	32.6	SS15M4C3ULC	17	3	-	-	20	32.6
			S2	70′	+90	+162.5		17	3	-	-	20	32.6		17	3	-	-	20	32.6
			S3	70′	+90	-162.5		17	3	-	-	20	32.6		17	3	-	-	20	32.6
			S4	70′	-90	-162.5		17	3	-	-	20	32.6		17	3	-	-	20	32.6
TOTALS			4	(50′ SETBACK)				68	12	0	0	80	130.4		68	12	0	0	80	130.4
30 FC (300 LUX) Class III	360′	225′	S1	70′	-90	+162.5	SS15M4D3	11	1	-	-	12	19.6	SS15M4D3ULC	11	1	-	-	12	19.6
			S2	70′	+90	+162.5		11	1	-	-	12	19.6		11	1	-	-	12	19.6
			S3	70′	+90	-162.5		11	1	-	-	12	19.6		11	1	-	-	12	19.6
			S4	70′	-90	-162.5		11	1	-	-	12	19.6		11	1	-	-	12	19.6
TOTALS			4	(50′ SETBACK)				44	4	0	0	48	78.2		44	4	0	0	48	78.2
50 FC (500 LUX)	360′	225′	S1	70′	-90	+182.5	SS15M4E3	19	3	-	-	22	35.9	SS15M4E3ULC	19	3	-	-	22	35.9
			S2	70′	+90	+182.5		19	3	-	-	22	35.9		19	3	-	-	22	35.9
			S3	70′	+90	-182.5		19	3	-	-	22	35.9		19	3	-	-	22	35.9
			S4	70′	-90	-182.5		19	3	-	-	22	35.9		19	3	-	-	22	35.9
TOTALS			4	(70′ SETBACK)				76	12	0	0	88	143.4		76	12	0	0	88	143.4
30 FC (300 LUX) Class III	360′	225′	S1	70′	-90	+182.5	SS15M4F3	12	2	-	-	14	22.8	SS15M4F3ULC	12	2	-	-	14	22.8
			S2	70′	+90	+182.5		12	2	-	-	14	22.8		12	2	-	-	14	22.8
			S3	70′	+90	-182.5		12	2	-	-	14	22.8		12	2	-	-	14	22.8
			S4	70′	-90	-182.5		12	2	-	-	14	22.8		12	2	-	-	14	22.8
TOTALS			4	(70′ SETBACK)				48	8	0	0	56	91.3		48	8	0	0	56	91.3
50 FC (500 LUX) Class II	360′	225′	S1	80′	-90	+202.5	SS15M4G3	21	3	-	-	24	39.1	SS15M4G3ULC	21	3	-	-	24	39.1
			S2	80′	+90	+202.5		21	3	-	-	24	39.1		21	3	-	-	24	39.1
			S3	80′	+90	-202.5		21	3	-	-	24	39.1		21	3	-	-	24	39.1
			S4	80′	-90	-202.5		21	3	-	-	24	39.1		21	3	-	-	24	39.1
TOTALS			4	(90′ SETBACK)				84	12	0	0	96	156.5		84	12	0	0	96	156.5
50 FC (500 LUX) Class II	360′	225′	S1	90′	-90	+222.5	SS15M4H3	25	-	-	-	25	40.8	SS15M4H3ULC	26	-	-	-	26	42.4
			S2	90′	+90	+222.5		25	-	-	-	25	40.8		26	-	-	-	26	42.4
			S3	90′	+90	-222.5		25	-	-	-	25	40.8		26	-	-	-	26	42.4
			S4	90′	- 90	-222.5		25	-	-	-	25	40.8		26	-	-	-	26	42.4
TOTALS			4	(110′ SETBACK)				100	0	0	0	100	163.0		104	0	0	0	104	169.5

Sports Lighting

Football

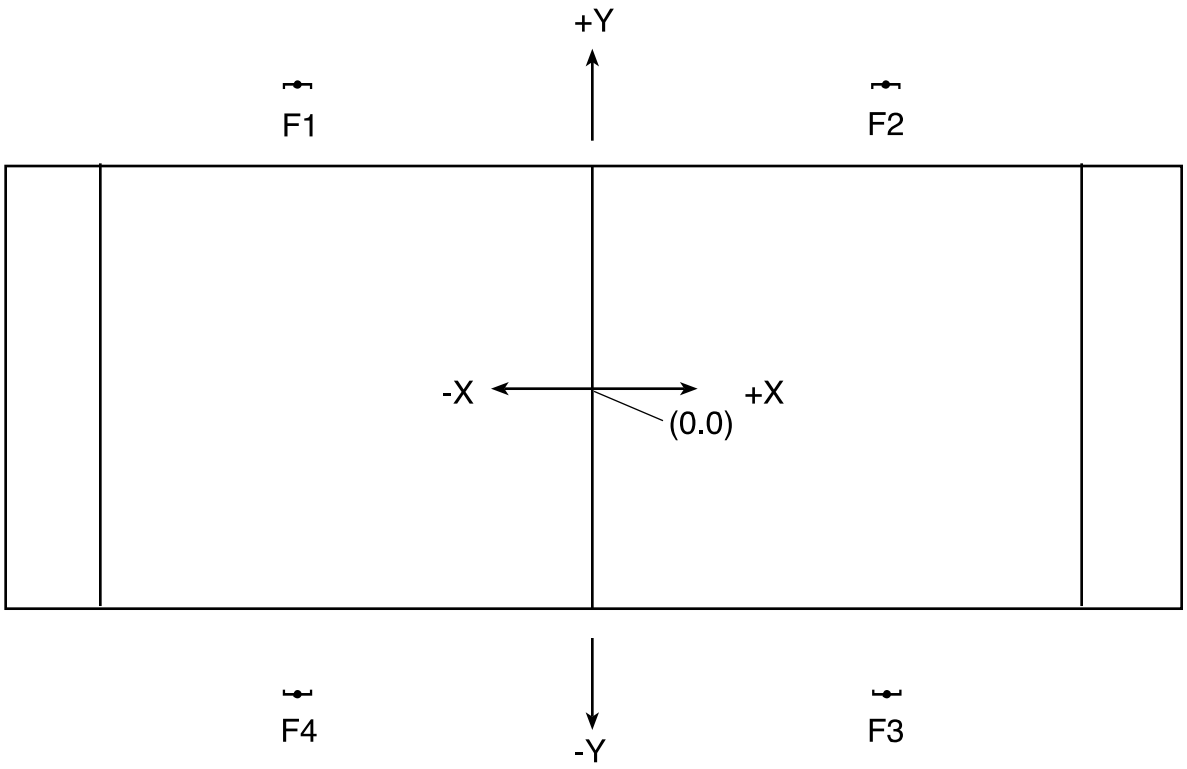
Typical Layouts

Luminaire Selection

No individual floodlight should produce more than the average design illumination level at any point on the field. Floodlights with too narrow beam type will cause hot spots and poor uniformity. The beam type selection, therefore, is always a function of the light level and the pole setback. This is the reason why fixtures from different manufacturers cannot be relied on to produce the same light levels or uniformity.

Aiming Diagrams

Individual aiming diagrams are available for each recommended system. Where the setback is different on the two sides of the field, order the diagrams for each setback and aim each side accordingly. Recommendations for higher light levels or for TV lighting should be referred to the Application Engineering unit at the factory.



Sports Lighting

Football

Design Illuminance (maintained)	Poles				Layout #	Standard 1500 Watt Metal Halide (PSFA) Fixture Quantities						Layout #	ULC Glare Control 1500 Watt Metal Halide (ULGC) Fixture Quantities					
	ID	Mtg. Height	"X"	"Y"		Nema 3 (B0)	Nema 4 (C0)	Nema 5 (D0)	Nema 6 (E0)	Total	Power (KWA)		Nema 3 (B0)	Nema 4 (C0)	Nema 5 (D0)	Nema 6 (E0)	Total	Power (KWA)
50 FC (500 LUX) Class II	F1	60′	-90	+110	FB15M4A3	3	10	-	-	13	21.2	FB15M4A3ULC	3	10	-	-	13	21.2
	F2	60′	+90	+110		3	10	-	-	13	21.2		3	10	-	-	13	21.2
	F3	60′	+90	-110		3	10	-	-	13	21.2		3	10	-	-	13	21.2
	F4	60′	-90	-110		3	10	-	-	13	21.2		3	10	-	-	13	21.2
TOTALS	4	('30′ SETBACK)				12	40	0	0	52	84.8		12	40	0	0	52	84.8
30 FC (300 LUX) Class III	F1	60′	-90	+110	FB15M4B3	1	7	-	-	8	13.0	FB15M4B3ULC	2	6	-	-	8	13.0
	F2	60′	+90	+110		1	7	-	-	8	13.0		2	6	-	-	8	13.0
	F3	60′	+90	-110		1	7	-	-	8	13.0		2	6	-	-	8	13.0
	F4	60′	-90	-110		1	7	-	-	8	13.0		2	6	-	-	8	13.0
TOTALS	4	('30′ SETBACK)				4	28	0	0	32	52.2		8	24	0	0	32	52.2
50 FC (500 LUX) Class II	F1	60′	-90	+130	FB15M4C3	9	6	-	-	15	24.5	FB15M4C3ULC	9	6	-	-	15	24.5
	F2	60′	+90	+130		9	6	-	-	15	24.5		9	6	-	-	15	24.5
	F3	60′	+90	-130		9	6	-	-	15	24.5		9	6	-	-	15	24.5
	F4	60′	-90	-130		9	6	-	-	15	24.5		9	6	-	-	15	24.5
TOTALS	4	(50′ SETBACK)				36	24	0	0	60	97.8		36	24	0	0	60	97.8
30 FC (300 LUX) Class III	F1	60′	-90	+130	FB15M4D3	6	3	-	-	9	14.7	FB15M4D3ULC	7	2	-	-	9	14.7
	F2	60′	+90	+130		6	3	-	-	9	14.7		7	2	-	-	9	14.7
	F3	60′	+90	-130		6	3	-	-	9	14.7		7	2	-	-	9	14.7
	F4	60′	-90	-130		6	3	-	-	9	14.7		7	2	-	-	9	14.7
TOTALS	4	(50′ SETBACK)				24	12	0	0	36	58.7		28	8	0	0	36	58.7
50 FC (500 LUX) Class II	F1	70′	-90	+150	FB15M4E3	16	0	-	-	16	26.1	FB15M4E3ULC	16	-	-	-	16	26.1
	F2	70′	+90	+150		16	0	-	-	16	26.1		16	-	-	-	16	26.1
	F3	70′	+90	-150		16	0	-	-	16	26.1		16	-	-	-	16	26.1
	F4	70′	-90	-150		16	0	-	-	16	26.1		16	-	-	-	16	26.1
TOTALS	4	(70′ SETBACK)				64	0	0	0	64	104.3		64	0	0	0	64	104.3
30 FC (300 LUX) Class III	F1	70′	-90	+150	FB15M4F3	10	-	-	-	10	16.3	FB15M4F3ULC	10	-	-	-	10	16.3
	F2	70′	+90	+150		10	-	-	-	10	16.3		10	-	-	-	10	16.3
	F3	70′	+90	-150		10	-	-	-	10	16.3		10	-	-	-	10	16.3
	F4	70′	-90	-150		10	-	-	-	10	16.3		10	-	-	-	10	16.3
TOTALS	4	(70′ SETBACK)				40	0	0	0	40	65.2		40	0	0	0	40	65.2
50 FC (500 LUX) Class II	F1	80′	-90	+170	FB15M4G3	17	-	-	-	17	27.7	FB15M4G3ULC	18	-	-	-	18	29.3
	F2	80′	+90	+170		17	-	-	-	17	27.7		18	-	-	-	18	29.3
	F3	80′	+90	-170		17	-	-	-	17	27.7		18	-	-	-	18	29.3
	F4	80′	-90	-170		17	-	-	-	17	27.7		18	-	-	-	18	29.3
TOTALS	4	(90′ SETBACK)				68	0	0	0	68	110.8		72	0	0	0	72	117.4
30 FC (300 LUX) Class III	F1	80′	-90	+170	FB15M4H3	10	-	-	-	10	16.3	FB15M4H3ULC	11	-	-	-	11	17.9
	F2	80′	+90	+170		10	-	-	-	10	16.3		11	-	-	-	11	17.9
	F3	80′	+90	-170		10	-	-	-	10	16.3		11	-	-	-	11	17.9
	F4	80′	-90	-170		10	-	-	-	10	16.3		11	-	-	-	11	17.9
TOTALS	4	(90′ SETBACK)				40	0	0	0	40	65.2		44	0	0	0	44	71.7
50 FC (500 LUX) Class II	F1	90′	-90	+190	FB15M4J3	19	-	-	-	19	31.0	FB15M4J3ULC	20	-	-	-	20	32.6
	F2	90′	+90	+190		19	-	-	-	19	31.0		20	-	-	-	20	32.6
	F3	90′	+90	-190		19	-	-	-	19	31.0		20	-	-	-	20	32.6
	F4	90′	-90	-190		19	-	-	-	19	31.0		20	-	-	-	20	32.6
TOTALS	4	(110′ SETBACK)				76	0	0	0	76	123.9		80	0	0	0	80	130.4
30 FC (300 LUX) Class III	F1	90′	-90	+190	FB15M4J3	11	-	-	-	11	17.9	FB15M4J3ULC	12	-	-	-	12	19.6
	F2	90′	+90	+190		11	-	-	-	11	17.9		12	-	-	-	12	19.6
	F3	90′	+90	-190		11	-	-	-	11	17.9		12	-	-	-	12	19.6
	F4	90′	-90	-190		11	-	-	-	11	17.9		12	-	-	-	12	19.6
TOTALS	4	(110′ SETBACK)				44	0	0	0	44	71.7		48	0	0	0	48	78.2

Sports Lighting

Tennis

TYPICAL LAYOUTS

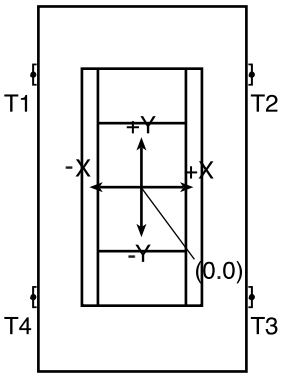
Pole Location

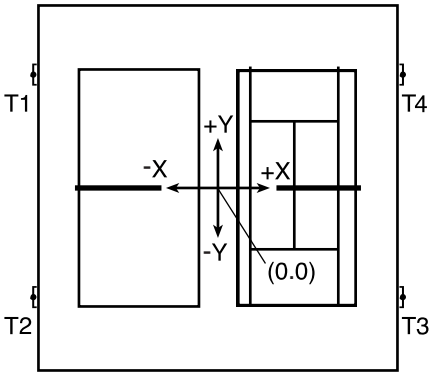
Pole locations are selected to produce uniform lighting on the entire play area while accenting the court area. Three poles per side produce the best results. These locations produce lighting on all sides of the ball through the entire length of the playing area. The pole height is selected to produce good uniformity and minimum glare for the number of courts to be lighted.

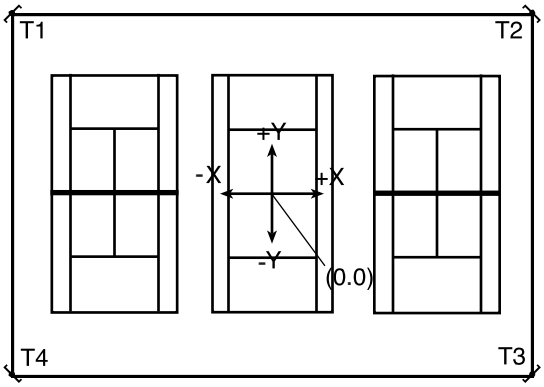
Two poles per side can also be used. A four-pole system (2/side) has a lower cost but does not produce as high a light level at the net or on the back court. The uniformity is also not as good. Contact the Application Engineering department at the factory for designs using three poles per side. Metal halide systems can be used on singles phase circuits. If HPS is used, three-phase power is suggested to eliminate stroboscopic effect. Coin-operated systems must make provisions for restrike and warm-up time required for HID systems.

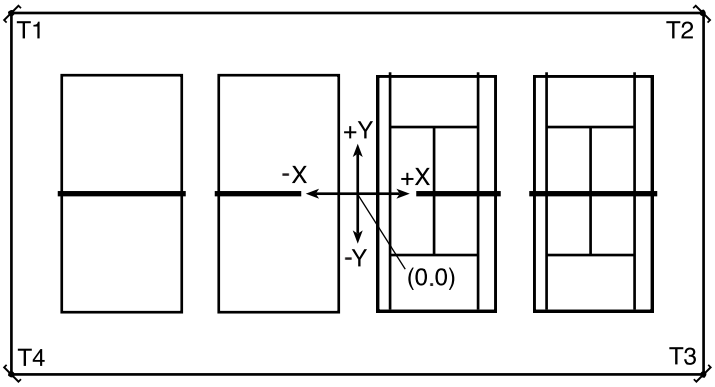
Aiming Diagrams

The floodlight aiming is designed to provide the highest levels on the playing surface especially at the net. The illumination levels and uniformity are based on the average of all test stations.









Sports Lighting

Tennis

Standard 1000 Watt Metal Halide (PSFA)													
	Court Information			Poles				Fixture Quantities					
Design Illuminance (maintained)	Width	Length	Layout #	ID	Mtg. Height	"X"	"Y"	Nema 3 (B0)	Nema 4 (C0)	Nema 5 (D0)	Nema 6 (E0)	Total	Power (KWA)
30 FC (300 lux) 1 COURT	60′	120′	TN10M1A3	T1	30′	-30	+39	-	-	-	2	2	2.2
				T2	30′	+30	+39	-	-	-	2	2	2.2
				T3	30′	+30	-39	-	-	-	2	2	2.2
				T4	30′	-30	-39	-	-	-	2	2	2.2
TOTALS				4				0	0	0	8	8	8.8
50 FC (500 LUX) 1 COURT	60′	120′	TN10M1B3	T1	30′	-30	+39	-	-	-	3	3	3.3
				T2	30′	+30	+39	-	-	-	3	3	3.3
				T3	30′	+30	-39	-	-	-	3	3	3.3
				T4	30′	-30	-39	-	-	-	3	3	3.3
TOTALS				4				0	0	0	12	12	13.2
30 FC (300 lux) 2 COURT	108′	120′	TN10M2A3	T1	40′	-54	+39	-	-	2	-	2	2.2
				T2	40′	+54	+39	-	-	2	-	2	2.2
				T3	40′	+54	-39	-	-	2	-	2	2.2
				T4	40′	-54	-39	-	-	2	-	2	2.2
TOTALS				4				0	0	8	0	8	8.8
50 FC (500 LUX) 2 COURT	108′	120′	TN10M2B3	T1	40′	-54	+39	-	1	2	-	3	3.3
				T2	40′	+54	+39	-	1	2	-	3	3.3
				T3	40′	+54	-39	-	1	2	-	3	3.3
				T4	40′	-54	-39	-	1	2	-	3	3.3
TOTALS				4				0	4	8	0	12	13.2
30 FC (300 lux) 3 COURT	156′	120′	TN10M3A3	T1	40′	-78	+60	1	2	-	-	3	3.3
				T2	40′	+78	+60	1	2	-	-	3	3.3
				T3	40′	+78	-60	1	2	-	-	3	3.3
				T4	40′	-78	-60	1	2	-	-	3	3.3
TOTALS				4				4	8	0	0	12	13.2
50 FC (500 LUX) 3 COURT	156′	120′	TN10M3B3	T1	40′	-78	+60	1	4	-	-	5	5.5
				T2	40′	+78	+60	1	4	-	-	5	5.5
				T3	40′	+78	-60	1	4	-	-	5	5.5
				T4	40′	-78	-60	1	4	-	-	5	5.5
TOTALS				**4**				**4**	**16**	**0**	**0**	**20**	**22.0**
30 FC (300 lux) 4 COURT	204′	120′	TN10M4A3	T1	50′	-102	+60	1	3	-	-	4	4.4
				T2	50′	+102	+60	1	3	-	-	4	4.4
				T3	50′	+102	-60	1	3	-	-	4	4.4
				T4	50′	-102	-60	1	3	-	-	4	4.4
TOTALS				**4**				**4**	**12**	**0**	**0**	**16**	**17.6**
50 FC (500 LUX) 4 COURT	204′	120′	TN10M4B3	T1	50′	-102	+60	2	5	-	-	7	7.7
				T2	50′	+102	+60	2	5	-	-	7	7.7
				T3	50′	+102	-60	2	5	-	-	7	7.7
				T4	50′	-102	-60	2	5	-	-	7	7.7
TOTALS				**4**				**8**	**20**	**0**	**0**	**28**	**30.8**
12′ BETWEEN COURTS; 12′ TO BASELINE FENCES; 21′ TO SIDELINE FENCES													

Sports Lighting

Indoor Sports Lighting

APPLICATIONS

For 15 to 35 ft. (5 to 11 meter) applications requiring high efficiency and the need for low glare

VB5 Versabeam™ Luminaire

High Bay or Low Bay, Enclosed – Surface Mount Optical Series

SPECIFICATION FEATURES

- Refractor with combination of reflecting and refracting prisms for high efficiency and good brightness control
- Symmetrical heavy-duty die-cast aluminum ballast housing with electrocoat gray or white polyester paint finish
- Ceramic and pulse start system available for metal halide
- NuVation™ HID electronic ballast available (shown)

NuVation™
Surface-Mount Series

NuVation™
Disconnect Series

OG5 Omniglow™ 400 Luminaire

Low Bay, Enclosed - Disconnect Mount Series

SPECIFICATION FEATURES

- Borosilicate prismatic glass reflector with bright zinc-plated, corrosion resistant steel frame
- High "up light" reduces cave effect
- Symmetrical heavy-duty die-cast aluminum ballast housing with electrocoat gray or white polyester paint finish
- Ceramic and pulse start system available for metal halide
- NuVation™ HID electronic ballast available (shown)

OG5 GHB® Prismatic Luminaire

Low Bay, Enclosed

SPECIFICATION FEATURES

- Symmetrical heavy duty die-cast aluminum ballast housing with electrocoat gray or white polyester paint finish
- UV stabilized acrylic reflector
- Single casting integral hook/loop and mounting plate is available
- Symmetrical heavy-duty die-cast aluminum ballast housing with electrocoat gray or white polyester paint finish
- Ceramic and pulse start system available for metal halide

VBE Versabeam™

OGE Omniglow® 400

OG5 GHB® Prismatic

Sports Lighting

Gymnasium Lighting

- **Innovative products**
- **Highest quality**
- **Numerous choices**
- **Fixtures for a variety of mounting heights and applications**
- **Easy installation and minimum maintenance**

GE Lighting Systems can help you light any type of indoor sports facility including: basketball; volleyball and tennis courts; exercise and weight rooms; and swimming pools. Following are detailed layouts and design data for lighting basketball courts. The lighting designs are also appropriate for volleyball gymnastics, wrestling, physical education classes, and indoor recreational soccer. They offer a choice of three top-quality products:

GE Versabeam™ Luminaire

GE GP5– GHB® Luminaire

GE Omniglow™ Luminaire

These design recommendations apply to high school, elementary school, club, and recreational basketball courts, as well as small college gymnasiums where video and still cameras are used for teaching or for local news. Larger college athletic facilities will require higher light levels to accommodate broadcast quality television coverage. Consult your GE representative or the factory for information on these types of applications.

This design guide features metal halide lamps, which we consider the best choice for gymnasium lighting. For applications where saving energy is the main consideration, GE can supply high pressure sodium (HPS) lighting systems.

GE Lighting Systems also designs and manufactures a range of high intensity discharge (HID) fixtures suitable for outdoor sports facilities, as well as area, industrial, hazardous, roadway and security lighting applications.

Design Guide

This design guide includes information pertinent to the layouts on the following pages. Reference this page along with the appropriate layout and luminaire specifications for a complete lighting design package. Consult GE Lighting Systems for luminaire and accessory ordering numbers.

These layouts assume a ceiling height of 25 feet. Recommended minimum mounting height to the bottom of the luminaire is 22 feet above the finished floor.

For gymnasiums, room surface finishes should have reasonable reflectance. Minimum wall and ceiling reflectances should be used. Reflectances are listed in the standard order: ceiling/wall/floor.

Designs include a light loss factor (LLF) which is the combined effect on light output of lamp lumen depreciation (LLD) and luminaire dirt depreciation (LDD).

Data shown is for fixtures using a 44,000-lumen 400-watt metal halide lamp with a rated life of 20,000 hours. It is based on a medium dirt environment after 8,000 hours of lamp operation (40% of life) at an average of 10 hours per start. Thus, foot-candle (fc) levels given are maintained, as recommended by IESNA. They are average fc (i.e., the average of all measured points on the court) and are based on measurements computed 3' off the floor. Test points for measuring light levels are on a 15' by 15' grid, with the first test point not more that 7.5' from the out of bounds line.

The ballast employed for the design is a NuVation™ Electronic. There are other types of ballasts and 400-watt metal halide lamps which are suitable for gymnasiums. Metal halide lamp technology is changing rapidly, particularly with 400-watt lamps, so be aware of the choices available. High pressure sodium lamps can be used for gymnasiums when color is not critical.

Sports Lighting

Gymnasium Lighting

Design data on page 26 is for a 44,000-lumen 400-watt metal halide pulse start lamp in a medium dirt environment after 8,000 hours of operation (40% of the 20,000-hour rated life) at an average of 10 hours per start. The ballast is NuVation™ Electronic HID.

In gymnasium applications, GE recommends flexible mounting on a hook and loop to minimize the risk of damage if a luminaire is struck by a moving ball. Safety chains should be used for each ballast housing and for each optical assembly.

Gymnasium Lighting with Versabeam Luminaires

The enclosed and gasketed GE Versabeam Luminaire projects light efficiently to both horizontal and vertical planes, with more downward efficiency than other luminaires intended for low to medium mounting heights. This attractive luminaire offers low glare, but with enough uplight for acceptable ceiling brightness. The rugged acrylic refractor is impact resistant. The luminaire may be remotely ballasted.

Design Data

Basketball court: 94' by 50'

Lamp: 400-watt metal halide pulse start

NuVation™ Ballast

Mounting height: 22'

Illuminance levels: average maintained foot-candles

LLF = 0.79: LLD = 0.85 and LDD = 0.93

Uniformity: maximum/minimum (max/min)

Fixture Spacing Criterion: 1.7

Illumination Engineering of North America (IESNA) Illumination Recommendations

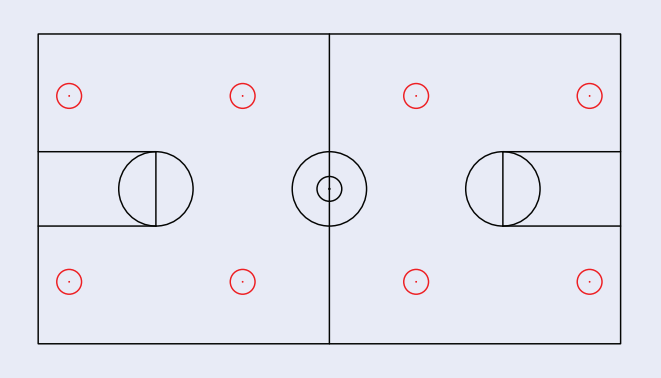
Application	**Horizontal:** Foot-candles (fc)/Maintained	**Uniformity:** Maximum/Minimum
Basketball:		
High School	75	2.1
Elementary	50	3.0
Club	50	3.0
Recreational	30	3.0
Gymnastics	30	2.5
Volleyball	30	3.5

Sports Lighting

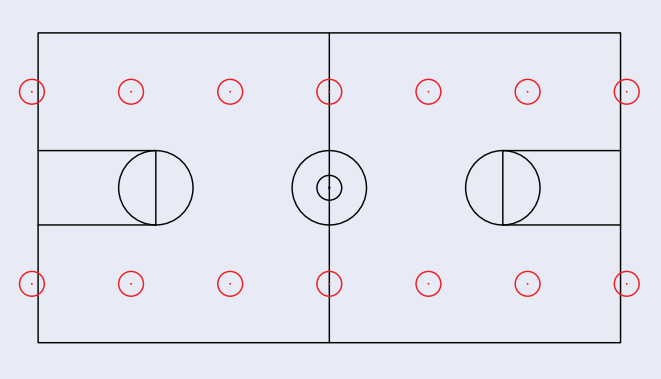
Gymnasium Lighting

Court Layouts

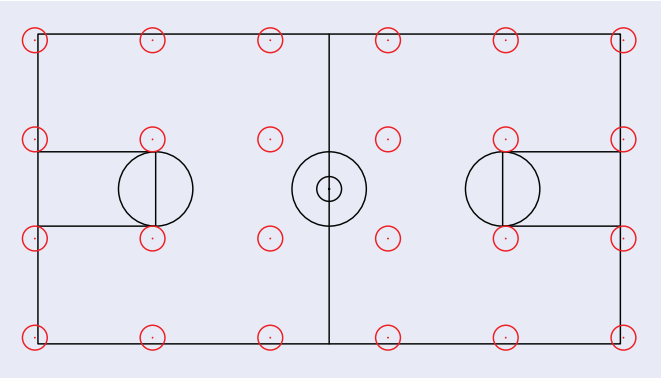
Room reflectances: 50/30/20
Dotted circles indicate luminaire positions. Layouts given are suggestions only. Luminaires should be mounted over the court, in a fairly uniform pattern, but placement is not critical. No matter what the spacing is, the average light level will remain about the same so long as the suggested number of luminaires is used, and all are over the court.



8 Luminaires – 32 fc; uniformity 1.3 max/min*



14 Luminaires – 55 fc; uniformity 1.4 max/min*



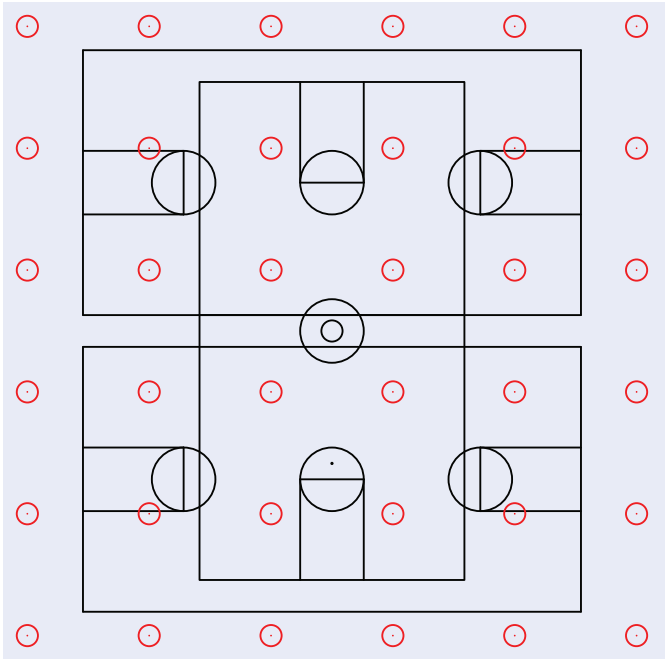
24 Luminaires – 87 fc; uniformity 1.3 max/min*

Light level data applies just to the court, but no additional lighting is needed in the gym if the area around the court does not extend further than 5' at each basket end and 30' along the side lines. Larger rooms may require additional luminaires.

Room reflectances: 50/30/20.
(These multiple court designs are generally for newer facilities, so ceiling reflectances are higher.)

Room size: 140' wide by 130' long.
Room consists of center main court and two cross-wise practice courts. Eliminate or add luminaires for different size rooms.

Luminaire: Versabeam™ with NuVation™ electronic ballast with pulse start metal halide VBU.*



36 Luminaires – 22'x 22' spacing
Main court: 59 fc; uniformity 1.2 max/min*
Practice courts: 59 fc; uniformity 1.2 max/min*

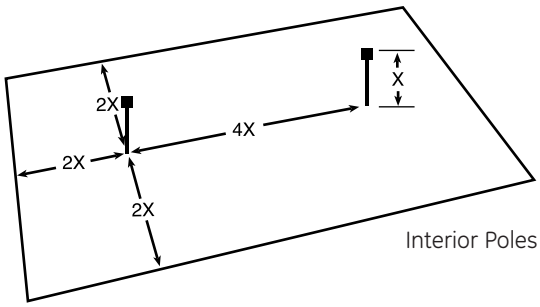
Parking Area Lighting

Area Lighting

Area Lighting Placement General Rules of Thumb

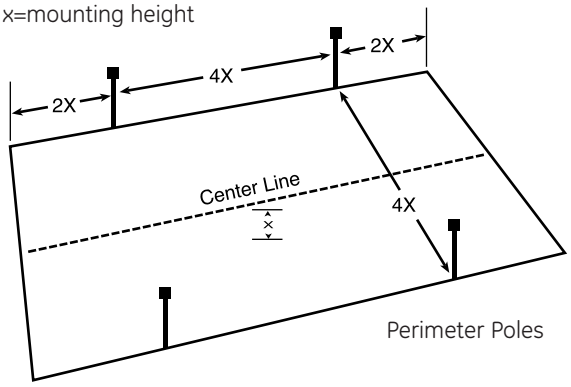
Areas lighted from central locations can be more economical but periphery locations are also desirable to provide needed visibility at entrances and exits, and on each side of three-dimensional objects.

If corner locations are not used, the distance from any side locations to the edge of the area should not exceed twice the mounting height (2X). The distance between poles should be no more than 4X.



Interior Poles

x=mounting height



Perimeter Poles

Parking Areas, Entrances & Roadways

Criterion™ Area Lighting

APPLICATIONS

- Walkways, parking lots and area lighting where reduced glare is desired

Criterion

Decashield® Luminaire

APPLICATIONS

- Parking lots, walkways, driveways, tennis courts, and parkway lighting
- 175W, 400W, or 1000W styles available

Decashield

M-400 Luminaire

APPLICATIONS

- For access roads, street, highway, parking lot and area lighting

Other fixture designs are available – contact sales agent

M-400

Walkway Lighting

Area Lighting

Walkways & Trails

StreetDreams® Avery™

APPLICATIONS

- Parking areas, roadways and walkways
- Access roads, paths
- IESNA cutoff optics available

Decashield® 175

APPLICATIONS

- Walkways, trails, pathways and parking areas

StreetDreams® Pendant Mount Series

APPLICATIONS

- Parking areas, roadways and walkways
- Access roads, walkways and paths (StreetDreams® - Lenoir Pendant Shown)

StreetDreams® Vandermore™

APPLICATIONS

- Parking areas, roadways and walkways
- Access roads, paths

Flood & Wall Lighting

Area Lighting

Floodlighting Building Facades

Decaflood® 400

APPLICATIONS

- Parking lots, building security, building facade, floodlighting applications
- Engineered for situations requiring high performance and varied optics.

SBF, SBN Powerflood® Floodlight

APPLICATIONS

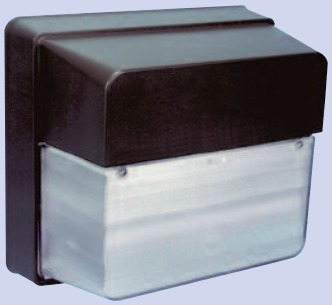
- Signage, facades, landscape lighting, building mounted focal points, flag lighting
- Ideal for situations where an easy-to-conceal floodlight with either wide beam or narrow beam photometrics is needed

Wall Lighting for Security

Criterion™ Wall Luminaire

APPLICATIONS

- Building perimeter security, high-activity entrances
- Full cut-off to limit light trespass
- Wall mounted luminaire applications where high light levels and low glare are required



Wallighter 175 Luminaire

APPLICATIONS

- Building perimeters, entrances, walkways
- Area lighting applications with vandal-resistant polycarbonate refractor

Pavillon & Wall Lighting/Glare Control

Area Lighting

Pavillon & Canopy Lighting

JR. Versabeam™

APPLICATIONS

- For clear lighting in your parks' pavilions and canopies
- Indoors, the Jr. Versabeam™ is ideal for hallways, locker rooms, restrooms and concession areas
- HID or CFL available

Wall Lighting

Wallmount™ Vandal-Resistant Luminaire

APPLICATIONS

- Office and shopping complexes, malls, parking garages, motels, condominiums
- Wall or ceiling mounted applications where a vandal-proof luminaire is needed
- Tamper-resistant screws

Glare Control

Skygard® 201SA Unit Pack

APPLICATIONS

- For outdoor work yards, equipment buildings, suburban developments, rural homes and yards where reduced glare and full cutoff lighting is required.

SPECIFICATION FEATURES

- Reduces glare and light trespass
- Complete unit pack in one package standard: includes hood, optical, lamp, PE control, prewired cable and mounting hardware

Sports Lighting

The following represents a partial lisiting of completed sports projects by GE Lighting Systems.

Parks:

Kaneohe Park District
Lipscomb Civitan Ballpark
Aala Park
Whalen Field
Waggoner Park
Melrose Park
Selma Park
Jackson Park
Wagon Wheel Park
Rutherford County Parkwest Rec Cmplx
Faulkner Park
Highland Park
Coleman Park
Metro Parks & Rec
Shenandoah Park
LaSierra Skate Park
Moss Wright Park
Richmond Park
City of Vero Beach
Smith Baseball Field
Greenville Park
Cartersville Park
Etheridge Park
Wyomia Tyus Park
Columbus Park
Cloverleaf Park
Ben Hill Park
Lake Park Arena
Portland Park
Andy Brown Park
Mullaney Park
Spain Park
Blackwater Rec Ctr
Nosotros Park
Vierra East Park
City of Charleston
Northdale Park
Pals Park
Benton Ridge Park
Reistertown Regional Park
Meadowood Park Fields
Halifax Rec
Hana Ballpark
Lakeshore Park
Lamar Co Rec Dept
Caldwell Park
Covington Youth Sports
Dorton Park
Columbus Cty Parks/Rec
Plainsman Park
Wilmington State Park
Mullins Park
Eastside Park
Helder Park
Clayton Park
Floyd Bennett Field
Millers Pond Park
Montgomery Park
Eastern Regional Pk
Eastside Park
Thompson Parks & Rec
Grant Park
Greenfield Park
Greenroad Park
Rancho Etiwanda Park
Los Encinos Park
Stinson Park
Davis Park
Grayson Park
IPES Road Park
Warner Park
Grayson Park

...and many, many more

North American College Facilities:

Arizona State University
The Citadel
Cotton Bowl
East Carolina State University
Furman University
Hofstra University
Gator Bowlv
Legion Field, Birmingham
Michigan State University
Mississippi State University
New Mexico State University
North Carolina State University
Oklahoma State University
Oregon State University
Princeton University
Rice Institute
Rutgers University
Skidmore College
State University of New York
Sun Bowl
Syracuse University
Texas Tech University
University of Alabama
University of Arizona
University of California, Los Angeles
University of Illinois
University of Maryland
University of Missouri
University of Nevada
University of North Carolina
University of Oregon
University of South Carolina
University of Tennessee
University of Virginia
University of Washington
Vanderbilt University
Virginia Military Institute
Western Carolina State University
Wichita State University

North American Professional Facilities

Anahiem Stadium – Anahiem Angels
Arrowhead Football Stadium (original and relight) – Kansas City Chiefs
Bowie Field, Maryland
Bradley Arena, Milwaukee
Busch Stadium - St. Louis Cardinals
Camden Yards – Baltimore Orioles
Candlestick Park – San Francisco 49ers
Cenergy Field – Cincinnati Reds
Cleveland Browns Stadium (old and new stadium)
Coors Field – Colorado Rockies
Cowboy Stadium Dallas Cowboys
Fenway Park – Boston Red Sox
Fulton County Stadium – Atlanta Braves
Gund Arena, Cleveland
Houston Astros
Hubert Humphrey Metrodome – Minnesota Twins
Jack Murphy Stadium – San Diego Chargers
Jacobs Field – Cleveland Indians
Jaguar's Stadium – Jacksonville Jaguars
Kaufman Stadium (original and relight) – Kansas City Royals
Los Angeles Coliseum – LA Rams
MeadowLands – NY Giants and Jets home field

Sports Lighting

Memorial Park, Las Vegas
Miami Arena
Mile High Stadium – Denver Broncos
(original and new stadium)
Molson Centre, Montreal
Oakland Coliseum – Oakland Raiders
PAC BELL Park – San Francisco Giants
PNC Ballpark – Pittsburgh Pirates
Paul Brown Stadium – Cincinnati Bengals
Philadelphia Eagles
Philadelphia Phillies
Qual Comm Park – San Diego padres
Ralph Wilson Stadium – Buffalo Bills
(original and relight)
Richfield Coliseum, Cleveland
Safeco Field – Seattle Mariners
Sam Houston Track, Houston
San Diego Padres
Sun Devil's Stadium – Phoenix Cardinals
Tropicana Dome – Devil Rays
Wrigley Field – Chicago Cubs

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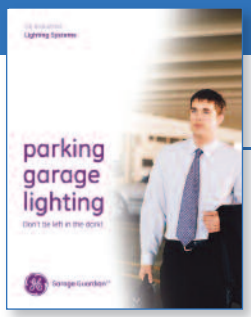
NuVation™ – HID electronic ballast reduces operating cost via lower wattage lamps in retrofits or fewer fixtures in new installations. (Order: OLP-2762)

Garage Guardian™ – Guarding you from the dark. These luminaries are designed specifically for parking garage lighting applications. (Order: OLP-2795A)



GE Total Lighting Control (TLC®) – Offers many different light control systems, from the very basic to the most extreme. Meet energy code legislation with TLC. For more information call 877.584.2685 or visit www.ge.com/TLC

imagination at work

OLP-2736A
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