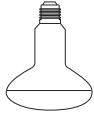


Directional Lamp Types

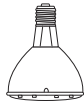
Directional lamps with built-in reflectors are frequently used for track and recessed lighting applications. The variety of Incandescent, Halogen and Ceramic Metal Halide lamps typically used are described below.

Incandescent R (Reflector) and BR (Bulge Reflector)



These lamps are available in limited sizes and wattages in two basic spot and flood patterns. They offer soft, even beams of warm incandescent light. Though the least expensive to purchase, their cost of ownership is the highest because they are the least energy efficient. Typical life is 2000 hours.

Halogen PAR (Parabolic Aluminized Reflector)



Parabolic Aluminized Reflector (PAR) lamps are the most popular directional lamps, offering a wide variety of sizes, wattages and beam spreads. A more sophisticated lens/reflector system and halogen technology make PAR lamps 50% more efficient than incandescent R/BR lamps. A staple of the retail environment, they are well suited for high level ambient and accent applications, because their good beam definition and white halogen light enhance visibility and contrast. PAR lamps are also available in energy-saving "IR" models whereby the infrared heat produced by the lamp is reflected back onto the filament, enabling it to burn hotter and brighter, improving energy efficiency up to 30%. Typical life of PAR lamps is 2000 to 3000 hours.

12-Volt and 24-Volt MR11/MR16 (Mirrored Reflector)



These 2" Mirrored Reflector (MR) lamps have smaller "point-source" filaments that are precisely aligned in a miniature multi-faceted reflector to produce exacting beam distributions of white, halogen light. For spot distributions they produce more usable light per watt of energy than comparable wattage halogen PAR lamps. Available in a wide range of beam spreads and wattages, the miniature 2" MR16 lamps allow for very compact fixture designs and, in combination with light control lenses, a high degree of specificity in lighting design. They are the best accent source for highlighting artwork, sculpture, or creating dramatic effects. Smaller, lower wattage 1 3/8" diameter MR11 lamps are also available for special situations where ultra-miniature fixture size is required. Like halogen PAR lamps, MR16 lamps are now available in "IR" models whereby the infrared heat produced by the lamp is reflected back onto the filament, enabling it to burn hotter and brighter, improving energy efficiency up to 30%. Life ranges from 2000 to 6000 hours. MR lamps require a step-down transformer to supply their required 12 or 24 volts.

12-Volt PAR36, AR111



Like MR16 lamps, AR111 and PAR36 utilize a smaller "point source" filament aligned in an optically efficient reflector. The difference is that these lamps use a larger parabolic reflector and a capped filament to produce a tightly collimated beam of light resulting in center beam intensities up to five times that of MR16s. They are best suited for dramatic, high-contrast accents and hold their beam over longer throw distances. Because the filament is shielded with a metal cap, PAR36 and AR111 lamps have very low brightness, much like one experiences with a dental examination light. Their typical life is 2000 to 3000 hours. These lamps require a step-down transformer to supply their required 12 volts.

Ceramic Arc Metal Halide (CMH) PAR

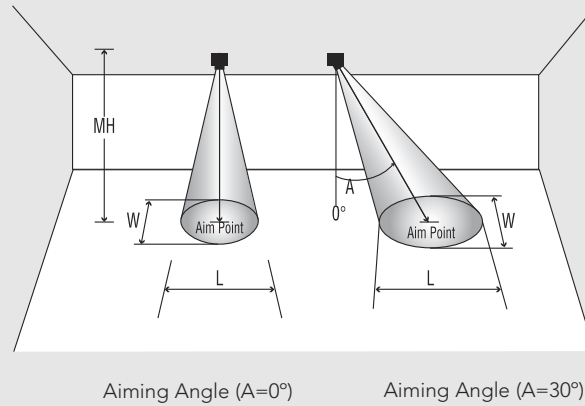


Similar in optical performance to Halogen PARs, CMH PARs are three to five times more efficient, have 2-3 times longer life and introduce less heat into a space. CMH lamps are typically operated with electronic ballasts that precisely regulate the current to the lamp, providing consistent lamp-to-lamp color and excellent color stability over life, previously not attainable from metal halide sources. Available in 3000K and 4000K colors. Center beam intensities and energy efficiency up to four times that of halogen PARs make these high performance lamps an excellent choice for higher ceiling, long burning, commercial and retail applications. CMH lamps require a couple of minutes to reach full brightness and several minutes to restrike in the event of a power disruption. Typical life is 9-12,000 hours.

The tables on the following pages provide illumination levels (FC) and beam size (in feet) for lamps of various wattages and beam patterns. Data is given for lamps aimed at both horizontal and vertical surfaces.

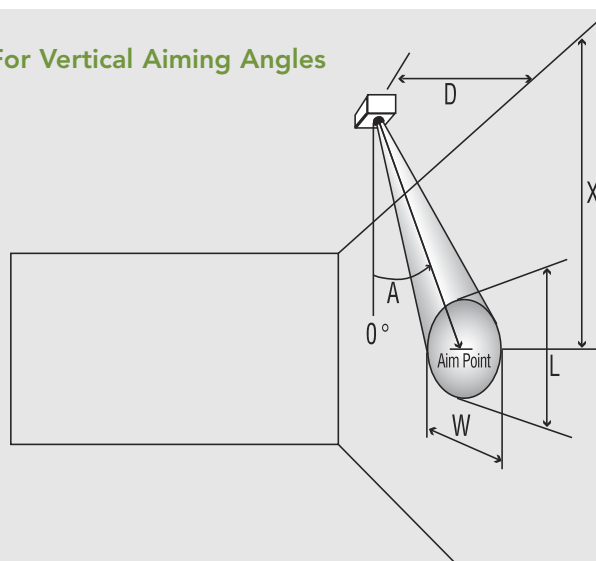
Maximum candlepower and rated life is also indicated for each lamp. Lamp performance is based on bare lamp photometrics provided by lamp manufacturers. The illustrations below define the table headings used on the following pages.

For Horizontal Aiming Angles



Aiming angles for vertical surfaces include: 30° and 45°

For Vertical Aiming Angles



Aiming angles for horizontal surfaces include: 0° and 30°

CBCP - Center Beam Candle Power

A - Aiming angle of fixture/lamp, measured from 0° vertical

MH - Vertical distance from the fixture/lamp to the horizontal surface

FC - Footcandles at beam center (aim point)

L - Length of beam*

W - Width of beam*

D - Distance from fixture/lamp to wall**

X - Vertical distance to the center of the beam measured from ceiling**





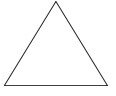


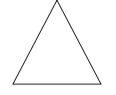











* The beam spread in degrees and the beam "L" and "W" in the following tables are computed at 50% of centerbeam candlepower and represent areas of "effective illumination."

** In vertical aiming applications, aim point (X) is determined by dividing distance from the wall (D) by the tangent of the desired aim angle (A) (0.577 for 30°, 1.0 for 45°, 1.732 for 60°)

















Line Voltage Incandescent & Halogen



Lamp Data

Lamp	Beam Type	Beam Spread	Rated Life	CBCP	Horizontal Surface						Vertical Surface														
					0 degrees			30 degrees			30 degrees			45 degrees			60 degrees								
					MH	FC	L	W	FC	L	W	D	FC	X	L	W	FC	X	L	W	D	FC	X	L	W
50W R20 Incandescent 		45° 	2000	550	2	138	1.7	1.7	89	2.3	1.9	2	17	3.5	13.7	3.3	49	2.0	4.0	2.3	2	89	1.2	2.3	1.9
					4	34	3.3	3.3	22	4.7	3.8	3	8	5.2	20.5	5.0	22	3.0	6.0	3.5	3	40	1.7	3.5	2.9
					6	15	5.0	5.0	10	7.0	5.7	4	4	6.9	27.3	6.6	12	4.0	8.0	4.7	4	22	2.3	4.7	3.8
					8	9	6.6	6.6	6	9.4	7.7	5	3	8.7	34.1	8.3	8	5.0	10.0	5.9	5	14	2.9	5.9	4.8
					10	5	8.3	8.3	4	11.7	9.6	6	2	10.4	41.0	9.9	5	6.0	12.0	7.0	6	10	3.5	7.0	5.7
65W BR30 Incandescent 	SP	27° 	2000	1680	2	420	1.0	1.0	273	1.3	1.1	2	53	3.5	4.6	1.9	148	2.0	2.0	1.4	3	121	1.7	2.0	1.7
					4	105	1.9	1.9	68	2.6	2.2	3	23	5.2	7.0	2.9	66	3.0	3.1	2.0	4	68	2.3	2.6	2.2
					6	47	2.9	2.9	30	3.9	3.3	4	13	6.9	9.3	3.8	37	4.0	4.1	2.7	5	44	2.9	3.3	2.8
					8	26	3.8	3.8	17	5.2	4.4	5	8	8.7	11.6	4.8	24	5.0	5.1	3.4	6	30	3.5	3.9	3.3
					10	17	4.8	4.8	11	6.5	5.5	6	6	10.4	13.9	5.8	16	6.0	6.1	4.1	7	22	4.0	4.6	3.9
	FL	60° 	2000	510	2	128	2.3	2.3	83	3.5	2.7	1	64	1.7	**	2.3	180	1.0	3.5	1.6	1	331	0.6	1.7	1.3
					3	57	3.5	3.5	37	5.2	4.0	2	16	3.5	**	4.6	45	2.0	6.9	3.3	2	83	1.2	3.5	2.7
					4	32	4.6	4.6	21	6.9	5.3	3	7	5.2	**	6.9	20	3.0	10.4	4.9	3	37	1.7	5.2	4.0
					5	20	5.8	5.8	13	8.7	6.7	4	4	6.9	**	9.2	11	4.0	13.9	6.5	4	21	2.3	6.9	5.3
					6	14	6.9	6.9	9	10.4	8.0	5	3	8.7	**	11.5	7	5.0	17.3	8.2	5	13	2.9	8.7	6.7
120W BR40 Incandescent 	SP	20° 	2000	6690	6	186	2.1	2.1	121	2.9	2.4	3	93	5.2	4.7	2.1	263	3.0	2.2	1.5	5	174	2.9	2.4	2.0
					8	105	2.8	2.8	68	3.8	3.3	4	52	6.9	6.2	2.8	148	4.0	2.9	2.0	6	121	3.5	2.9	2.4
					10	67	3.5	3.5	43	4.8	4.1	5	33	8.7	7.8	3.5	95	5.0	3.6	2.5	7	89	4.0	3.3	2.9
					12	46	4.2	4.2	30	5.7	4.9	6	23	10.4	9.3	4.2	66	6.0	4.4	3.0	8	68	4.6	3.8	3.3
					14	34	4.9	4.9	22	6.7	5.7	7	17	12.1	10.9	4.9	48	7.0	5.1	3.5	9	54	5.2	4.3	3.7
	FL	53° 	2000	1430	4	89	4.0	4.0	58	5.8	4.6	2	45	3.5	**	4.0	126	2.0	5.3	2.8	3	103	1.7	4.3	3.5
					6	40	6.0	6.0	26	8.7	6.9	3	20	5.2	**	6.0	56	3.0	8.0	4.2	4	58	2.3	5.8	4.6
					8	22	8.0	8.0	15	11.6	9.2	4	11	6.9	**	8.0	32	4.0	10.6	5.6	5	37	2.9	7.2	5.8
					10	14	10.0	10.0	9	14.5	11.5	5	7	8.7	**	10.0	20	5.0	13.3	7.1	6	26	3.5	8.7	6.9
					12	10	12.0	12.0	6	17.4	13.8	6	5	10.4	**	12.0	14	6.0	15.9	8.5	7	19	4.0	10.1	8.1
45W PAR16 Halogen 	NSP	10° 	2000	5000	6	139	1.0	1.0	90	1.4	1.2	2	156	3.5	1.4	0.7	442	2.0	0.7	0.5	6	90	3.5	0.9	0.8
					8	78	1.4	1.4	51	1.9	1.6	3	69	5.2	2.1	1.0	196	3.0	1.1	0.7	9	40	5.2	1.4	1.2
					10	50	1.7	1.7	32	2.3	2.0	4	39	6.9	2.9	1.4	110	4.0	1.4	1.0	12	23	6.9	1.9	1.6
					12	35	2.1	2.1	23	2.8	2.4	5	25	8.7	3.6	1.7	71	5.0	1.8	1.2	15	14	8.7	2.3	2.0
					14	26	2.4	2.4	17	3.3	2.8	6	17	10.4	4.3	2.1	49	6.0	2.1	1.5	18	10	10.4	2.8	2.4
	NFL	27° 	2000	1400	3	156	1.4	1.4	101	2.0	1.7	1	175	1.7	2.3	1.0	495	1.0	1.0	0.7	4	57	2.3	1.3	1.1
					5	56	2.4	2.4	36	3.3	2.8	2	44	3.5	4.6	1.9	124	2.0	2.0	1.4	6	25	3.5	2.6	2.2
					7	29	3.4	3.4	19	4.6	3.9	3	19	5.2	7.0	2.9	55	3.0	3.1	2.0	8	14	4.6	3.9	3.3
					9	17	4.3	4.3	11	5.9	5.0	4	11	6.9	9.3	3.8	31	4.0	4.1	2.7	10	9	5.8	5.2	4.4
					11	12	5.3	5.3	8	7.2	6.1	5	7	8.7	11.6	4.8	20	5.0	5.1	3.4	12	6	6.9	6.5	5.5
					12	10	12.0	12.0	6	17.4	13.8	6	5	10.4	**	12.0	14	6.0	15.9	8.5	7	19	4.0	10.1	8.1
60W PAR16 Halogen 	NSP	10° 	2000	5000	6	139	1.0	1.0	90	1.4	1.2	2	156	3.5	5.5	2.1	115	2.0	2.3	1.5	5	130	2.9	1.2	1.0
					8	78	1.4	1.4	51	1.9	1.6	3	69	5.2	2.1	1.0	196	3.0	1.1	0.7	6	90	3.5	1.4	1.2
					10	50	1.7	1.7	32	2.3	3.0	4	39	6.9	2.9	1.4	110	4.0	1.4	1.0	7	66	4.0	1.6	1.4
					12	35	2.1	2.1	23	2.8	2.4	5	25	8.7	3.6	1.7	71	5.0	1.8	1.2	8	51	4.6	1.9	1.6
					14	26	2.4	2.4	17	3.3	2.8	6	17	10.4	4.3	2.1	49	6.0	2.1	1.5	9	40	5.2	2.1	1.8
	NFL	30° 	2000	1300	4	81	2.1	2.1	53	2.9	2.5	2	41	3.5	5.5	2.1	115	2.0	2.3	1.5	3	94	1.7	2.2	1.9
					6	36	3.2	3.2	23	4.4	3.7	3	18	5.2	8.2	3.2	51	3.0	3.5	2.3	4	53	2.3	2.9	2.5
					8	20	4.3	4.3	13	5.9	5.0	4	10	6.9	10.9	4.3	29	4.0	4.6	3.0	5	34	2.9	3.7	3.1
					10	13	5.4	5.4	8	7.3	6.2	5	7	8.7	13.7	5.4	18	5.0	5.8	3.8	6	23	3.5	4.4	3.7
					12	9	6.4	6.4	6	8.8	7.4	6	5	10.4	16.4	6.4	13	6.0	6.9	4.5	7	17	4.0	5.1	4.3
					12	10	12.0	12.0	6	17.4	13.8	6	5	10.4	**	12.0	14	6.0	15.9	8.5	7	19	4.0	10.1	8.1
75W PAR16 Halogen 	NSP	10° 	2000	7500	6	208	1.0	1.0	135	1.4	1.2	2	234	3.5	1.4	0.7	663	2.0	0.7	0.5	6	135	3.5	1.4	1.2
					8	117	1.4	1.4	76	1.9	1.6	3	104	5.2	2.1	1.0	295	3.0	1.1	0.7	7	99	4.0	1.6	1.4
					10	75	1.7	1.7	49	2.3	2.0	4	59	6.9	2.9	1.4	166	4.0	1.4	1.0	8	76	4.6	1.9	1.6
					12	52	2.1	2.1	34	2.8	2.4	5	38	8.7	3.6	1.7	106	5.0	1.8	1.2	9	60	5.2	2.1	1.8
					14	38	2.4	2.4	25	3.3	2.8	6	26	10.4	4.3	2.1	74	6.0	2.1	1.5	10	49	5.8	2.3	2.0
	NFL	30° 	2000	1900	4	119	2.1	2.1	77	2.9	2.5	2	59	3.5	5.5	2.1	168	2.0	2.3	1.5	2	309	1.2	1.5	1.2
					6	53	3.2	3.2	34	4.4	3.7	3	26	5.2	8.2	3.2	75	3.0	3.5	2.3	3	137	1.7	2.2	1.9
					8	30	4.3	4.3	19	5.9	5.0	4	15	6.9	10.9	4.3	42	4.0	4.6	3.0	4	77	2.3	2.9	2.5
					10	19	5.4	5.4	12	7.3	6.2	5	10	8.7	13.7	5.4	27	5.0	5.8	3.8	5	49	2.9	3.7	3.1
					12	13	6.4	6.4	9	8.8	7.4	6	7	10.4	16.4	6.4	19	6.0	6.9	4.5	6	34	3.5	4.4	3.7
					12	10	12.0	12.0	6	17.4	13.8	6	5	10.4	**	12.0	14	6.0	15.9	8.5	7	19	4.0	10.1	8.1
50W PAR20 Halogen 	SP	10° 	2500	4600	6	128	1.0	1.0	83	1.4	1.2	2	144	3.5	1.4	0.7	407	2.0	0.7	0.5	3	332	1.7	1.7	0.6
					8	72	1.4	1.4	47	1.9	1.6	3	64	5.0	2.1	1.0	181	3.0	1.1	0.7	4	187	2.3	0.9	0.8
					10	46	1.7	1.7	30	2.3	2.0	4	36	6.9	2.9	1.4	102	4.0	1.4	1.0	5	120	2.9	1.2	1.0
					12	32	2.1	2.1	21	2.8	2.4	5	23	8.7	3.6	1.7	65	5.0	1.8	1.2	6	83	3.5	1.4	1.2
					14	24	2.4	2.4	15	3.3	2.8	6	16	10.4	4										






Line Voltage Halogen

Lamp	Beam Type	Beam Spread	Rated Life	CBCP	Horizontal Surface						Vertical Surface														
					0 degrees			30 degrees			30 degrees			45 degrees			60 degrees								
					MH	FC	L	W	FC	L	W	D	FC	X	L	W	FC	X	L	W	D	FC	X	L	W
50W PAR30 Halogen 	SP	10° 	3000	6900	6	192	1.0	1.0	124	1.4	1.2	3	96	5.2	2.1	1.0	271	3.0	1.1	0.7	6	124	3.5	1.4	1.2
					8	108	1.4	1.4	70	1.9	1.6	4	54	6.9	2.9	1.4	152	4.0	1.4	1.0	7	91	4.0	1.6	1.4
					10	69	1.7	1.7	45	2.3	2.0	5	35	8.7	3.6	1.7	98	5.0	1.8	1.2	8	70	4.6	1.9	1.6
					12	48	2.1	2.1	31	2.8	2.4	6	24	10.4	4.3	2.1	68	6.0	2.1	1.5	9	55	5.2	2.1	1.8
					14	35	2.4	2.4	23	3.3	2.8	7	18	12.1	5.0	2.4	50	7.0	2.5	1.7	10	45	5.8	2.3	2.0
	NFL	25° 	3000	2000	4	125	1.8	1.8	81	2.4	2.0	2	63	3.5	4.2	1.8	177	2.0	1.9	1.3	4	81	2.3	2.4	2.0
					6	56	2.7	2.7	36	3.6	3.1	3	28	5.2	6.2	2.7	79	3.0	2.8	1.9	5	52	2.9	3.0	2.6
					8	31	3.5	3.5	20	4.8	4.1	4	16	6.9	8.3	3.5	44	4.0	3.7	2.5	6	36	3.5	3.6	3.1
					10	20	4.4	4.4	13	6.0	5.1	5	10	8.7	10.4	4.4	28	5.0	4.7	3.1	7	27	4.0	4.2	3.6
					12	14	5.3	5.3	9	7.2	6.1	6	7	10.4	12.5	5.3	20	6.0	5.6	3.8	8	20	4.6	4.8	4.1
	FL	35° 	3000	1400	3	156	1.9	1.9	101	2.6	2.2	1	175	1.7	3.6	1.3	495	1.0	1.4	0.9	2	227	1.2	1.7	1.5
					5	56	3.2	3.2	36	4.3	3.6	2	44	3.5	7.2	2.5	124	2.0	2.8	1.8	3	101	1.7	2.6	2.2
7					29	4.4	4.4	19	6.1	5.1	3	19	5.2	10.8	3.8	55	3.0	4.2	2.7	4	57	2.3	3.5	2.9	
9					17	5.7	5.7	11	7.8	6.6	4	11	6.9	14.4	5.0	31	4.0	5.6	3.6	5	36	2.9	4.3	3.6	
11					12	6.9	6.9	8	9.6	8.0	5	7	8.7	18.0	6.3	20	5.0	7.0	4.5	6	25	3.5	5.2	4.4	
50W PAR30 Halogen IR 	SP	9° 	3000	13000	6	361	0.9	0.9	235	1.3	1.1	4	102	6.9	2.6	1.3	287	4.0	1.3	0.9	7	172	4.0	1.5	1.3
					8	203	1.3	1.3	132	1.7	1.5	5	65	8.7	3.2	1.6	184	5.0	1.6	1.1	8	132	4.6	1.7	1.5
					10	130	1.6	1.6	84	2.1	1.8	6	45	10.4	3.8	1.9	128	6.0	1.9	1.3	9	104	5.2	1.9	1.6
					12	90	1.9	1.9	59	2.5	2.2	7	33	12.1	4.5	2.2	94	7.0	2.2	1.6	10	84	5.8	2.1	1.8
					14	66	2.2	2.2	43	2.9	2.5	8	25	13.9	5.1	2.5	72	8.0	2.5	1.8	11	70	6.4	2.3	2.0
	NFL	25° 	3000	2700	4	169	1.8	1.8	110	2.4	2.0	2	84	3.5	4.2	1.8	239	2.0	1.9	1.3	4	110	2.3	2.4	2.0
					6	75	2.7	2.7	49	3.6	3.1	3	38	5.2	6.2	2.7	106	3.0	2.8	1.9	5	70	2.9	3.0	2.6
					8	42	3.5	3.5	27	4.8	4.1	4	21	6.9	8.3	3.5	60	4.0	3.7	2.5	6	49	3.5	3.6	3.1
					10	27	4.4	4.4	19	6.0	5.1	5	14	8.7	10.4	4.4	38	5.0	4.7	3.1	7	36	4.0	4.2	3.6
					12	19	5.3	5.3	12	7.2	6.1	6	9	10.4	12.5	5.3	27	6.0	5.6	3.8	8	27	4.6	4.8	4.1
	FL	35° 	3000	1500	3	167	1.9	1.9	108	2.6	2.2	1	188	1.7	3.6	1.3	530	1.0	1.4	0.9	3	108	1.7	2.6	2.2
					5	60	3.2	3.2	39	4.3	3.6	2	47	3.5	7.2	2.5	133	2.0	2.8	1.8	4	61	2.3	3.5	2.9
7					31	4.4	4.4	20	6.1	5.1	3	21	5.2	10.8	3.8	59	3.0	4.2	2.7	5	39	2.9	4.3	3.6	
9					19	5.7	5.7	12	7.8	6.6	4	12	6.9	14.4	5.0	33	4.0	5.6	3.6	6	27	3.5	5.2	4.4	
11					12	6.9	6.9	8	9.6	8.0	5	8	8.7	18.0	6.3	21	5.0	7.0	4.5	7	20	4.0	6.1	5.1	
75W PAR30 Halogen 	SP	10° 	3000	13000	6	361	1.0	1.0	235	1.4	1.2	3	181	5.2	2.1	1.0	511	3.0	1.1	0.7	7	172	4.0	1.6	1.4
					8	203	1.4	1.4	132	1.9	1.6	4	102	6.9	2.9	1.4	287	4.0	1.4	1.0	8	132	4.6	1.9	1.6
					10	130	1.7	1.7	84	2.3	2.0	5	65	8.7	3.6	1.7	184	5.0	1.8	1.2	9	104	5.2	2.1	1.8
					12	90	2.1	2.1	59	2.8	2.4	6	45	10.4	4.3	2.1	128	6.0	2.1	1.5	10	84	5.8	2.3	2.0
					14	66	2.4	2.4	43	3.3	2.8	7	33	12.1	5.0	2.4	94	7.0	2.5	1.7	11	70	6.4	2.6	2.2
	NFL	25° 	3000	3100	4	194	1.8	1.8	126	2.4	2.0	2	97	3.5	4.2	1.8	274	2.0	1.9	1.3	3	224	1.7	1.8	1.5
					6	86	2.7	2.7	56	3.6	3.1	3	43	5.2	6.2	2.7	122	3.0	2.8	1.9	4	126	2.3	2.4	2.0
					8	48	3.5	3.5	31	4.8	4.1	4	24	6.9	8.3	3.5	69	4.0	3.7	2.5	5	81	2.9	3.0	2.6
					10	31	4.4	4.4	20	6.0	5.1	5	16	8.7	10.4	4.4	44	5.0	4.7	3.1	6	56	3.5	3.6	3.1
					14	66	2.4	2.4	43	3.3	2.8	6	11	10.4	12.5	5.3	30	6.0	5.6	3.8	7	41	4.0	4.2	3.6
	FL	35° 	3000	2000	4	125	2.5	2.5	81	3.5	2.9	2	63	3.5	7.2	2.5	177	2.0	2.8	1.8	3	144	1.7	2.6	2.2
					6	56	3.8	3.8	36	5.2	4.4	3	28	5.2	10.8	3.8	79	3.0	4.2	2.7	4	81	2.3	3.5	2.9
8					31	5.0	5.0	20	7.0	5.8	4	16	6.9	14.4	5.0	44	4.0	5.6	3.6	5	52	2.9	4.3	3.6	
10					20	6.3	6.3	13	8.7	7.3	5	10	8.7	18.0	6.3	28	5.0	7.0	4.5	6	36	3.5	5.2	4.4	
12					14	7.6	7.6	9	10.4	8.7	6	7	10.4	21.6	7.6	20	6.0	8.4	5.4	7	27	4.0	6.1	5.1	
60W PAR38 Halogen IR 	SP	10° 	3000	20000	8	313	1.4	1.4	203	1.9	1.6	5	100	8.7	3.6	1.7	283	5.0	1.8	1.2	7	265	4.0	1.6	1.4
					12	139	2.1	2.1	90	2.8	2.4	7	51	12.1	5.0	2.4	144	7.0	2.5	1.7	8	203	4.6	1.9	1.6
					16	78	2.8	2.8	51	3.7	3.2	9	31	15.6	6.4	3.1	87	9.0	3.2	2.2	9	160	5.2	2.1	1.8
					20	50	3.5	3.5	32	4.7	4.0	11	21	19.1	7.9	3.8	58	11.0	3.9	2.7	10	130	5.8	2.3	2.0
					24	35	4.2	4.2	23	5.6	4.8	13	15	22.5	9.3	4.5	42	13.0	4.6	3.2	11	107	6.4	2.6	2.2
	FL	30° 	3000	3600	6	100	3.2	3.2	65	4.4	3.7	2	113	3.5	5.5	2.1	318	2.0	2.3	1.5	4	146	2.3	2.9	2.5
					8	56	4.3	4.3	37	5.9	5.0	3	50	5.2	8.2	3.2	141	3.0	3.5	2.3	5	94	2.9	3.7	3.1
					10	36	5.4	5.4	23	7.3	6.2	4	28	6.9	10.9	4.3	80	4.0	4.6	3.0	6	65	3.5	4.4	3.7
					12	25	6.4	6.4	16	8.8	7.4	5	18	8.7	13.7	5.4	51	5.0	5.8	3.8	7	48	4.0	5.1	4.3
					14	18	7.5	7.5	12	10.2	8.7	6	13	10.4	16.4	6.4	35	6.0	6.9	4.5	8	37	4.6	5.9	5.0
	WFL	40° 	3000	2000	6	56	4.4	4.4	36	6.1	5.0	1	250	1.7	4.8	1.5	707	1.0	1.7	1.0	2	325	1.2	2.0	1.7
					7	41	5.1	5.1	27	7.1	5.9	2	63	3.5	9.7	2.9	177	2.0	3.4	2.1	3	144	1.7	3.0	2.5
8					31	5.8	5.8	20	8.1	6.7	3	28	5.2	14.5	4.4	79	3.0	5.0	3.1	4	81	2.3	4.1	3.4	
9					25	6.6	6.6	16	9.1	7.6	4	16	6.9	19.3	5.8	44	4.0	6.7	4.1	5	52	2.9	5.1	4.2	
10					20	7.3	7.3	13	10.2	8.4	5	10	8.7	24.2	7.3	28	5.0	8.4	5.1	6	36	3.5	6.1	5.0	

** Due to steep aiming angle, length of beam extends beyond 25'.
Each angle listed is measured from 0° vertical.

Line Voltage Halogen



Lamp	Beam Type	Beam Spread	Rated Life	CBCP	Horizontal Surface						Vertical Surface																		
					0 degrees			30 degrees			30 degrees			45 degrees			60 degrees												
					MH	FC	L	W	FC	L	W	D	FC	X	L	W	FC	X	L	W	D	FC	X	L	W				
90W PAR38 Halogen 	SP	12°	3000	12000	8	188	1.7	1.7	122	2.3	1.9	3	167	5.2	2.6	1.3	471	3.0	1.3	0.9	6	217	3.5	1.7	1.5				
					10	120	2.1	2.1	78	2.8	2.4	4	94	6.9	3.5	1.7	265	4.0	1.7	1.2	7	159	4.0	2.0	1.7				
					12	83	2.5	2.5	54	3.4	2.9	5	60	8.7	10.4	4.4	78	5.0	2.1	1.5	8	122	4.6	2.3	1.9				
					14	61	2.9	2.9	40	3.9	3.4	6	42	10.4	5.2	2.5	118	6.0	2.6	1.8	9	96	5.2	2.5	2.2				
					16	47	3.4	3.4	30	4.5	3.9	7	31	12.1	6.1	2.9	87	7.0	3.0	2.1	10	78	5.8	2.8	2.4				
					FL	30°	3000	3600	5	144	2.7	2.7	94	3.7	3.1	2	113	3.5	5.5	2.1	318	2.0	2.3	1.5	4	146	2.3	2.9	2.5
									7	73	3.8	3.8	48	5.1	4.3	3	50	5.2	8.2	3.2	141	3.0	3.5	2.3	5	94	2.9	3.7	3.1
									9	44	4.8	4.8	29	6.6	5.6	4	28	6.9	10.9	4.3	80	4.0	4.6	3.0	6	65	3.5	4.4	3.7
	11	30	5.9	5.9					19	8.1	6.8	5	18	8.7	13.7	5.4	51	5.0	5.8	3.8	7	48	4.0	5.1	4.3				
	WFL	55°	3000	950	8	15	8.3	8.3	10	12.2	9.6	2	30	3.5	**	4.2	84	2.0	5.7	2.9	2	154	1.2	3.1	2.4				
					9	12	9.4	9.4	8	13.7	10.8	3	13	5.2	**	6.2	37	3.0	8.6	4.4	3	69	1.7	4.6	3.6				
					10	10	10.4	10.4	6	15.3	12.0	4	7	6.9	**	8.3	21	4.0	11.4	5.9	4	39	2.3	6.1	4.8				
					11	8	11.5	11.5	5	16.8	13.2	5	5	8.7	**	10.4	13	5.0	14.3	7.4	5	25	2.9	7.6	6.0				
	12	7	12.5	12.5	4	18.3	14.4	6	3	10.4	**	12.5	9	6.0	17.1	8.8	6	17	3.5	9.2	7.2								
	90W PAR38 Halogen IR Long Life 	SP	12°	6000	12000	8	188	1.7	1.7	122	2.3	1.9	3	167	5.2	2.6	1.3	471	3.0	1.3	0.9	6	217	3.5	1.7	1.5			
						10	120	2.1	2.1	78	2.8	2.4	4	94	6.9	3.5	1.7	265	4.0	1.7	1.2	7	159	4.0	2.0	1.7			
12						84	2.5	2.5	54	3.4	2.9	5	60	8.7	4.3	2.1	170	5.0	2.1	1.5	8	122	4.6	2.3	1.9				
14						61	2.9	2.9	40	3.9	3.4	6	42	10.4	5.2	2.5	118	6.0	2.6	1.8	9	96	5.2	2.5	2.2				
16						47	3.4	3.4	30	4.5	3.9	7	31	12.1	6.1	2.9	87	7.0	3.0	2.1	10	78	5.8	2.8	2.4				
FL						40°	6000	2800	5	112	3.6	3.6	73	5.1	4.2	2	88	3.5	9.7	2.9	247	2.0	3.4	2.1	4	114	2.3	4.1	3.4
									7	57	5.1	5.1	37	7.1	5.9	3	39	5.2	14.5	4.4	110	3.0	5.0	3.1	5	73	2.9	5.1	4.2
									9	35	6.6	6.6	22	9.1	7.6	4	22	6.9	19.3	5.8	62	4.0	6.7	4.1	6	51	3.5	6.1	5.0
		11	23	8.0	8.0				15	11.2	9.2	5	14	8.7	24.2	7.3	40	5.0	8.4	5.1	7	37	4.0	7.1	5.9				
13		17	9.5	9.5	11	13.2	10.9	6	10	10.4	**	8.7	27	6.0	10.1	6.2	8	28	4.6	8.1	6.7								
100W PAR38 Halogen IR 		SP	10°	3000	29000	10	290	1.7	1.7	188	2.3	2.0	6	101	10.4	4.3	2.1	285	6.0	2.1	1.5	8	294	4.6	1.9	1.6			
						14	148	2.4	2.4	96	3.3	2.8	9	45	15.6	6.4	3.1	127	9.0	3.2	2.2	9	233	5.2	2.1	1.8			
						18	90	3.1	3.1	58	4.2	3.6	12	25	20.8	8.6	4.2	71	12.0	4.2	3.0	10	188	5.8	2.3	2.0			
						22	60	3.8	3.8	39	5.1	4.4	15	16	26.0	10.7	5.2	46	15.0	5.3	3.7	11	156	6.4	2.6	2.2			
						26	43	4.5	4.5	28	6.1	5.3	18	11	31.2	12.9	6.3	32	18.0	6.3	4.5	12	131	6.9	2.8	2.4			
						FL	25°	3000	6300	6	175	2.7	2.7	114	3.6	3.1	3	88	5.2	6.2	2.7	247	3.0	2.8	1.9	4	256	2.3	2.4
	8									98	3.5	3.5	64	4.8	4.1	4	49	6.9	8.3	3.5	139	4.0	3.7	2.5	5	164	2.9	3.0	2.6
	10									63	4.4	4.4	41	6.0	5.1	5	32	8.7	10.4	4.4	89	5.0	4.7	3.1	6	114	3.5	3.6	3.1
	12	44	5.3	5.3	28					7.2	6.1	6	22	10.4	12.5	5.3	61	6.0	5.6	3.8	7	84	4.0	4.2	3.6				
	WFL	40°	3000	3400	7	16	12.1	14.6	6.2	7	16	12.1	14.6	6.2	45	7.0	6.5	4.4	8	64	4.6	4.8	4.1						
					4	213	2.9	2.9	138	4.1	3.4	2	106	3.5	9.7	2.9	301	2.0	3.4	2.1	2	552	1.2	2.0	1.7				
					6	94	4.4	4.4	61	6.1	5.0	3	47	5.2	14.5	4.4	134	3.0	5.0	3.1	3	245	1.7	3.0	2.5				
					8	53	5.8	5.8	35	8.1	6.7	4	27	6.9	19.3	5.8	75	4.0	6.7	4.1	4	138	2.3	4.1	3.4				
	10	34	7.3	7.3	22	10.2	8.4	5	17	8.7	24.2	7.3	48	5.0	8.4	5.1	5	88	2.9	5.1	4.2								
	12	24	8.7	8.7	15	12.2	10.1	6	12	10.4	**	8.7	33	6.0	10.1	6.2	6	61	3.5	6.1	5.0								
	120W PAR38 Halogen 	SP	10°	3000	22500	10	225	1.7	1.7	146	2.3	2.0	6	78	10.4	4.3	2.1	221	6.0	2.1	1.5	8	228	4.6	1.9	1.6			
14						115	2.4	2.4	75	3.3	2.8	9	35	15.6	6.4	3.1	98	9.0	3.2	2.2	9	180	5.2	2.1	1.8				
18						69	3.1	3.1	45	4.2	3.6	12	20	20.8	8.6	4.2	55	12.0	4.2	3.0	10	146	5.8	2.3	2.0				
22						46	3.8	3.8	30	5.1	4.4	15	13	26.0	10.7	5.2	35	15.0	5.3	3.7	11	121	6.4	2.6	2.2				
26						33	4.5	4.5	22	6.1	5.3	18	9	31.2	12.9	6.3	25	18.0	6.3	4.5	12	101	6.9	2.8	2.4				
FL						30°	3000	4600	6	128	3.2	3.2	83	4.4	3.7	3	64	5.2	8.2	3.2	181	3.0	3.5	2.3	4	187	2.3	2.9	2.5
									8	72	4.3	4.3	47	5.9	5.0	4	36	6.9	10.9	4.3	102	4.0	4.6	3.0	5	120	2.9	3.7	3.1
									10	46	5.4	5.4	30	7.3	6.2	5	23	8.7	13.7	5.4	65	5.0	5.8	3.8	6	83	3.5	4.4	3.7
		12	32	6.4	6.4				21	8.8	7.4	6	16	10.4	16.4	6.4	45	6.0	6.9	4.5	7	61	4.0	5.1	4.3				
WFL		55°	3000	2000	14	23	7.5	7.5	15	10.2	8.7	7	12	12.1	19.1	7.5	33	7.0	8.1	5.3	8	47	4.6	5.9	5.0				
					4	125	4.2	4.2	81	6.1	4.8	2	63	3.5	**	4.2	177	2.0	5.7	2.9	3	144	1.7	4.6	3.6				
					6	56	6.2	6.2	36	9.2	7.2	3	28	5.2	**	6.2	79	3.0	8.6	4.4	4	81	2.3	6.1	4.8				
					8	31	8.3	8.3	20	12.2	9.6	4	16	6.9	**	8.3	44	4.0	11.4	5.9	5	52	2.9	7.6	6.0				
10		20	10.4	10.4	13	15.3	12.0	5	10	8.7	**	10.4	28	5.0	14.3	7.4	6	36	3.5	9.2	7.2								
12		14	12.5	12.5	9	18.3	14.4	6	7	10.4	**	12.5	20	6.0	17.1	8.8	7	27	4.0	10.7	8.4								
250W PAR38 Halogen 		SP	10°	4200	40000	12	278	2.1	2.1	180	2.8	2.4	6	139	10.4	4.3	2.1	393	6.0	2.1	1.5	8	406	4.6	1.9	1.6			
	14					204	2.4	2.4	133	3.3	2.8	9	62	15.6	6.4	3.1	175	9.0	3.2	2.2	9	321	5.2	2.1	1.8				
	16					156	2.8	2.8	101	3.7	3.2	12	35	20.8	8.6	4.2	98	12.0	4.2	3.0	10	260	5.8	2.3	2.0				
	22					83	3.8	3.8	54	5.1	4.4	15	22	26.0	10.7	5.2	63	15.0	5.3	3.7	11	215	6.4	2.6	2.2				
	30					44	5.2	5.2	29	7.0	6.1	18	15	31.2	12.9	6.3	44	18.0	6.3	4.5	12	180	6.9	2.8	2.4				
	FL					30°	4200	9000	6	250	3.2	3.2	162	4.4	3.7	3	125	5.2	8.2	3.2	354	3.0	3.5	2.3	6	162	3.5	4.4	3.7
									8	141	4.3	4.3	91	5.9	5.0	4	70	6.9	10.9	4.3	199	4.0	4.6	3.0	7	119	4.0	5.1	4.3
									10	90	5.4	5.4	58	7.3	6.2	5	45	8.7	13.7	5.4	127	5.0	5.8	3.8	8	91	4.6	5.9	5.0
		12	63	6.4	6.4				41	8.8	7.4	6	31	10.4	16.4	6.4	88	6.0	6.9	4.5	9	72	5.2	6.6	5.6				
	WFL	55°	4200	9000	14	46	7.5	7.5	30	10.2	8.7	7	23	12.1	19.1	7.5	65	7.0	8.1	5.3	10	58	5.8	7.3	6.2				

Low Voltage Halogen





Lamp	Beam Type	Beam Spread	Rated Life	CBCP	Horizontal Aiming Angles						Vertical Aiming Angles														
					0 degrees			30 degrees			30 degrees				45 degrees				60 degrees						
					MH	FC	L	W	FC	L	W	D	FC	X	L	W	FC	X	L	W	D	FC	X	L	W
20W MR11 Halogen	SP	10°	4000	5500	2	1375	0.3	0.3	893	0.5	0.4	1	688	1.7	0.7	0.3	1945	1.0	0.4	0.2	2	893	1.2	0.5	0.4
					4	344	0.7	0.7	223	0.9	0.8	2	172	3.5	1.4	0.7	486	2.0	0.7	0.5	3	397	1.7	0.7	0.6
					6	153	1.0	1.0	99	1.4	1.2	3	76	5.2	2.1	1.0	216	3.0	1.1	0.7	4	223	2.3	0.9	0.8
					8	86	1.4	1.4	56	1.9	1.6	4	43	6.9	2.9	1.4	122	4.0	1.4	1.0	5	143	2.9	1.2	1.0
					10	55	1.7	1.7	36	2.3	2.0	5	28	8.7	3.6	1.7	78	5.0	1.8	1.2	6	99	3.5	1.4	1.2
	NFL	30°	3500	600	2	175	1.3	1.3	114	1.7	1.5	1	88	1.7	3.6	1.3	247	1.0	1.4	0.9	2	114	1.2	1.7	1.5
					4	44	2.5	2.5	28	3.5	2.9	2	22	3.5	7.2	2.5	62	2.0	2.8	1.8	3	51	1.7	2.6	2.2
					6	19	3.8	3.8	13	5.2	4.4	3	10	5.2	10.8	3.8	27	3.0	4.2	2.7	4	28	2.3	3.5	2.9
					8	11	5.0	5.0	7	7.0	5.8	4	5	6.9	14.4	5.0	15	4.0	5.6	3.6	5	18	2.9	4.3	3.6
					10	7	6.3	6.3	5	8.7	7.3	5	4	8.7	18	6.3	10	5.0	7.0	4.5	6	13	3.5	5.2	4.4
35W MR11 Halogen	SP	10°	4000	3800	4	238	0.7	0.7	154	.9	0.8	2	119	3.5	1.4	0.7	336	2.0	0.7	0.5	2	617	1.2	0.5	0.4
					6	106	1.0	1.0	69	1.4	1.2	3	53	5.2	2.8	1.0	149	3.0	1.1	0.7	3	274	1.7	0.7	0.6
					8	59	1.4	1.4	39	1.9	1.6	4	30	6.9	2.9	1.4	84	4.0	1.4	1.0	4	154	2.3	0.9	0.8
					10	38	1.7	1.7	25	2.3	2.0	5	19	8.7	3.6	1.7	54	5.0	1.8	1.2	5	99	2.9	1.2	1.0
					12	26	2.1	2.1	17	2.8	2.4	6	13	10.4	4.3	2.1	37	6.0	2.1	1.5	6	69	3.5	1.4	1.2
	FL	35°	4000	1500	8	23	5.0	5.0	15	7.0	5.8	2	47	3.5	7.2	2.5	133	2.0	2.8	1.8	2	244	1.2	1.7	1.5
					10	15	6.3	6.3	10	8.7	7.3	3	21	5.2	10.8	3.8	59	3.0	4.2	2.7	3	108	1.7	2.6	2.2
					12	10	7.6	7.6	7	10.4	8.7	4	12	6.9	14.4	5.0	33	4.0	5.6	3.6	4	61	2.3	3.5	2.9
					14	8	8.8	8.8	5	12.2	10.2	5	8	8.7	18.0	6.3	21	5.0	7.0	4.5	5	39	2.9	4.3	3.6
					16	6	10.1	10.1	4	13.9	11.7	6	5	10.4	21.6	7.6	15	6.0	8.4	5.4	6	27	3.5	5.2	4.4
20W MR16 Halogen	VNSP	7°	3000	7400	6	206	0.7	0.7	134	1.0	0.8	3	103	5.2	1.5	0.7	291	3.0	0.7	0.5	6	134	3.5	1.0	0.8
					9	91	1.1	1.1	59	1.5	1.3	4	58	6.9	2.0	1.0	164	4.0	1.0	0.7	7	98	4.0	1.1	1.0
					12	51	1.5	1.5	33	2.0	1.7	5	37	8.7	2.5	1.2	105	5.0	1.2	0.9	8	75	4.6	1.3	1.1
					15	33	1.8	1.8	21	2.4	2.1	6	26	10.4	3.0	1.5	73	6.0	1.5	1.0	9	59	5.2	1.5	1.3
					18	23	2.2	2.2	15	2.9	2.5	7	19	12.1	3.5	1.7	53	7.0	1.7	1.2	10	48	5.8	1.6	1.4
	NSP	15°	5000	3750	4	234	1.1	1.1	152	1.4	1.2	2	117	3.5	2.2	1.1	331	2.0	1.1	0.7	4	152	2.3	1.4	1.2
					6	104	1.6	1.6	68	2.1	1.8	3	52	5.2	3.3	1.6	147	3.0	1.6	1.1	5	97	2.9	1.8	1.5
					8	59	2.1	2.1	38	2.8	2.4	4	29	6.9	4.4	2.1	83	4.0	2.1	1.5	6	68	3.5	2.1	1.8
					10	38	2.6	2.6	24	3.5	3.0	5	19	8.7	5.6	2.6	53	5.0	2.7	1.9	7	50	4.0	2.5	2.1
					12	26	3.2	3.2	17	4.2	3.6	6	13	10.4	6.7	3.2	37	6.0	3.2	2.2	8	38	4.6	2.8	2.4
20W MR16 Halogen IR Lensed	NSP	8°	5000	6500	6	181	0.8	0.8	117	1.1	1.0	3	90	5.2	1.7	0.8	255	3.0	0.8	0.6	6	117	3.5	1.1	1.0
					9	80	1.3	1.3	52	1.7	1.5	4	51	6.9	2.3	1.1	144	4.0	1.1	0.8	7	86	4.0	1.3	1.1
					12	45	1.7	1.7	29	2.2	1.9	5	33	8.7	2.8	1.4	92	5.0	1.4	1.0	8	66	4.6	1.5	1.3
					16	25	2.2	2.2	16	3.0	2.6	6	23	10.4	3.4	1.7	64	6.0	1.7	1.2	9	52	5.2	1.7	1.5
					18	20	2.5	2.5	13	3.4	2.9	7	17	12.1	4.0	2.0	47	7.0	2.0	1.4	10	42	5.8	1.9	1.6
	FL	36°	5000	1000	3	111	1.9	1.9	72	2.7	2.3	1	125	1.7	3.8	1.3	354	1.0	1.5	0.9	2	162	1.2	1.8	1.5
					5	40	3.2	3.2	26	4.5	3.8	2	31	3.5	7.6	2.6	88	2.0	2.9	1.8	3	72	1.7	2.7	2.3
					7	20	4.5	4.5	13	6.3	5.3	3	14	5.2	11.4	3.9	39	3.0	4.4	2.8	4	41	2.3	3.6	3.0
					9	12	5.8	5.8	8	8.1	6.8	4	8	6.9	15.2	5.2	22	4.0	5.8	3.7	5	26	2.9	4.5	3.8
					11	8	7.1	7.1	5	9.9	8.3	5	5	8.7	19.0	6.5	14	5.0	7.3	4.6	6	18	3.5	5.4	4.5
35W MR16 Halogen	NSP	10°	4000	8300	6	231	1.0	1.0	150	1.4	1.2	3	115	5.2	2.1	1.0	326	3.0	1.1	0.7	5	216	2.9	1.2	1.0
					8	130	1.4	1.4	84	1.9	1.6	4	65	6.9	2.9	1.4	183	4.0	1.4	1.0	6	150	3.5	1.4	1.2
					10	83	1.7	1.7	54	2.3	2.0	5	42	8.7	3.6	1.7	117	5.0	1.8	1.2	7	110	4.0	1.6	1.4
					12	58	2.1	2.1	37	2.8	2.4	6	29	10.4	4.3	2.1	82	6.0	2.1	1.5	8	84	4.6	1.9	1.6
					14	42	2.4	2.4	28	3.3	2.8	7	21	12.1	5.0	2.4	60	7.0	2.5	1.7	9	67	5.2	2.1	1.8
	NFL	25°	4000	3100	4	194	1.8	1.8	126	2.4	2.0	2	97	3.5	4.2	1.8	274	2.0	1.9	1.3	3	224	1.7	1.8	1.5
					6	86	2.7	2.7	56	3.6	3.1	3	43	5.2	6.2	2.7	122	3.0	2.8	1.9	4	126	2.3	2.4	2.0
					8	48	3.5	3.5	31	4.8	4.1	4	24	6.9	8.3	3.5	69	4.0	3.7	2.5	5	81	2.9	3.0	2.6
					10	31	4.4	4.4	20	6.0	5.1	5	16	8.7	10.4	4.4	44	5.0	4.7	3.1	6	56	3.5	3.6	3.1
					12	22	5.3	5.3	14	7.2	6.1	6	11	10.4	12.5	5.3	30	6.0	5.6	3.8	7	41	4.0	4.2	3.6
FL	40°	4000	1250	2	313	1.5	1.5	203	2.0	1.7	1	156	1.7	4.8	1.5	442	1.0	1.7	1.0	2	203	1.2	2.0	1.7	
				4	78	2.9	2.9	51	4.1	3.4	2	39	3.5	9.7	2.9	110	2.0	3.4	2.1	3	90	1.7	3.0	2.5	
				6	35	4.4	4.4	23	6.1	5.0	3	17	5.2	14.5	4.4	49	3.0	5.0	3.1	4	51	2.3	4.1	3.4	
				8	20	5.8	5.8	13	8.1	6.7	4	10	6.9	19.3	5.8	28	4.0	6.7	4.1	5	32	2.9	5.1	4.5	
				10	13	7.3	7.3	8	10.2	8.4	5	6	8.7	24.2	7.3	18	5.0	8.4	5.1	6	23	3.5	6.1	5.0	
WFL	60°	4000	650	2	163	2.3	2.3	106	3.5	2.7	1	81	1.7	**	2.3	230	1.0	3.5	1.6	2	106	1.2	3.5	2.7	
				3	72	3.5	3.5	47	5.2	4.0	2	20	3.5	**	4.6	57	2.0	6.9	3.3	3	47	1.7	5.2	4.0	
				4	41	4.6	4.6	26	6.9	5.3	3	9	5.2	**	6.9	26	3.0	10.4	4.9	4	26	2.3	6.9	5.3	
				5	26	5.8	5.8	17	8.7	6.7	4	5	6.9	**	9.2	14	4.0	13.9	6.5	5	17	2.9	8.7	6.7	
				6	18	6.9	6.9	12	10.4	8.0	5	3	8.7	**	11.5	9	5.0	17.3	8.2	6	12	3.5	10.4	8.0	

** Due to steep aiming angle, length of beam extends beyond 25'.
Each angle listed is measured from 0° vertical.

Lamp Data

Low Voltage Halogen





Lamp	Beam Type	Beam Spread	Rated Life	CBCP	Horizontal Surface						Vertical Surface														
					0 degrees			30 degrees			45 degrees				60 degrees										
					MH	FC	L	W	FC	L	W	D	FC	X	L	W	D	FC	X	L	W				
37W MR16 Halogen IR Lensed 	NSP	10°	4000	13100	6	364	1.0	1.0	236	1.4	1.2	3	182	5.2	2.1	1.0	515	3.0	1.1	0.7	7	174	4.0	1.6	1.4
					9	162	1.6	1.6	105	2.1	1.8	4	102	6.9	2.9	1.4	289	4.0	1.4	1.0	8	133	4.6	1.9	1.6
					12	91	2.1	2.1	59	2.8	2.4	5	66	8.7	3.6	1.7	185	5.0	1.8	1.2	9	105	5.2	2.1	1.8
					15	58	2.6	2.6	38	3.5	3.0	6	45	10.4	4.3	2.1	129	6.0	2.1	1.5	10	85	5.8	2.3	2.0
	18	40	3.1	3.1	26	4.2	3.6	7	33	12.1	5.0	2.4	95	7.0	2.5	1.7	11	70	6.4	2.6	2.2				
	NFL	25°	4000	4600	4	288	1.8	1.8	187	2.4	2.0	2	144	3.5	4.2	1.8	407	2.0	1.9	1.3	4	187	2.3	2.4	2.0
					6	128	2.7	2.7	83	3.6	3.1	3	64	5.2	6.2	2.7	181	3.0	2.8	1.9	5	120	2.9	3.0	2.6
					8	72	3.5	3.5	47	4.8	4.1	4	36	6.9	8.3	3.5	102	4.0	3.7	2.5	6	83	3.5	3.6	3.1
					10	46	4.4	4.4	30	6.0	5.1	5	23	8.7	10.4	4.4	65	5.0	4.7	3.1	7	61	4.0	4.2	3.6
	12	32	5.3	5.3	21	7.2	6.1	6	16	10.4	12.5	5.3	45	6.0	5.6	3.8	8	47	4.6	4.8	4.1				
	FL	40°	4000	2500	3	278	2.2	2.2	180	3.0	2.5	1	313	1.7	4.8	1.5	884	1.0	1.7	1.0	2	406	1.2	2.0	1.7
					5	100	3.6	3.6	65	5.1	4.2	2	78	3.5	9.7	2.9	221	2.0	3.4	2.1	3	180	1.7	3.0	2.5
					7	51	5.1	5.1	33	7.1	5.9	3	35	5.2	14.5	4.4	98	3.0	5.0	3.1	4	101	2.3	4.1	3.4
					9	31	6.6	6.6	20	9.1	7.6	4	20	6.9	19.3	5.8	55	4.0	6.7	4.1	5	65	2.9	5.1	4.2
					11	21	8.0	8.0	13	11.2	9.2	5	13	8.7	24.2	7.3	35	5.0	8.4	5.1	6	45	3.5	6.1	5.0
	42W MR16 Halogen 	VNSP	9°	3500	12300	8	192	1.3	1.3	125	1.7	1.5	4	96	6.9	2.6	1.3	272	4.0	1.3	0.9	7	163	4.0	1.5
10						123	1.6	1.6	80	2.1	1.8	5	62	8.7	3.2	1.6	174	5.0	1.6	1.1	8	125	4.6	1.7	1.5
12						85	1.9	1.9	55	2.5	2.2	6	43	10.4	3.8	1.9	121	6.0	1.9	1.3	9	99	5.2	1.9	1.6
14						63	2.2	2.2	41	2.9	2.5	7	31	12.1	4.5	2.2	89	7.0	2.2	1.6	10	80	5.8	2.1	1.8
16						48	2.5	2.5	31	3.4	2.9	8	24	13.9	5.1	2.5	68	8.0	2.5	1.8	11	66	6.4	2.3	2.0
8						142	2.1	2.1	92	2.8	2.4	3	126	5.2	3.3	1.6	357	3.0	1.6	1.1	6	164	3.5	2.1	1.8
50W MR16 Halogen 	NSP	15°	6000	9100	10	91	2.6	2.6	59	3.5	3.0	4	71	6.9	4.4	2.1	201	4.0	2.1	1.5	7	121	4.0	2.5	2.1
					12	63	3.2	3.2	41	4.2	3.6	5	46	8.7	5.6	2.6	129	5.0	2.7	1.9	8	92	4.6	2.8	2.4
					14	46	3.7	3.7	30	4.9	4.3	6	32	10.4	6.7	3.2	89	6.0	3.2	2.2	9	73	5.2	3.2	2.7
					16	36	4.2	4.2	23	5.6	4.9	7	23	12.1	7.8	3.7	66	7.0	3.8	2.6	10	59	5.8	3.5	3.0
	NFL	25°	6000	3200	6	89	2.7	2.7	58	3.6	3.1	2	100	3.5	4.2	1.8	283	2.0	1.9	1.3	4	130	2.3	2.4	2.0
					8	50	3.5	3.5	32	4.8	4.1	3	44	5.2	6.2	2.7	126	3.0	2.8	1.9	5	83	2.9	3.0	2.6
					10	32	4.4	4.4	21	6.0	5.1	4	25	6.9	8.3	3.5	71	4.0	3.7	2.5	6	58	3.5	3.6	3.1
					12	22	5.3	5.3	14	7.2	6.1	5	16	8.7	10.4	4.4	45	5.0	4.7	3.1	7	42	4.0	4.2	3.6
	14	16	6.2	6.2	11	8.4	7.2	6	11	10.4	12.5	5.3	31	6.0	5.6	3.8	8	32	4.6	4.8	4.1				
	FL	40°	6000	1700	3	189	2.2	2.2	123	3.0	2.5	1	213	1.7	4.8	1.5	601	1.0	1.7	1.0	2	276	1.2	2.0	1.7
					5	68	3.6	3.6	44	5.1	4.2	2	53	3.5	9.7	2.9	150	2.0	3.4	2.1	3	123	1.7	3.0	2.5
					7	35	5.1	5.1	23	7.1	5.9	3	24	5.2	14.5	4.4	67	3.0	5.0	3.1	4	69	2.3	4.1	3.4
					9	21	6.6	6.6	14	9.1	7.6	4	13	6.9	19.3	5.8	38	4.0	6.7	4.1	5	44	2.9	5.1	4.2
					11	14	8.0	8.0	9	11.2	9.2	5	9	8.7	24.2	7.3	24	5.0	8.4	5.1	6	31	3.5	6.1	5.0
	WFL	55°	6000	900	3	100	3.1	3.1	65	4.6	3.6	1	113	1.7	**	2.1	318	1.0	2.9	1.5	2	146	1.2	3.1	2.4
					5	36	5.2	5.2	23	7.6	6.0	2	28	3.5	**	4.2	80	2.0	5.7	2.9	3	65	1.7	4.6	3.6
7					18	7.3	7.3	12	10.7	8.4	3	13	5.2	**	6.2	35	3.0	8.6	4.4	4	37	2.3	6.1	4.8	
9					11	9.4	9.4	7	13.7	10.8	4	7	6.9	**	8.3	20	4.0	11.4	5.9	5	23	2.9	7.6	6.0	
11					7	11.5	11.5	5	16.8	13.2	5	5	8.7	**	10.4	13	5.0	14.3	7.4	6	16	3.5	9.2	7.2	
50W MR16 Halogen IR 	NSP	10	4000	15000	8	234	1.4	1.4	152	1.9	1.6	4	117	6.9	2.9	1.4	331	4.0	1.4	1.0	7	199	4.0	1.6	1.4
					12	104	2.1	2.1	68	2.8	2.4	5	75	8.7	3.6	1.7	212	5.0	1.8	1.2	8	152	4.6	1.9	1.6
					16	59	2.8	2.8	38	3.7	3.2	6	52	10.4	4.3	2.1	147	6.0	2.1	1.5	9	120	5.2	2.1	1.8
					20	38	3.5	3.5	24	4.7	4.0	7	38	12.1	5.0	2.4	108	7.0	2.5	1.7	10	97	5.8	2.3	2.0
	24	26	4.2	4.2	17	5.6	4.8	8	29	13.9	5.7	2.8	83	8.0	2.8	2.0	11	81	6.4	2.6	2.2				
	NFL	24	4000	5100	4	319	1.7	1.7	207	2.3	2.0	2	159	3.5	3.9	1.7	451	2.0	.8	1.2	5	133	2.9	2.9	2.5
					8	80	3.4	3.4	52	4.6	3.9	3	71	5.2	5.9	2.6	200	3.0	2.7	1.8	6	92	3.5	3.5	2.9
					12	35	5.1	5.1	23	6.9	5.9	4	40	6.9	7.9	3.4	113	4.0	3.6	2.4	7	68	4.0	4.0	3.4
					16	20	6.8	6.8	13	9.2	7.9	5	26	8.7	9.8	4.3	72	5.0	4.5	3.0	8	52	4.6	4.6	3.9
	20	13	8.5	8.5	8	11.5	9.8	6	18	10.4	11.8	5.1	50	6.0	5.3	3.6	9	41	5.2	5.2	4.4				
	FL	38	4000	2500	4	156	2.8	2.8	101	3.8	3.2	1	313	1.7	4.3	1.4	884	1.0	1.6	1.0	4	101	2.3	3.8	3.2
					6	69	4.1	4.1	45	5.7	4.8	2	78	3.5	8.6	2.8	221	2.0	3.1	1.9	5	65	2.9	4.8	4.0
					8	39	5.5	5.5	25	7.6	6.4	3	35	5.2	12.8	4.1	98	3.0	4.7	2.9	6	45	3.5	5.7	4.8
					10	25	6.9	6.9	16	9.6	8.0	4	20	6.9	17.1	5.5	55	4.0	6.3	3.9	7	33	4.0	6.7	5.6
	12	17	8.3	8.3	11	11.5	9.5	5	13	8.7	21.4	6.9	35	5.0	7.8	4.9	8	25	4.6	7.6	6.4				



Lamp Data

Low Voltage Halogen & Ceramic Metal Halide PAR Lamps



Lamp Data

Low Voltage Halogen					Horizontal Surface						Vertical Surface														
Lamp	Beam Type	Beam Spread	Rated Life	CBCP	0 degrees				30 degrees			30 degrees			45 degrees			60 degrees							
					MH	FC	L	W	FC	L	W	D	FC	X	L	W	FC	X	L	W	D	FC	X	L	W
50W AR111 Halogen 	VNSP	4°	3000	45000	12	313	0.8	0.8	203	1.1	1.0	6	156	10.4	1.7	0.8	442	6.0	0.8	0.6	10.0	292	5.8	0.6	0.5
					16	176	1.1	1.1	114	1.5	1.3	10	56	17.3	2.8	1.4	159	10.0	1.4	1.0	13.0	173	7.5	0.9	0.8
					20	113	1.4	1.4	73	1.9	1.6	14	29	24.2	3.9	2.0	81	14.0	2.0	1.4	16.0	114	9.2	1.3	1.1
					24	78	1.7	1.7	51	2.2	1.9	18	17	31.2	5.0	2.5	49	18.0	2.5	1.8	19.0	81	11.0	1.7	1.5
					28	57	2.0	2.0	37	2.6	2.3	22	12	38.1	5.2	3.1	33	22.0	3.1	2.2	22.0	60	12.7	2.0	1.8
SP	8°	3000	20000	12	139	1.7	1.7	90	2.2	1.9	4	156	6.9	2.3	1.1	442	4.0	1.1	0.8	8.0	203	4.6	0.7	0.6	
				16	78	2.2	2.2	51	3.0	2.6	6	69	10.4	3.4	1.7	196	6.0	1.7	1.2	10.0	130	5.8	1.1	1.0	
				20	50	2.8	2.8	32	3.7	3.2	8	39	13.9	4.5	2.2	110	8.0	2.2	1.6	12.0	90	6.9	1.5	1.3	
				24	35	3.4	3.4	23	4.5	3.9	10	25	17.3	5.7	2.8	71	10.0	2.8	2.0	14.0	66	8.1	1.9	1.6	
				28	26	3.9	3.9	17	5.2	4.5	12	17	20.8	6.8	3.4	49	12.0	3.4	2.4	16.0	51	9.2	2.2	1.9	
FL	25°	3000	4000	6	111	2.7	2.7	72	3.6	3.1	2	125	3.5	4.2	1.8	354	2.0	1.9	1.3	3	289	1.7	1.8	1.5	
				8	63	3.5	3.5	41	4.9	4.1	3	56	5.2	6.2	2.7	157	3.0	2.8	1.9	4	162	2.3	2.4	2.0	
				10	40	4.4	4.4	26	6.0	5.1	4	31	6.9	8.3	3.5	88	4.0	3.7	2.5	5	104	2.9	3.0	2.6	
				12	28	5.3	5.3	18	7.2	6.1	5	20	8.7	10.4	4.4	57	5.0	4.7	3.1	6	72	3.5	3.6	3.1	
				14	20	6.2	6.2	13	8.4	7.2	6	14	10.4	12.5	5.3	39	6.0	5.6	3.8	7	53	4.0	4.2	3.6	
75W AR111 Halogen 	SP	8°	3000	30000	10	300	1.4	1.4	195	1.9	1.6	4	234	6.9	2.3	1.1	663	4.0	1.1	0.8	8	304	4.6	1.5	1.3
					14	153	2.0	2.0	99	2.6	2.3	6	104	10.4	3.4	1.7	295	6.0	1.7	1.2	10	195	5.8	1.9	1.6
					18	93	2.5	2.5	60	3.4	2.9	8	59	13.9	4.5	2.2	166	8.0	2.2	1.6	12	135	6.9	2.2	1.9
					22	62	3.1	3.1	40	4.1	3.6	10	38	17.3	5.7	2.8	106	10.0	2.8	2.0	14	99	8.1	2.6	2.3
					26	44	3.6	3.6	29	4.9	4.2	12	26	20.8	6.8	3.4	74	12.0	3.4	2.4	16	76	9.2	3.0	2.6
FL	25°	3000	5300	4	331	1.8	1.8	215	2.4	2.0	2	166	3.5	4.2	1.8	468	2.0	1.9	1.3	4	215	2.3	2.4	2.0	
				6	147	2.7	2.7	63	3.6	3.1	3	74	5.2	6.2	2.7	28	3.0	2.8	1.9	5	138	2.9	3.0	2.6	
				8	83	3.5	3.5	54	4.8	4.1	4	41	6.9	8.3	3.5	117	4.0	3.7	2.5	6	96	3.5	3.6	3.1	
				10	53	4.4	4.4	34	6.0	5.1	5	27	8.7	10.4	4.4	75	5.0	4.7	3.1	7	70	4.0	4.2	3.6	
				12	37	5.3	5.3	24	7.2	6.1	6	18	10.4	12.5	5.3	52	6.0	5.6	3.8	8	54	4.6	4.8	4.1	
WFL	45°	3000	2000	3	222	2.5	2.5	144	3.5	2.9	2	63	3.5	13.7	3.3	177	2.0	4.0	2.3	3.0	144	1.7	2.3	1.9	
				5	80	4.1	4.1	52	5.9	4.8	3	28	5.2	20.5	5.0	79	3.0	6.0	3.5	4.0	81	2.3	3.5	2.9	
				7	41	5.8	5.8	27	8.2	6.7	4	16	6.9	27.3	6.6	44	4.0	8.0	4.7	5.0	52	2.9	4.7	3.8	
				9	25	7.5	7.5	16	10.5	8.6	5	10	8.7	34.1	8.3	28	5.0	10.0	4.7	6.0	36	3.5	5.9	4.8	
				11	17	9.1	9.1	11	12.9	10.5	6	7	10.4	41.0	9.9	20	6.0	12.0	7.0	7.0	27	4.0	7.0	5.7	

Ceramic Metal Halide PAR Lamps					Horizontal Surface						Vertical Surface														
Lamp	Beam Type	Beam Spread	Rated Life	CBCP	0 degrees				30 degrees			30 degrees			45 degrees			60 degrees							
					MH	FC	L	W	FC	L	W	D	FC	X	L	W	FC	X	L	W	D	FC	X	L	W
39W PAR20 Ceramic Metal Halide 	SP	10°	9000	23000	10	230	1.7	1.7	149	2.3	2.0	4	180	6.9	2.9	1.4	508	4.0	1.4	1.0	5	598	2.9	1.2	1.0
					12	160	2.1	2.1	104	2.8	2.4	6	80	10.4	1.3	2.1	226	6.0	2.1	1.5	7	305	4.0	1.6	1.4
					14	117	2.4	2.4	73	3.3	2.8	8	45	13.9	5.7	2.8	127	8.0	2.8	2.0	9	184	5.2	2.1	1.8
					16	90	2.8	2.8	58	3.7	3.2	10	29	17.3	7.2	3.5	81	10.0	3.5	2.5	11	123	6.4	2.6	2.2
					18	71	3.1	3.1	46	4.2	3.6	12	20	20.8	8.6	4.2	56	12.0	4.2	3.0	13	88	7.5	3.0	2.6
FL	30°	9000	5000	6	139	3.2	3.2	90	4.4	4.7	2	156	3.5	5.5	2.1	442	2.0	2.3	1.5	3	361	1.7	2.2	1.9	
				8	78	4.3	4.3	51	5.9	5.0	3	69	5.2	8.2	3.2	196	3.0	3.5	2.3	4	203	2.3	2.9	2.5	
				10	50	5.4	5.4	32	4.3	6.2	4	39	6.9	10.9	4.3	110	4.0	4.6	3.0	5	130	2.9	3.7	3.1	
				12	35	6.4	6.4	23	8.8	7.4	5	25	8.7	13.7	5.4	71	5.0	5.8	3.8	6	90	3.5	4.4	3.7	
				14	26	7.5	7.5	17	10.2	8.7	6	17	10.4	16.4	6.4	49	6.0	6.9	4.5	7	66	4.0	5.1	4.3	
39W PAR30L Ceramic Metal Halide 	SP	10°	9000	44000	9	543	1.6	1.6	353	2.1	1.8	5	220	8.7	3.6	1.7	622	5.0	1.8	1.2	6	794	3.5	1.4	1.2
					12	306	2.1	2.1	198	2.8	2.4	7	112	12.1	5.0	2.4	317	7.0	2.5	1.7	9	353	5.2	2.1	1.8
					15	196	2.6	2.6	127	3.5	3.0	9	68	15.6	6.4	3.4	192	9.0	3.2	2.2	12	198	6.9	2.8	2.4
					18	136	3.1	3.1	88	4.2	3.6	11	45	19.1	7.9	3.8	129	11.0	3.9	2.7	15	127	8.7	3.5	3.0
					21	100	3.7	3.7	65	4.9	4.2	13	33	22.5	9.3	4.5	92	13.0	4.6	3.2	18	88	10.4	4.2	3.6
FL	30°	9000	7400	8	116	4.3	4.3	75	5.9	5.0	2	231	3.5	5.5	2.1	654	2.0	2.3	1.5	3	534	1.7	2.2	1.9	
				10	74	5.4	5.4	48	7.3	6.2	3	103	5.2	8.2	3.2	291	3.0	3.5	2.3	4	300	2.3	2.9	2.5	
				12	51	6.4	6.4	33	8.8	7.4	4	58	6.9	10.9	4.3	164	4.0	4.6	3.0	5	192	2.9	3.7	3.1	
				14	38	7.5	7.5	25	10.2	8.7	5	37	8.7	13.7	5.4	105	5.0	5.8	3.8	6	134	3.5	4.4	3.7	
				16	29	8.6	8.6	19	11.7	9.9	6	26	10.4	16.4	6.4	73	6.0	6.9	4.5	7	98	4.0	5.1	4.3	

Ceramic Metal Halide PAR Lamps

Lamp	Beam Type	Beam Spread	Rated Life	CBCP	Horizontal Surface						Vertical Surface															
					0 degrees			30 degrees			30 degrees			45 degrees			60 degrees									
					MH	FC	L	W	FC	L	W	D	FC	X	L	W	FC	X	L	W	D	FC	X	L	W	
70W PAR30L Ceramic Metal Halide	SP	10°	9000	68000	10	680	1.7	1.7	442	2.3	2.0	6	236	10.4	4.3	2.1	668	6.0	2.1	1.5	9	545	5.2	2.1	1.8	
					14	347	2.4	2.4	225	3.3	2.8	8	133	13.9	5.7	2.8	376	8.0	2.8	2.0	12	307	6.9	2.8	2.4	
					18	210	3.1	3.1	136	4.2	3.6	10	85	17.3	7.2	3.5	240	10.0	3.5	2.5	15	196	8.7	3.5	3.0	
					22	140	3.8	3.8	91	5.1	4.4	12	59	20.8	8.6	4.2	167	12.0	4.2	3.0	18	136	10.4	4.2	3.6	
					24	118	4.2	4.2	77	5.6	4.8	14	43	24.2	10.0	1.9	123	14.0	4.9	3.5	21	100	12.1	4.9	4.2	
	FL	40°	9000	10000	6	278	4.4	4.4	180	6.1	5.0	2	313	3.5	9.7	2.9	884	2.0	3.4	2.1	3	722	1.7	3.0	2.5	
					8	156	5.8	5.8	101	8.1	6.7	3	139	5.2	14.5	4.4	393	3.0	5.0	3.1	4	406	2.3	4.1	3.4	
					10	100	7.3	7.3	65	10.2	8.4	4	78	6.9	19.3	5.8	221	4.0	6.7	4.1	5	260	2.9	5.1	4.2	
					12	69	8.7	8.7	45	12.2	10.1	5	50	8.7	24.2	7.3	141	5.0	8.4	5.1	6	180	3.5	6.1	5.0	
					14	51	10.2	10.2	33	14.2	11.8	6	35	10.4	**	8.7	98	6.0	10.1	6.2	7	133	4.0	7.1	5.9	
	70W PAR38 Ceramic Metal Halide	SP	15°	10000	50000	10	347	2.6	2.6	325	3.5	3.0	4	391	6.9	4.4	2.1	1105	4.0	2.1	1.5	6	902	3.5	2.1	1.8
						12	347	3.2	3.2	226	4.2	3.6	6	174	10.4	6.7	3.2	491	6.0	3.2	2.2	9	401	5.2	3.2	2.7
14						255	3.7	3.7	166	4.9	4.3	8	98	13.9	8.9	4.2	276	8.0	4.3	3.0	12	226	6.9	4.2	3.6	
16						195	4.2	4.2	127	5.6	4.9	10	63	17.3	11.1	5.3	177	10.0	5.4	3.7	15	144	8.7	5.3	4.6	
18						154	4.7	4.7	100	6.4	5.5	12	43	20.8	13.3	6.3	123	12.0	6.4	4.5	18	100	10.4	6.4	5.5	
FL		25°	10000	18000	8	281	3.5	3.5	183	4.8	4.1	2	563	3.5	4.2	1.8	1591	2.0	1.9	1.3	4	731	2.3	2.4	2.0	
					10	180	4.4	4.4	117	6.0	5.1	4	141	6.9	8.3	3.5	398	4.0	3.7	2.5	6	325	3.5	3.6	3.1	
					12	125	5.3	5.3	81	7.2	6.1	6	63	10.4	12.5	5.3	177	6.0	5.6	3.8	8	183	4.6	4.8	4.1	
					14	92	6.2	6.2	60	8.4	7.2	8	35	13.9	16.6	7.1	99	8.0	7.5	5.0	10	117	5.8	6.0	5.1	
					16	70	7.1	7.1	46	9.6	8.2	10	23	17.3	20.8	8.9	64	10.0	9.3	6.3	12	81	6.9	7.2	6.1	
WFL		60°	10000	5000	8	78	9.2	9.2	51	13.9	10.7	2	156	3.5	**	4.6	442	2.0	6.9	3.3	2	812	1.2	3.5	2.7	
					10	50	11.5	11.5	32	17.3	13.3	3	69	5.2	**	6.9	196	3.0	10.4	4.9	3	361	1.7	5.2	4.0	
	12				35	13.9	13.9	23	20.8	16.0	4	39	6.9	**	9.2	110	4.0	13.9	6.5	4	203	2.3	6.9	5.3		
	14				26	16.2	16.2	17	24.2	18.7	5	25	8.7	**	11.5	71	5.0	17.3	8.2	5	130	2.9	8.7	6.7		
	16				20	18.5	18.5	13	**	21.3	6	17	10.4	**	13.9	49	6.0	20.8	9.8	6	90	3.5	10.4	8.0		
100W PAR38 Ceramic Metal Halide	SP	15°	12500	70000	10	700	2.6	2.6	455	3.5	3.0	4	547	6.9	4.4	2.1	1547	4.0	2.1	1.5	6	1263	3.5	2.1	1.8	
					12	486	3.2	3.2	316	4.2	3.6	6	243	10.4	6.7	3.2	687	6.0	3.2	2.2	9	561	5.2	3.2	2.7	
					14	357	3.7	3.7	232	4.9	4.3	8	137	13.9	8.9	4.2	387	8.0	4.3	3.0	12	316	6.9	4.2	3.6	
					16	273	4.2	4.2	178	5.6	4.9	10	88	17.3	11.1	5.3	247	10.0	5.4	3.7	15	202	8.7	5.3	4.6	
					18	216	4.7	4.7	140	6.4	5.5	12	61	20.8	13.3	6.3	172	12.0	6.4	4.5	18	140	10.4	6.4	5.5	
	FL	25°	12500	25000	8	391	3.5	3.5	254	4.8	4.1	2	781	3.5	4.2	1.8	2210	2.0	1.9	1.3	4	1015	2.3	2.4	2.0	
					10	250	4.4	4.4	162	6.0	5.1	4	195	6.9	8.3	3.5	552	4.0	3.7	2.5	6	451	3.5	3.6	3.1	
					12	174	5.3	5.3	113	7.2	6.1	6	87	10.4	12.5	5.3	246	6.0	5.6	3.8	8	254	4.6	4.8	4.1	
					14	128	6.2	6.2	83	8.4	7.2	8	49	13.9	16.6	7.1	138	8.0	7.5	5.0	10	162	5.8	6.0	5.1	
					16	98	7.1	7.1	63	9.6	8.2	10	31	17.3	20.8	8.9	88	10.0	9.3	6.3	12	113	6.9	7.2	6.1	
	WFL	60°	12500	7000	8	109	9.2	9.2	71	13.9	10.7	2	219	3.5	**	4.6	619	2.0	6.9	3.3	2	1137	1.2	3.5	2.7	
					10	70	11.5	11.5	45	17.3	13.3	3	97	5.2	**	6.9	275	3.0	10.4	4.9	3	505	1.7	5.2	4.0	
12					49	13.9	13.9	32	20.8	16.0	4	55	6.9	**	9.2	155	4.0	13.9	6.5	4	284	2.3	6.9	5.3		
14					36	16.2	16.2	23	24.2	18.7	5	35	8.7	**	11.5	99	5.0	17.3	8.2	5	182	2.9	8.7	6.7		
16					27	18.5	18.5	18	27.7	21.3	6	24	10.4	**	13.9	69	6.0	20.8	9.8	6	126	3.5	10.4	8.0		
150W PAR38 Ceramic Metal Halide	SP	15°	9000	50000	10	500	2.6	2.6	325	3.5	3.0	6	174	10.4	6.7	3.2	491	6.0	3.2	2.2	8	507	4.6	2.8	2.4	
					14	255	3.7	3.7	166	4.9	4.3	8	98	13.9	8.9	4.2	276	8.0	4.3	3.0	10	325	5.8	3.1	3.0	
					18	154	4.7	4.7	100	6.4	5.5	10	63	17.3	11.1	5.3	177	10.0	5.4	3.7	12	226	6.9	4.2	3.6	
					22	103	5.8	5.8	67	7.8	6.7	12	43	20.8	13.3	6.3	123	12.0	6.4	4.5	14	166	8.1	4.9	4.3	
					26	74	6.8	6.8	48	9.2	7.9	14	32	24.2	15.6	7.4	90	14.0	7.05	5.2	16	127	9.2	5.6	4.9	
	FL	25°	9000	28000	8	438	3.5	3.5	284	4.8	4.1	2	219	6.9	8.3	3.5	619	4.0	3.7	2.5	6	505	3.5	3.6	3.1	
					10	280	4.4	4.4	182	6.0	5.1	4	97	10.4	12.5	5.3	275	6.0	5.6	3.8	8	284	4.6	4.8	4.1	
					12	194	5.3	5.3	126	7.2	6.1	6	55	13.9	16.6	7.1	155	8.0	7.5	5.0	10	182	5.8	6.0	5.1	
					14	143	6.2	6.2	93	8.4	7.2	8	35	17.3	20.8	8.9	99	10.0	9.3	6.3	12	126	6.9	7.2	6.1	
					16	109	7.1	7.1	71	9.6	8.2	10	24	20.8	25.0	10.6	69	12.0	11.2	7.5	14	93	8.1	8.4	7.2	
	WFL	65°	9000	6500	8	102	10.2	10.2	66	15.7	11.8	3	90	5.2	**	7.6	255	3.0	12.9	5.4	4	264	2.3	7.9	5.9	
					10	65	12.7	12.7	42	19.6	14.7	4	51	6.9	**	10.2	144	4.0	17.2	7.2	5	169	2.9	9.8	7.4	
12					45	15.3	15.3	29	23.6	17.7	5	33	8.7	**	12.7	92	5.0	21.4	9.0	6	117	3.5	11.8	8.8		
14					33	17.8	17.8	22	27.5	20.6	6	23	10.4	**	15.3	64	6.0	**	10.8	7	86	4.0	13.8	10.3		
16					25	20.4	20.4	16	31.4	23.5	7	17	12.1	**	17.8	47	7.0	**	12.6	8	66	4.6	15.7	11.8		

** Due to steep aiming angle, length of beam extends beyond 25'. Each angle listed is measured from 0° vertical.