LM-79-08 Test Report

For

P.Q.L., Inc.

2285 Ward Avenue / Simi Valley, CA 93065

Bollards

Model name(s): BLRD-RL-14/19/24W-3CCT-PC,
BLRD-DL-14/19/24W-3CCT-PC

Shape of luminaire RL=Round with Louver Reflector, DL=Dome with Louver Reflector.
3CCT=3000/4000/5000 Selectable,
PC = represents photo control

Representative (Tested) Model:
BLRD-RL-14/19/24W-3CCT-PC (Setting at 3000K)
BLRD-RL-14/19/24W-3CCT-PC (Setting at 4000K)
BLRD-RL-14/19/24W-3CCT-PC (Setting at 5000K)

Model Different: All construction and rating are the same, except CCT

Test & Report By:

Candy Chen

Engineer: Candy Chen

Date: 2022-12-30

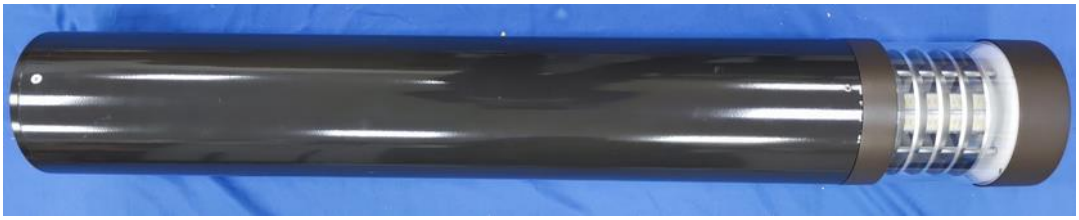
Review By:

Jason Luo

Manager: Jason Luo

1.1 Product Information:

Organization Name	P.Q.L., Inc.	
Model Number	BLRD-RL-14/19/24W-3CCT-PC	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)		
Rated Voltage / Frequency	120-277Vac, 50/60 Hz	
Nominal Power	24W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K, 4000K, 5000K(Color tunable)	
LED Manufacturer	Bridgelux Inc.	
LED Model	BXEN-XXE-13H-9D1-00-0-0	
Sample Number	BLC2212029E-C1	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s
Photo		



1.2 Test Specifications:

Date of Receipt	2022-12-20
Date of Test	2022-12-23
Test item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	BL-QP-033

1.3 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25 °C ±1 °C, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1 °vertical intervals and 22.5 °horizontal intervals. Goniophotometer far field detector f1'=1.42%, Test distance: 14.14m

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 ºC ±1 ºC. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

Self-absorption:

BLRD-RL-14/19/24W-3CCT-PC (Setting at 3000K)

BLRD-RL-14/19/24W-3CCT-PC (Setting at 4000K)

BLRD-RL-14/19/24W-3CCT-PC (Setting at 5000K)

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25 ºC ±1 ºC. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2022-12-23	Test Ambient:	25.2 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLRD-RL-14/19/24W-3CCT-PC (Setting at 3000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC221202 9E-C1	120.0	60	0.193	23.01	0.994	4.52
	277.0	60	0.093	24.16	0.940	9.54

Chromaticity Measurement - Sphere-Spectroradiometer Method:

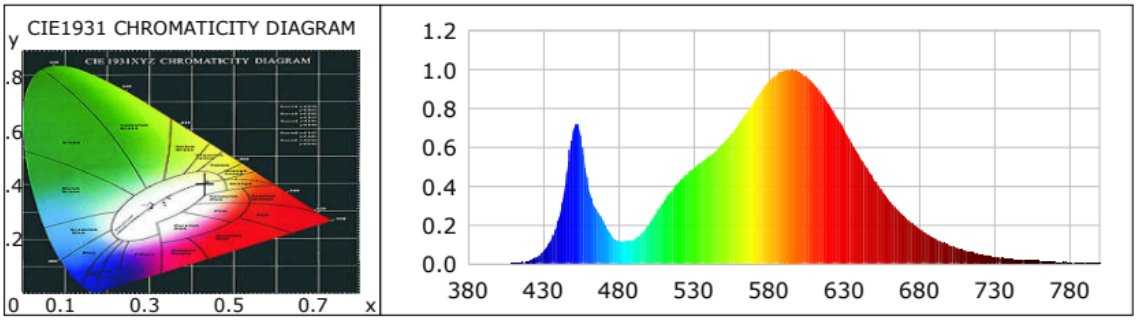
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	3089
Duv	-0.0005
Chromaticity (x, y)	x=0.4301 y=0.4004
Chromaticity (u', v')	u(u')=0.2477 v'=0.5189
Color Rendering Index (CRI)	73
R9	-33
Rf	76
Rg	93
Rcs,h1(%)	-17

Special Color Rendering Indices			
R1	69	R9	-34
R2	83	R10	61
R3	94	R11	63
R4	68	R12	49
R5	69	R13	72
R6	77	R14	97
R7	76	R15	61
R8	43	--	--
--	--	--	--
--	--	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	1679.6	1731.6
Luminous Efficacy (lm/W)	72.99	71.67
Most worst Luminous/Highest	69.52	
Beam Angle (°)	75.8	--
Center Beam Candle Power (cd)	1	--

Spectral Power Distribution & Chromaticity Diagram

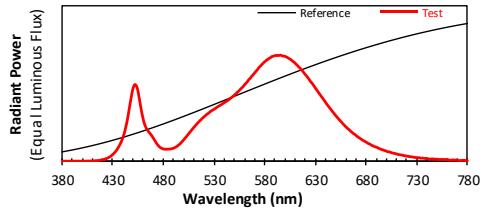


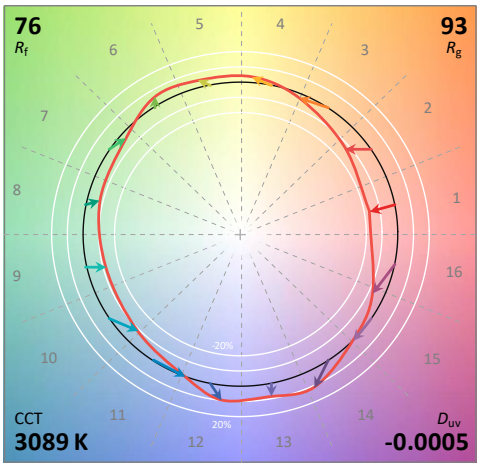
WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0004	0.0115	535	0.4562	14.7935	690	0.2442	7.9187
385	0.0004	0.0145	540	0.4892	15.8631	695	0.2085	6.7617
390	0.0006	0.0192	545	0.5206	16.8816	700	0.1806	5.8557
395	0.0003	0.0100	550	0.5529	17.9292	705	0.1529	4.9567
400	0.0004	0.0127	555	0.5829	18.9018	710	0.1325	4.2981
405	0.0013	0.0416	560	0.6221	20.1725	715	0.1110	3.5997
410	0.0024	0.0767	565	0.6681	21.6651	720	0.0943	3.0566
415	0.0059	0.1918	570	0.7197	23.3382	725	0.0802	2.5996
420	0.0142	0.4590	575	0.7757	25.1532	730	0.0682	2.2110
425	0.0301	0.9762	580	0.8325	26.9950	735	0.0574	1.8602
430	0.0630	2.0413	585	0.8904	28.8741	740	0.0479	1.5534
435	0.1204	3.9051	590	0.9388	30.4439	745	0.0418	1.3550
440	0.2198	7.1277	595	0.9743	31.5945	750	0.0340	1.1040
445	0.4183	13.5657	600	0.9956	32.2849	755	0.0292	0.9472
450	0.6837	22.1708	605	1.0000	32.4271	760	0.0265	0.8594
455	0.6591	21.3726	610	0.9893	32.0808	765	0.0225	0.7283
460	0.4018	13.0306	615	0.9639	31.2567	770	0.0194	0.6289
465	0.2841	9.2119	620	0.9251	29.9995	775	0.0179	0.5797
470	0.2195	7.1182	625	0.8763	28.4174	780	0.0148	0.4812
475	0.1477	4.7897	630	0.8190	26.5563	785	0.0112	0.3627
480	0.1156	3.7486	635	0.7543	24.4594	790	0.0107	0.3483
485	0.1141	3.6994	640	0.6897	22.3637	795	0.0088	0.2851
490	0.1228	3.9835	645	0.6237	20.2234	800	0.0050	0.1613
495	0.1522	4.9366	650	0.5563	18.0393			
500	0.2009	6.5133	655	0.4937	16.0081			
505	0.2595	8.4138	660	0.4307	13.9672			
510	0.3176	10.3002	665	0.3766	12.2135			
515	0.3708	12.0254	670	0.3244	10.5196			
520	0.4177	13.5447	675	0.2812	9.1178			
525	0.4562	14.7935	680	0.2442	7.9187			
530	0.4892	15.8631	685	0.2085	6.7617			

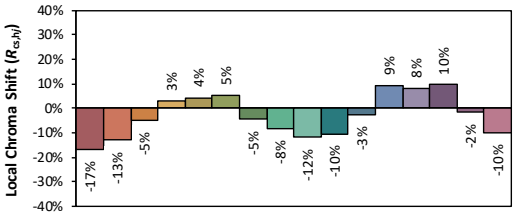
TM30

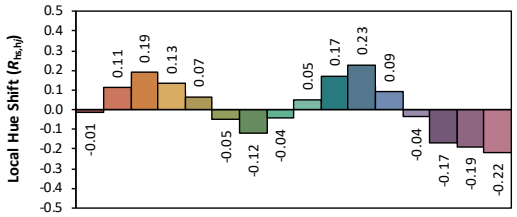
ANSI/IES TM-30-18 Color Rendition Report

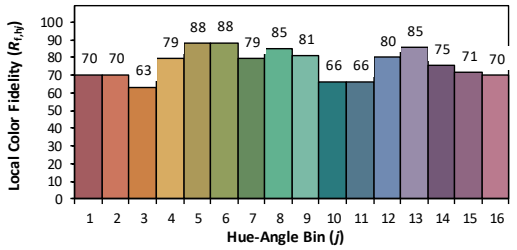
Source:	BXEN-XXE-13H-9D1-00-0-0	Manufacturer:	P.Q.L., Inc.
Date:	2022/12/23	Model:	BLRD-RL-14/19/24W-3CCT-PC (Setting at 3000K)

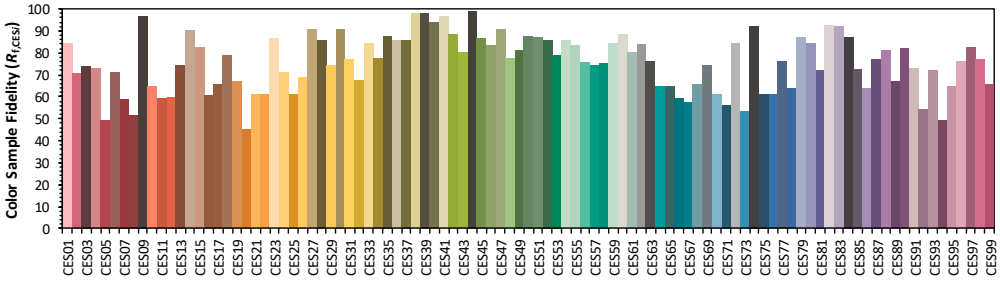












Notes:	This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4301
y	0.4004
u'	0.2477
v'	0.5189

CIE 13.3-1995 (CRI)	
R_a	73
R_9	-33

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Zonal Lumen Tabulation

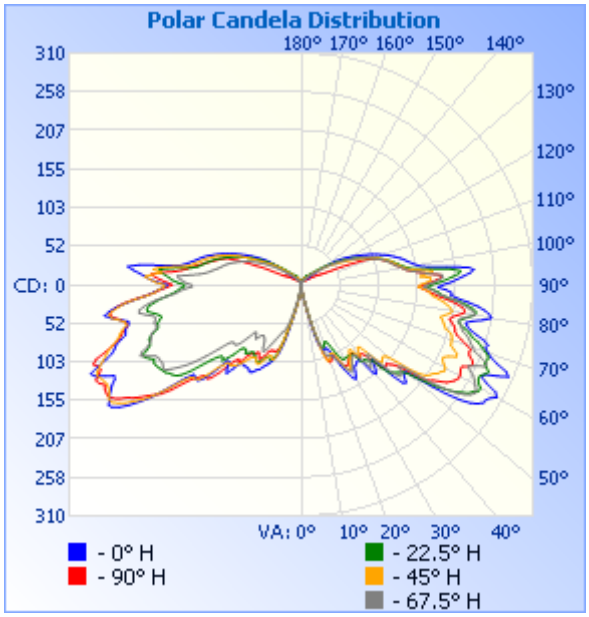
Zonal Lumen Summary

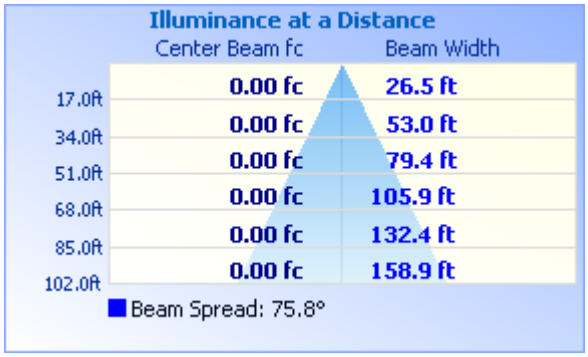
Zone	Lumens	% Lamp	% Luminaire
0-30	69.8	4.2%	4.2%
0-40	146.3	8.7%	8.7%
0-60	478.9	28.5%	28.5%
60-90	726.8	43.3%	43.3%
70-100	658.1	39.2%	39.2%
90-120	407.2	24.2%	24.2%
0-90	1,205.6	71.8%	71.8%
90-180	474.1	28.2%	28.2%
0-180	1,679.8	100%	100%

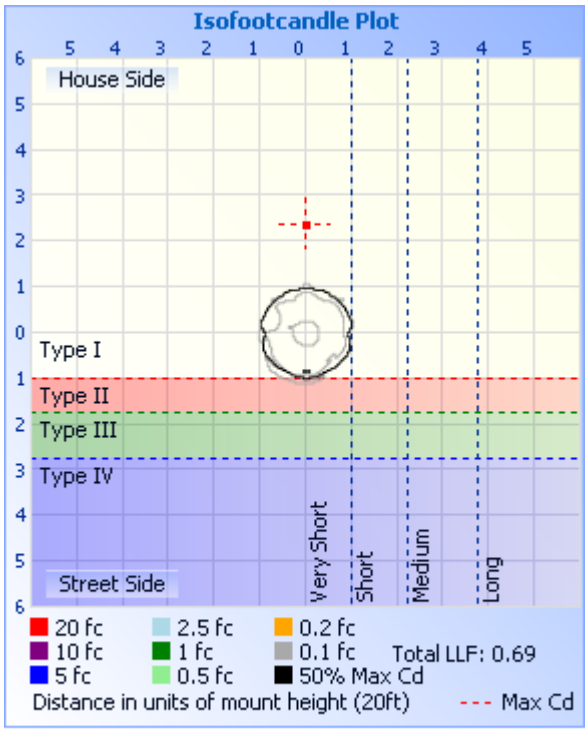
Lumens Per Zone

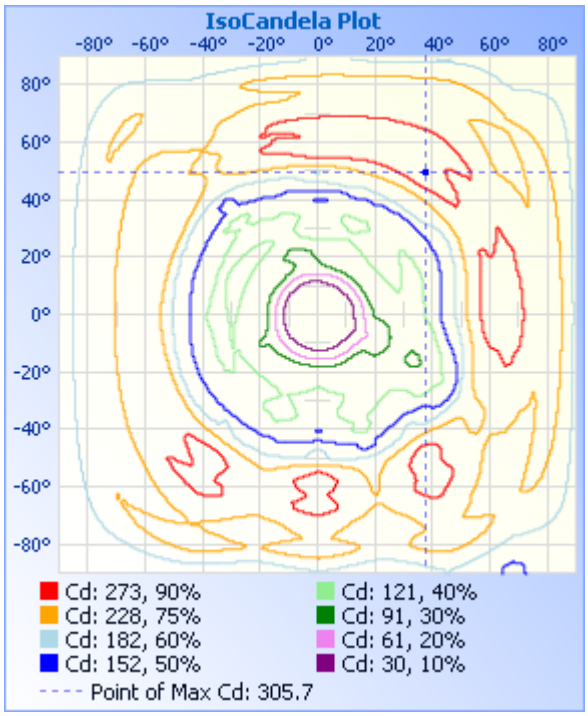
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	0.7	0.0%	90-100	192.7	11.5%
10-20	18.0	1.1%	100-110	132.3	7.9%
20-30	51.0	3.0%	110-120	82.2	4.9%
30-40	76.5	4.6%	120-130	39.5	2.4%
40-50	118.8	7.1%	130-140	15.5	0.9%
50-60	213.8	12.7%	140-150	7.2	0.4%
60-70	261.4	15.6%	150-160	3.6	0.2%
70-80	243.6	14.5%	160-170	1.0	0.1%
80-90	221.8	13.2%	170-180	0.1	0%

Photometric Data









Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	1	2	1	1	1	1	1	1	1	2	1	1	1	2	2	2
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4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	3	3	3	2	3	2	2	3	3	2	3	3	2	2	3	3	3
6	5	4	4	3	4	3	3	3	4	4	4	4	4	4	5	5	5
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9	15	14	14	13	14	13	13	13	14	13	14	11	14	14	16	16	15
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61	297	271	218	265	243	259	286	239	291	222	294	213	298	255	291	292	297

62	280	268	214	261	242	253	283	236	287	223	292	214	297	248	283	289	280
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79	248	228	202	226	213	216	236	210	247	201	248	211	246	224	252	244	248
80	258	235	205	236	220	226	247	218	258	208	258	220	255	231	265	258	258
81	255	237	203	233	222	232	257	224	266	209	260	219	259	230	266	262	255
82	248	232	198	226	217	227	254	221	260	206	255	213	257	221	258	255	248
83	238	223	192	217	209	217	246	213	249	198	246	205	250	211	246	242	238
84	225	211	185	209	199	205	231	202	235	191	237	195	239	201	233	227	225
85	209	196	178	198	187	192	216	191	221	182	222	181	224	189	218	211	209
86	201	187	173	185	177	179	201	180	206	173	206	168	208	179	206	198	201
87	201	183	171	180	170	169	187	172	198	167	196	163	196	174	201	196	201
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90	190	174	159	168	164	160	173	161	179	156	183	147	173	168	186	183	190
91	201	185	168	177	174	172	190	172	192	165	195	155	180	178	195	196	201
92	209	195	173	184	181	181	200	181	203	172	202	159	188	185	205	208	209
93	217	202	174	190	188	187	196	187	209	177	209	164	195	191	196	217	217

94	226	211	159	189	187	176	177	193	216	181	199	166	201	182	181	227	226
95	232	214	173	171	171	161	199	201	226	189	187	148	188	166	198	228	232
96	225	201	177	160	159	158	204	204	233	191	199	136	170	156	199	212	225
97	196	174	161	149	149	149	192	192	218	180	191	129	160	146	186	183	196
98	171	152	147	142	142	140	170	167	187	162	174	124	154	140	169	163	171
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101	151	136	134	131	131	128	146	142	153	137	146	114	139	129	146	145	151
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104	141	126	125	123	123	120	135	132	142	127	136	107	126	122	136	134	141
105	137	123	122	120	120	118	133	129	139	124	133	104	122	119	132	131	137
106	133	120	119	117	117	115	130	126	135	121	129	101	119	115	128	127	133
107	129	117	116	114	114	112	126	123	132	118	125	99	115	112	125	123	129
108	125	113	112	110	110	109	123	119	127	114	122	96	111	109	120	119	125
109	121	109	109	107	106	106	119	116	123	110	118	93	108	105	117	116	121
110	117	105	105	103	102	103	115	111	119	107	114	89	102	101	112	111	117
111	113	101	101	100	94	99	110	108	115	103	110	86	91	97	107	107	113
112	108	97	96	96	82	95	106	104	110	99	106	83	80	93	102	103	108
113	104	93	91	92	68	91	101	100	106	95	101	80	64	89	96	98	104
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115	95	85	81	84	45	83	90	92	98	87	90	73	43	82	85	90	95
116	91	81	76	80	37	79	85	87	93	84	85	69	34	78	80	86	91
117	86	77	71	76	32	75	79	84	89	79	79	66	28	74	74	81	86
118	82	73	67	72	29	71	74	80	85	75	73	62	25	70	70	77	82
119	78	69	63	68	27	67	69	76	81	72	68	59	24	66	65	74	78
120	74	66	59	64	26	63	65	72	76	68	64	55	23	62	62	70	74
121	70	62	56	60	24	59	61	68	72	65	60	51	22	58	58	66	70
122	66	59	53	56	22	55	57	64	68	61	56	48	21	54	55	62	66
123	62	55	50	52	20	51	54	60	64	57	53	44	19	50	52	59	62
124	58	52	47	48	19	47	51	57	60	54	49	41	18	46	49	55	58
125	53	48	44	43	17	43	48	53	56	51	47	37	17	42	45	51	53

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128	35	39	34	34	14	33	38	43	40	41	38	29	14	32	36	41	35
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132	18	29	25	25	11	24	27	33	22	31	27	21	11	23	26	31	18
133	16	28	23	23	10	22	25	30	19	29	25	20	11	22	24	29	16
134	14	26	22	21	10	20	24	29	17	27	24	19	10	20	22	27	14
135	13	24	20	20	9	19	22	27	15	25	22	17	10	19	21	25	13
136	12	22	19	18	9	17	20	25	14	24	20	16	9	18	19	23	12
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152	10	12	9	7	4	6	10	14	10	12	9	6	3	6	11	13	10
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156	8	10	7	4	3	5	8	12	9	10	8	5	3	5	9	10	8
157	8	9	7	4	3	5	7	11	8	10	7	4	2	5	9	10	8

158	7	9	6	3	3	4	7	10	8	9	7	4	2	5	8	9	7
159	7	8	5	3	2	4	6	9	7	8	6	4	2	4	8	8	7
160	6	7	4	3	2	3	6	9	7	7	6	3	2	4	7	7	6
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163	5	5	3	2	2	2	5	6	5	5	5	2	2	3	6	5	5
164	5	5	3	2	1	2	4	5	5	5	5	2	2	3	5	5	5
165	4	4	3	2	1	2	4	5	4	4	4	2	2	3	5	4	4
166	4	4	2	2	1	2	4	4	4	3	4	2	2	3	4	4	4
167	3	3	2	2	1	2	3	4	4	3	3	2	2	3	4	3	3
168	3	3	2	2	1	2	3	3	3	3	3	2	2	2	3	3	3
169	3	3	2	2	1	2	3	3	3	3	3	2	2	2	3	3	3
170	2	2	2	1	1	2	2	2	3	2	2	2	2	2	2	3	2
171	2	2	2	1	1	1	2	2	2	2	2	2	1	2	2	3	2
172	2	2	1	1	1	1	2	2	2	2	2	2	1	2	2	2	2
173	2	1	1	1	1	1	1	2	2	1	2	1	1	1	2	2	2
174	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
175	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
176	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
177	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

BUG Rating

Lum. Classification System (LCS)

LCS Zone	Lumens	%Lamp	%Lum
FL (0-30)	35.9	2.1	2.1
FM (30-60)	210.1	12.5	12.5
FH (60-80)	255.9	15.2	15.2
FVH (80-90)	111.6	6.6	6.6
BL (0-30)	33.8	2.0	2.0
BM (30-60)	199.0	11.9	11.9
BH (60-80)	249.0	14.8	14.8
BVH (80-90)	110.1	6.6	6.6
UL (90-100)	192.7	11.5	11.5
UH (100-180)	281.4	16.8	16.8
Total	1679.5	100.0	100.0
BUG Rating	**B1-U3-G2**		

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2022-12-23	Test Ambient:	25.2 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLRD-RL-14/19/24W-3CCT-PC (Setting at 4000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC221202 9E-C2	120.0	60	0.188	22.46	0.993	4.53
	277.0	60	0.090	23.53	0.940	9.54

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	3832
Duv	-0.0006
Chromaticity (x, y)	x=0.3877 y=0.3799
Chromaticity (u', v')	u(u')=0.2286 v'=0.5040
Color Rendering Index (CRI)	75
R9	-25
Rf	77
Rg	94
Rcs,h1(%)	-16

Special Color Rendering Indices			
R1	72	R9	-25
R2	83	R10	59
R3	91	R11	69
R4	73	R12	46
R5	72	R13	74
R6	76	R14	95
R7	81	R15	66
R8	52	--	--
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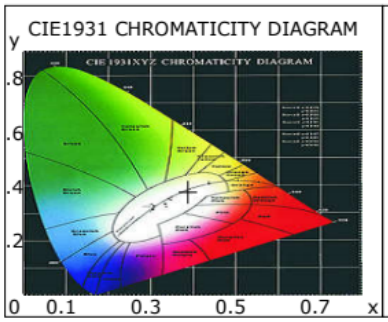
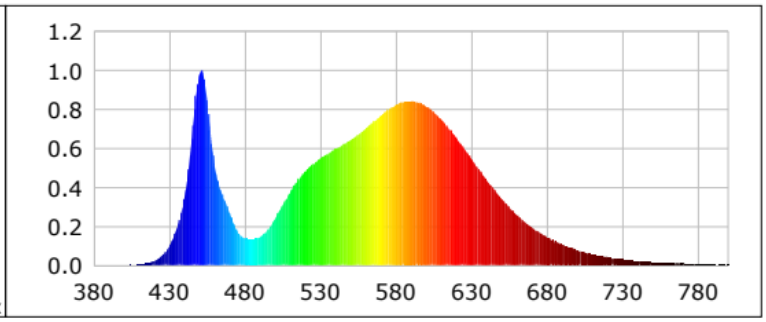
Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	1822.4	1877.9
Luminous Efficacy (lm/W)	81.14	79.81
Most worst Luminous/Highest Watts	77.45	

Spectral Power Distribution & Chromaticity Diagram



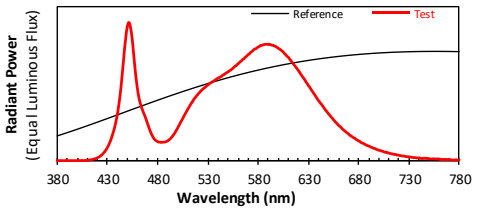


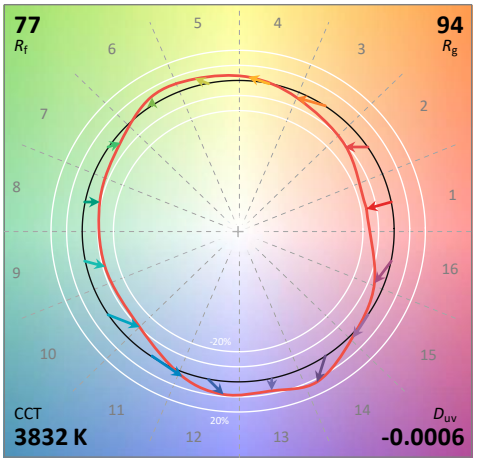
WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0005	0.0173	535	0.5199	18.1780	690	0.1940	6.7825
385	0.0007	0.0244	540	0.5487	19.1862	695	0.1663	5.8133
390	0.0008	0.0291	545	0.5729	20.0306	700	0.1431	5.0025
395	0.0007	0.0260	550	0.5981	20.9131	705	0.1233	4.3105
400	0.0008	0.0292	555	0.6208	21.7067	710	0.1067	3.7321
405	0.0020	0.0692	560	0.6431	22.4840	715	0.0896	3.1311
410	0.0030	0.1048	565	0.6706	23.4466	720	0.0757	2.6482
415	0.0086	0.3013	570	0.7015	24.5281	725	0.0644	2.2506
420	0.0222	0.7752	575	0.7356	25.7204	730	0.0562	1.9634
425	0.0472	1.6509	580	0.7677	26.8425	735	0.0457	1.5988
430	0.0970	3.3900	585	0.7985	27.9176	740	0.0394	1.3785
435	0.1876	6.5591	590	0.8237	28.8007	745	0.0343	1.1994
440	0.3418	11.9511	595	0.8393	29.3451	750	0.0288	1.0059
445	0.6474	22.6355	600	0.8412	29.4138	755	0.0223	0.7805
450	0.9779	34.1918	605	0.8345	29.1770	760	0.0208	0.7266
455	0.8548	29.8881	610	0.8136	28.4480	765	0.0193	0.6744
460	0.5126	17.9226	615	0.7870	27.5183	770	0.0153	0.5345
465	0.3657	12.7870	620	0.7490	26.1891	775	0.0137	0.4779
470	0.2671	9.3390	625	0.7016	24.5302	780	0.0110	0.3832
475	0.1766	6.1738	630	0.6532	22.8401	785	0.0102	0.3560
480	0.1384	4.8391	635	0.6000	20.9795	790	0.0103	0.3592
485	0.1335	4.6668	640	0.5444	19.0344	795	0.0051	0.1779
490	0.1440	5.0362	645	0.4910	17.1663	800	0.0057	0.1980
495	0.1800	6.2949	650	0.4359	15.2405			
500	0.2385	8.3406	655	0.3883	13.5783			
505	0.3068	10.7254	660	0.3399	11.8845			
510	0.3732	13.0501	665	0.2961	10.3540			
515	0.4320	15.1034	670	0.2561	8.9537			
520	0.4808	16.8099	675	0.2233	7.8063			
525	0.5199	18.1780	680	0.1940	6.7825			
530	0.5487	19.1862	685	0.1663	5.8133			

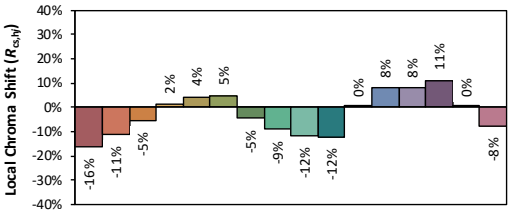
TM30

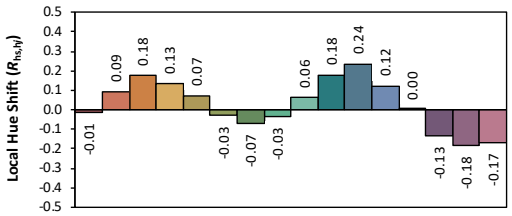
ANSI/IES TM-30-18 Color Rendition Report

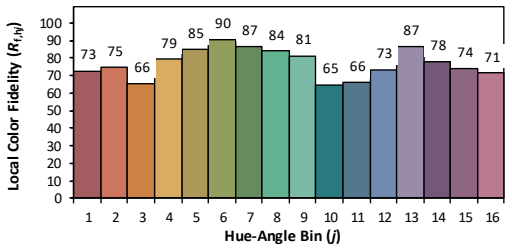
Source:	BXEN-XXE-13H-9D1-00-0-0	Manufacturer:	P.Q.L., Inc.
Date:	2022/12/23	Model:	BLRD-RL-14/19/24W-3CCT-PC (Setting at 4000K)

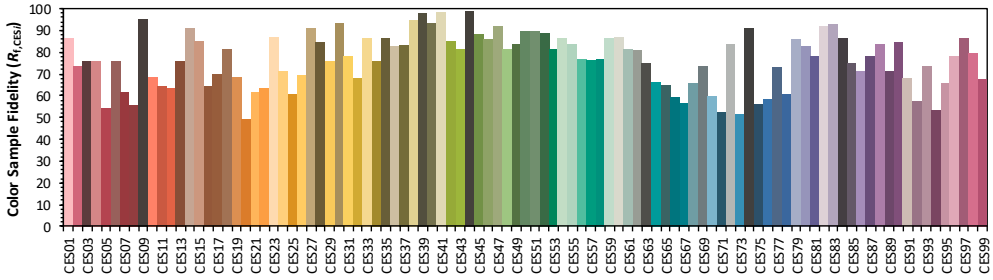












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3877
y	0.3799
u'	0.2286
v'	0.5040

CIE 13.3-1995 (CRI)

R_a	75
R_9	-25

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2022-12-23	Test Ambient:	25.2 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLRD-RL-14/19/24W-3CCT-PC (Setting at 5000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC221202 9E-C2	120.0	60	0.192	22.87	0.995	4.51
	277.0	60	0.092	23.91	0.941	9.53

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	5150
Duv	0.0032
Chromaticity (x, y)	x=0.3415 y=0.3550
Chromaticity (u', v')	u(u')=0.2077 v'=0.4858
Color Rendering Index (CRI)	74
R9	-29
Rf	75
Rg	94
Rcs,h1(%)	-17

Special Color Rendering Indices			
R1	71	R9	-29
R2	79	R10	49
R3	84	R11	72
R4	74	R12	44
R5	72	R13	72
R6	71	R14	91
R7	82	R15	65
R8	57	--	--
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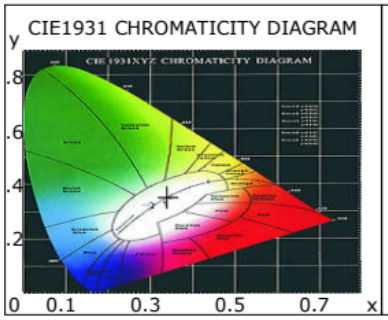
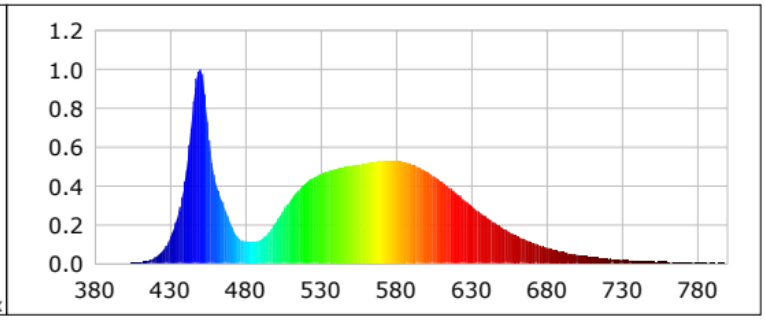
Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	1783.2	1832.0
Luminous Efficacy (lm/W)	77.97	76.62
Most worst Luminous/Highest Watts	74.58	

Spectral Power Distribution & Chromaticity Diagram



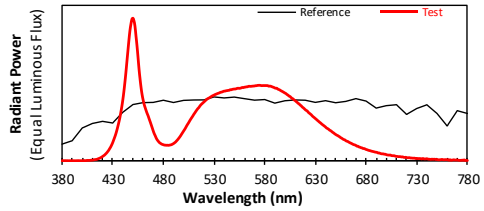


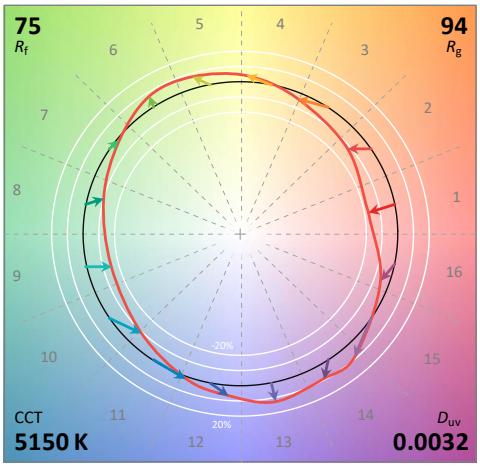
WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0005	0.0248	535	0.4398	21.3605	690	0.1075	5.2221
385	0.0007	0.0328	540	0.4605	22.3672	695	0.0919	4.4619
390	0.0007	0.0338	545	0.4752	23.0805	700	0.0794	3.8586
395	0.0006	0.0291	550	0.4883	23.7165	705	0.0683	3.3161
400	0.0008	0.0376	555	0.4945	24.0188	710	0.0599	2.9073
405	0.0025	0.1231	560	0.5033	24.4438	715	0.0493	2.3933
410	0.0049	0.2361	565	0.5080	24.6729	720	0.0428	2.0810
415	0.0119	0.5793	570	0.5161	25.0648	725	0.0367	1.7804
420	0.0300	1.4561	575	0.5224	25.3739	730	0.0310	1.5048
425	0.0637	3.0929	580	0.5248	25.4883	735	0.0266	1.2941
430	0.1270	6.1671	585	0.5294	25.7132	740	0.0228	1.1078
435	0.2379	11.5537	590	0.5274	25.6164	745	0.0195	0.9449
440	0.4268	20.7275	595	0.5239	25.4435	750	0.0171	0.8328
445	0.7684	37.3202	600	0.5107	24.8032	755	0.0128	0.6196
450	1.0000	48.5701	605	0.4960	24.0895	760	0.0141	0.6861
455	0.7264	35.2837	610	0.4750	23.0704	765	0.0115	0.5593
460	0.4282	20.7963	615	0.4508	21.8955	770	0.0095	0.4637
465	0.3148	15.2907	620	0.4222	20.5077	775	0.0096	0.4656
470	0.2098	10.1886	625	0.3908	18.9833	780	0.0071	0.3435
475	0.1371	6.6592	630	0.3586	17.4173	785	0.0043	0.2073
480	0.1127	5.4740	635	0.3281	15.9374	790	0.0055	0.2659
485	0.1084	5.2631	640	0.2960	14.3787	795	0.0044	0.2157
490	0.1205	5.8537	645	0.2659	12.9155	800	0.0018	0.0879
495	0.1559	7.5707	650	0.2370	11.5100			
500	0.2090	10.1533	655	0.2114	10.2661			
505	0.2676	12.9956	660	0.1848	8.9749			
510	0.3251	15.7908	665	0.1620	7.8687			
515	0.3731	18.1198	670	0.1410	6.8493			
520	0.4123	20.0252	675	0.1234	5.9954			
525	0.4398	21.3605	680	0.1075	5.2221			
530	0.4605	22.3672	685	0.0919	4.4619			

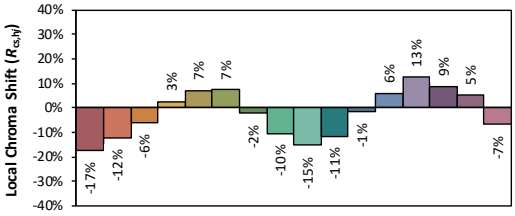
TM30

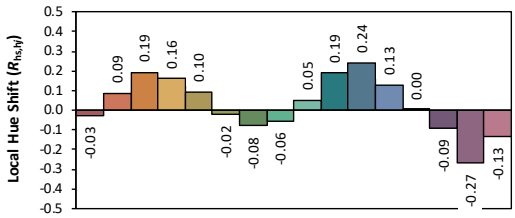
ANSI/IES TM-30-18 Color Rendition Report

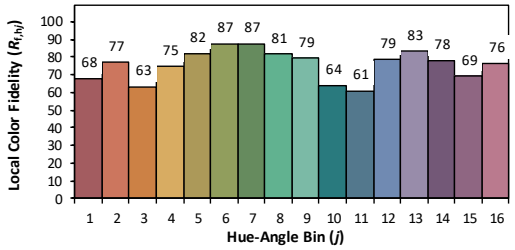
Source:	BXEN-XXE-13H-9D1-00-0-0	Manufacturer:	P.Q.L., Inc.
Date:	2022/12/23	Model:	BLRD-RL-14/19/24W-3CCT-PC (Setting at 5000K)

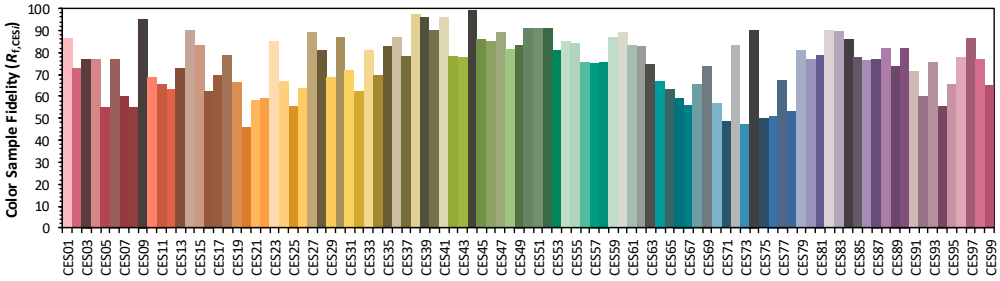












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3415
y	0.3550
u'	0.2077
v'	0.4858

CIE 13.3-1995 (CRI)

R_a	74
R_9	-29

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

3. Test Equipment

Equipment Name	Model No.	Serial No.	Calibration Date
Goniophotometeric System	GPM-3000	DYHXF120001	2022-01-18
AC Power Source	CHP-500C	DYBWD010159	2022-01-25
Total Luminous Flux Standard Lamp	24V/150W	DYJYR040040	2022-01-25
Digital Power Meter	WT500	DYDWQ20010	2022-01-25
Integral Sphere (2M)	2M	DYJCE120067	2022-01-18
Digital Power Meter	WT500	DYDWQ200006	2022-01-25
Optical Color and Electrical Measurement System	CMS-3000S	DYJCE120067	2022-01-18
Expand Uncertainty: Photometric Measurement (Sphere): 2.08%, k=2 Chromaticity Measurement(Sphere):25.6K, k=2 Photometric Measurement(Goniophotometer):2.645%, k=2			

******** END OF REPORT ********