



Report No.: BLC2212029E-B

LM-79-08 Test Report

For

P.Q.L., Inc.

2285 Ward Avenue / Simi Valley, CA 93065

Bollards

Model name(s): BLRD-R-14/19/24W-3CCT-PC
BLRD-D-14/19/24W-3CCT-PC

Shape of luminaire; R=Round, D=Dome,
3CCT = 3000/4000/5000 Selectable,
PC = represents photo control

Representative (Tested) Model:

BLRD-R-14/19/24W-3CCT-PC (Setting at 3000K)
BLRD-R-14/19/24W-3CCT-PC (Setting at 4000K)
BLRD-R-14/19/24W-3CCT-PC (Setting at 5000K)

Test & Report By:

Candy Chen

Engineer: Candy Chen

Date: 2022-12-30

Review By:

Jason Luo

Manager: Jason Luo

Laboratory: UTEST TECHNICAL LABORATORY CO.LTD A2LA Certificate# 4810.01
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Report Format Number BL-FM-SA-012

1.1 Product Information:

Organization Name	P.Q.L., Inc.	
Model Number	BLRD-R-14/19/24W-3CCT-PC	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Bollards	
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-B1	
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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, 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 $f\theta = 1.42\%$, 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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. 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-R-14/19/24W-3CCT-PC (Setting at 3000K)

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

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



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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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. 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 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLRD-R-14/19/24W-3CCT-PC (Setting at 3000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC221202	120.0	60	0.192	22.87	0.994	4.49
9E-B1	277.0	60	0.094	24.67	0.943	8.87
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

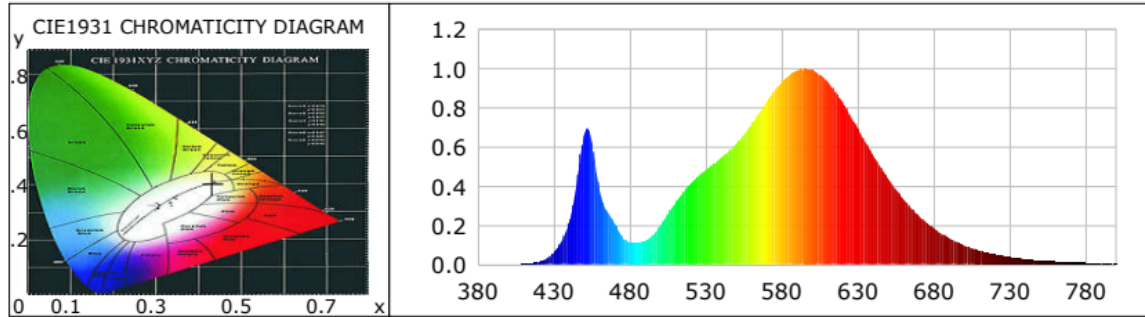
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	69	R9	-33
Frequency (Hz)	60	R2	83	R10	62
CCT (K)	3051	R3	94	R11	63
Duv	-0.0003	R4	68	R12	49
Chromaticity (x, y)	x=0.4329 y=0.4018	R5	69	R13	72
Chromaticity (u', v')	u(u')=0.2489 v'(v')=0.5199	R6	77	R14	97
Color Rendering Index (CRI)	73	R7	76	R15	61
R9	-33	R8	43	--	--
Rf	76	--	--	--	--
Rg	93	--	--	--	--
Rcs,h1(%)	-17				

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3291.4	3386.4	>=500(-10%)
Luminous Efficacy (lm/W)	143.92	137.27	Premium: >= 120(-3%)
Most worst Luminous/Highest	133.42		
Zonal lumens in the 90-110 °zone (%)	3.8	--	<=15(+3%)
Zonal lumens >110 °zone (%)	1.5	--	<=0(+3%)
Beam Angle (°)	98.1	--	--
Center Beam Candle Power (cd)	4	--	--

Spectral Power Distribution & Chromaticity Diagram



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0003	0.0161	535	0.4506	26.0287	690	0.2475	14.2976
385	0.0002	0.0124	540	0.4823	27.8545	695	0.2138	12.3484
390	0.0004	0.0232	545	0.5138	29.6738	700	0.1837	10.6107
395	0.0003	0.0178	550	0.5452	31.4900	705	0.1556	8.9848
400	0.0007	0.0404	555	0.5764	33.2893	710	0.1348	7.7870
405	0.0012	0.0680	560	0.6171	35.6424	715	0.1153	6.6599
410	0.0020	0.1183	565	0.6627	38.2766	720	0.0969	5.5984
415	0.0059	0.3398	570	0.7165	41.3845	725	0.0830	4.7913
420	0.0136	0.7864	575	0.7723	44.6084	730	0.0708	4.0882
425	0.0297	1.7131	580	0.8297	47.9229	735	0.0593	3.4277
430	0.0609	3.5153	585	0.8847	51.0994	740	0.0511	2.9524
435	0.1175	6.7861	590	0.9301	53.7197	745	0.0439	2.5369
440	0.2139	12.3573	595	0.9679	55.9060	750	0.0369	2.1298
445	0.4058	23.4412	600	0.9911	57.2453	755	0.0302	1.7454
450	0.6614	38.1992	605	0.9987	57.6828	760	0.0276	1.5931
455	0.6325	36.5344	610	0.9935	57.3807	765	0.0247	1.4266
460	0.3853	22.2558	615	0.9700	56.0277	770	0.0200	1.1548
465	0.2744	15.8499	620	0.9335	53.9171	775	0.0175	1.0095
470	0.2111	12.1927	625	0.8821	50.9508	780	0.0141	0.8139
475	0.1440	8.3161	630	0.8257	47.6888	785	0.0128	0.7386
480	0.1131	6.5310	635	0.7619	44.0035	790	0.0112	0.6486
485	0.1106	6.3856	640	0.6946	40.1163	795	0.0090	0.5224
490	0.1202	6.9403	645	0.6265	36.1855	800	0.0060	0.3482
495	0.1493	8.6252	650	0.5586	32.2648			
500	0.1977	11.4166	655	0.4964	28.6723			
505	0.2554	14.7495	660	0.4373	25.2563			
510	0.3137	18.1170	665	0.3826	22.1007			
515	0.3659	21.1330	670	0.3325	19.2050			
520	0.4130	23.8557	675	0.2893	16.7094			
525	0.4506	26.0287	680	0.2475	14.2976			
530	0.4823	27.8545	685	0.2138	12.3484			

TM30

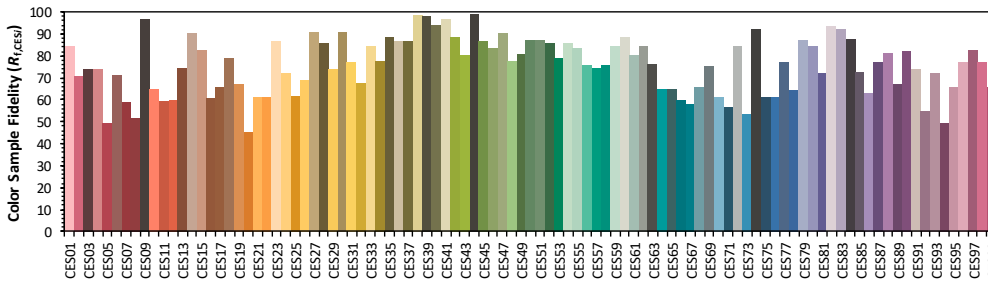
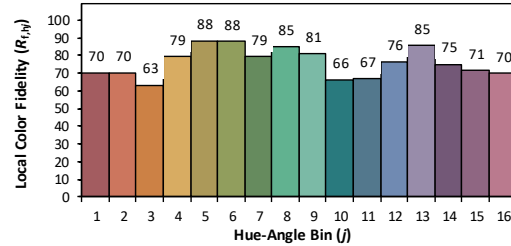
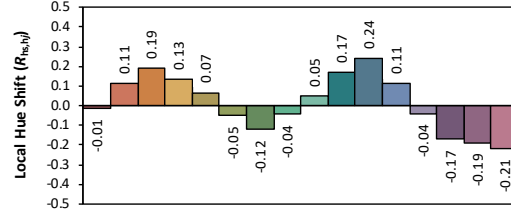
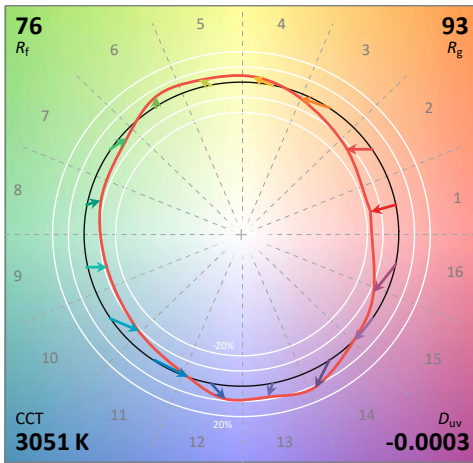
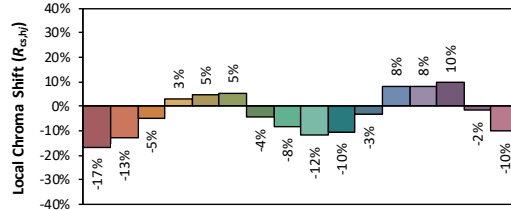
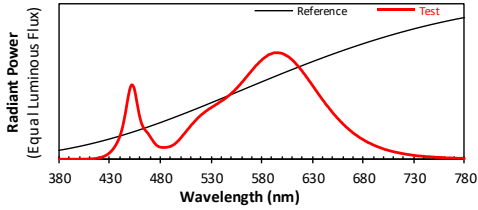
ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-XXE-13H-9D1-00-0-0

Manufacturer: P.Q.L., Inc.

Date: 2022/12/23

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



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

x 0.4329
 y 0.4018
 u' 0.2489
 v' 0.5199

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

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

Zonal Lumen Tabulation

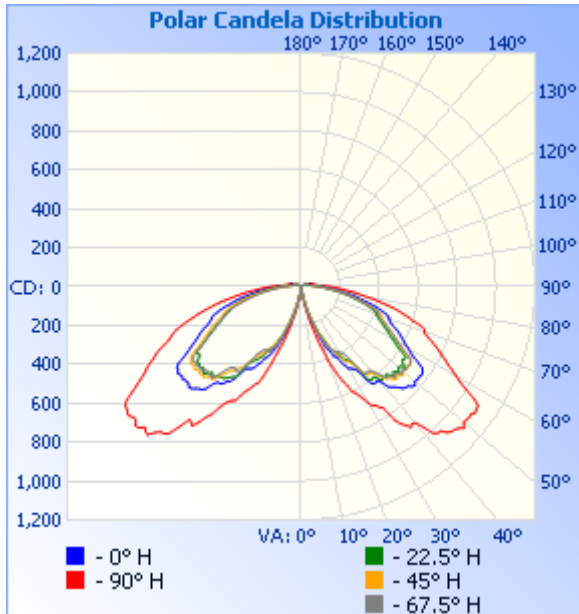
Zonal Lumen Summary

Zone	Lumens	% Lamp	% Luminaire
0-30	239.7	7.3%	7.3%
0-40	617.8	18.8%	18.8%
0-60	1,904.3	57.9%	57.9%
60-90	1,209.8	36.8%	36.8%
70-100	713.3	21.7%	21.7%
90-120	149.0	4.5%	4.5%
0-90	3,114.1	94.6%	94.6%
90-180	177.3	5.4%	5.4%
0-180	3,291.5	100%	100%

Lumens Per Zone

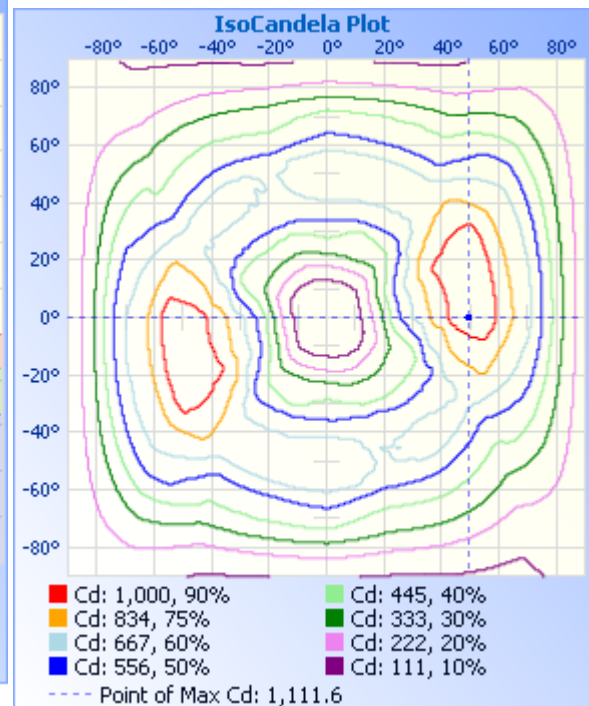
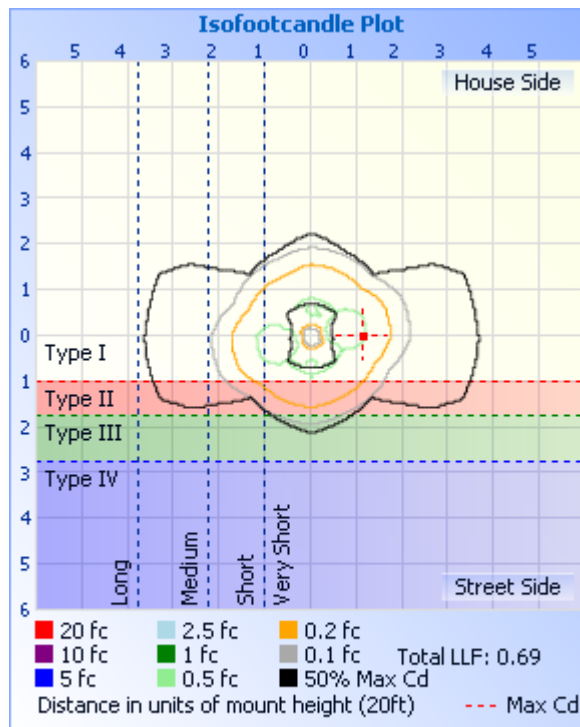
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	2.0	0.1%	90-100	79.9	2.4%
10-20	48.3	1.5%	100-110	45.2	1.4%
20-30	189.4	5.8%	110-120	23.9	0.7%
30-40	378.1	11.5%	120-130	11.3	0.3%
40-50	593.0	18.0%	130-140	8.2	0.2%
50-60	693.5	21.1%	140-150	5.0	0.2%
60-70	576.4	17.5%	150-160	2.6	0.1%
70-80	425.5	12.9%	160-170	1.1	0%
80-90	208.0	6.3%	170-180	0.2	0%

Photometric Data



	Illuminance at a Distance	
	Center Beam fc	Beam Width
17.0ft	0.02 fc	39.2 ft 15.7 ft
34.0ft	0.00 fc	78.4 ft 31.4 ft
51.0ft	0.00 fc	117.6 ft 47.1 ft
68.0ft	0.00 fc	156.9 ft 62.8 ft
85.0ft	0.00 fc	196.1 ft 78.4 ft
102.0ft	0.00 fc	235.3 ft 94.1 ft

■ Vert. Spread: 98.1°
■ Horiz. Spread: 49.5°



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	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1	5	5	4	4	5	6	4	5	5	4	4	4	5	5	4	4	5
2	4	5	5	4	5	6	4	5	5	5	5	5	5	6	4	4	4
3	5	5	5	5	5	6	3	4	6	5	5	5	5	6	5	5	5
4	6	5	4	5	6	7	5	5	6	5	5	5	6	7	5	5	6
5	6	6	6	5	6	8	6	6	7	6	7	7	8	9	6	7	6
6	8	7	7	7	9	11	8	8	10	10	12	10	10	13	8	8	8
7	13	11	10	8	16	21	13	13	18	16	17	18	19	21	14	12	13
8	25	22	18	17	34	40	23	25	27	22	22	25	33	42	25	25	25
9	34	29	28	27	46	51	32	32	38	36	36	32	48	61	35	37	34
10	52	40	43	40	75	65	48	48	54	50	51	47	62	74	50	50	52
11	64	55	54	54	94	89	63	65	69	53	52	62	79	88	61	63	64
12	82	69	67	62	113	107	74	82	88	72	64	84	116	117	77	79	82
13	105	87	85	84	145	138	95	103	110	95	81	101	148	156	98	104	105
14	122	106	101	109	173	173	112	120	120	100	86	118	166	166	112	119	122
15	150	134	126	123	208	202	134	144	145	139	107	140	205	203	141	149	150
16	169	147	146	148	237	233	155	163	170	158	151	158	239	248	155	166	169
17	199	166	166	176	275	269	176	189	193	164	172	187	266	267	173	192	199
18	213	194	189	200	319	303	200	229	223	201	200	213	302	303	199	228	213
19	234	205	209	219	341	336	226	242	251	208	221	228	335	345	220	238	234
20	275	238	245	249	406	384	253	280	277	239	251	263	361	384	250	284	275
21	293	257	258	274	434	421	277	293	302	276	280	274	417	431	276	311	293
22	326	274	286	298	475	455	308	335	333	281	283	302	459	469	305	335	326
23	347	291	303	318	510	497	325	347	350	300	312	339	506	490	317	347	347
24	366	315	329	333	535	532	344	368	372	322	317	335	542	524	342	360	366
25	390	342	340	350	563	565	359	381	393	345	332	349	551	568	354	378	390
26	401	362	358	362	603	598	371	403	406	366	347	358	572	608	380	393	401
27	412	378	376	370	612	598	392	405	417	369	354	367	592	628	398	396	412
28	443	387	397	377	635	642	414	412	444	391	370	372	612	644	412	405	443

29	463	402	414	384	659	675	428	416	458	411	389	372	639	669	425	408	463
30	485	417	432	388	694	698	447	416	481	421	404	374	676	710	442	411	485
31	489	439	450	396	716	721	457	419	492	439	404	384	683	718	462	422	489
32	497	445	453	408	718	727	470	441	497	445	422	399	694	745	471	438	497
33	506	456	465	423	741	759	474	448	503	458	427	413	713	756	483	466	506
34	526	473	491	461	751	772	490	484	509	469	453	462	746	784	501	501	526
35	584	535	525	513	839	868	521	542	548	521	480	490	801	880	539	555	584
36	613	595	552	552	873	965	540	570	589	575	520	538	829	939	549	575	613
37	626	599	567	557	892	962	568	583	611	578	520	540	874	952	565	594	626
38	623	597	566	552	917	988	585	604	621	592	543	547	907	984	582	592	623
39	621	596	568	557	905	1002	584	605	642	605	559	538	897	1005	578	587	621
40	643	619	584	567	916	1012	588	599	650	616	560	543	891	1015	581	603	643
41	682	634	604	586	959	1028	610	606	650	619	594	552	957	1025	601	628	682
42	694	628	627	613	1015	1029	643	645	671	621	607	575	1017	1029	656	671	694
43	705	635	646	641	1030	1048	661	696	718	630	646	614	1033	1053	672	686	705
44	720	627	653	640	1030	1049	674	694	736	649	659	656	1037	1048	661	683	720
45	740	642	672	650	1060	1038	678	688	741	643	659	647	1061	1031	677	702	740
46	746	662	683	668	1073	1075	694	711	754	634	666	652	1096	1068	682	713	746
47	750	645	670	658	1077	1078	701	726	768	651	681	656	1092	1093	690	696	750
48	766	651	680	662	1089	1061	689	708	774	671	680	648	1080	1074	689	710	766
49	774	667	694	682	1109	1089	706	718	765	661	686	653	1106	1080	696	728	774
50	761	649	683	676	1088	1092	711	731	762	652	679	669	1112	1096	699	721	761
51	761	650	682	677	1089	1072	702	722	766	662	681	666	1092	1079	702	731	761
52	766	670	687	688	1094	1077	703	734	771	663	693	668	1090	1080	697	740	766
53	763	655	683	682	1090	1083	704	734	765	655	683	671	1106	1085	695	732	763
54	767	641	689	683	1104	1062	710	732	769	660	683	668	1103	1070	705	738	767
55	761	648	685	683	1098	1032	710	733	774	643	692	670	1093	1051	697	732	761
56	750	647	680	679	1096	1058	696	734	762	625	681	670	1090	1064	690	719	750
57	718	617	656	659	1059	1053	689	723	760	635	674	661	1066	1049	675	684	718
58	680	585	621	624	998	1003	660	687	742	634	662	629	1022	995	640	657	680
59	654	565	598	595	951	950	631	657	703	603	632	601	986	959	617	630	654

60	635	545	578	575	918	914	605	631	676	576	604	578	951	929	600	608	635
61	612	528	559	555	887	886	582	607	650	557	584	555	920	896	577	587	612
62	598	510	538	540	854	850	565	587	629	533	563	539	899	864	554	571	598
63	581	495	521	523	830	825	546	567	606	514	545	523	873	837	539	553	581
64	565	478	506	500	803	796	530	545	588	495	526	501	844	810	523	532	565
65	551	466	494	486	781	771	515	530	574	482	510	482	822	789	505	517	551
66	531	451	479	473	757	747	499	514	556	465	494	467	795	765	491	502	531
67	511	436	466	456	732	726	485	498	537	448	477	451	762	736	472	490	511
68	498	424	450	441	704	697	469	486	516	434	459	437	734	704	459	477	498
69	485	418	440	427	684	678	455	475	501	421	440	421	716	687	449	463	485
70	481	409	435	422	672	662	445	462	491	409	428	411	698	665	441	460	481
71	476	408	433	422	669	651	435	453	484	392	419	401	676	649	435	457	476
72	461	390	417	410	643	632	428	446	472	385	407	383	646	632	420	437	461
73	439	371	391	385	601	599	410	428	450	374	390	362	612	595	396	420	439
74	418	355	373	364	576	571	387	413	430	359	369	341	577	566	379	399	418
75	391	331	345	342	542	539	363	391	410	343	350	320	548	540	354	371	391
76	369	312	325	321	516	509	340	364	381	324	329	299	519	510	332	350	369
77	343	290	305	302	483	481	321	346	361	307	308	277	484	478	312	325	343
78	317	269	283	279	445	443	296	320	340	289	289	260	455	445	288	300	317
79	295	257	265	256	413	418	277	296	317	269	272	243	426	420	274	281	295
80	274	235	244	240	383	386	259	277	296	254	252	222	393	390	253	259	274
81	252	219	227	217	347	356	238	254	275	235	229	205	361	357	232	239	252
82	231	199	208	198	316	327	216	234	253	217	213	188	333	331	212	218	231
83	214	185	188	178	290	301	200	216	234	200	198	170	305	303	192	200	214
84	195	170	171	165	270	276	182	197	216	182	179	153	283	276	175	181	195
85	171	149	154	152	241	247	165	179	193	164	164	140	256	248	155	161	171
86	154	135	140	136	218	223	148	158	169	147	149	126	229	229	141	145	154
87	142	125	129	127	201	209	134	144	154	135	136	114	213	210	128	132	142
88	131	117	120	118	187	195	124	130	141	125	124	103	193	194	116	120	131
89	120	108	112	108	170	177	113	119	129	114	114	95	173	176	108	111	120
90	112	101	102	97	150	156	102	111	118	104	105	87	156	160	99	105	112

91	103	93	89	87	133	139	90	104	109	96	93	78	139	140	87	98	103
92	92	82	77	79	119	122	81	94	99	86	83	70	125	125	78	88	92
93	83	73	69	70	106	109	72	85	88	77	73	63	110	109	68	80	83
94	76	66	61	63	95	96	63	76	80	69	64	57	99	96	61	74	76
95	70	61	54	57	88	84	55	69	73	63	56	51	89	84	55	68	70
96	64	56	50	52	82	77	50	64	67	56	49	46	82	76	51	62	64
97	60	51	48	46	75	71	48	59	61	51	45	42	76	71	49	58	60
98	55	46	47	44	71	68	47	56	58	48	44	40	71	68	47	54	55
99	53	44	45	43	68	66	45	52	54	46	42	39	67	67	45	49	53
100	49	43	42	41	66	66	44	48	50	44	40	37	65	66	43	47	49
101	48	42	40	39	63	64	42	46	49	43	39	37	63	63	41	45	48
102	46	40	39	37	60	62	40	45	48	42	39	35	61	62	39	44	46
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108	38	34	32	32	52	53	33	37	41	37	35	29	49	52	33	36	38
109	37	33	31	31	49	51	32	36	40	35	34	28	47	50	32	35	37
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112	32	28	27	27	34	41	29	34	36	31	30	25	35	41	27	31	32
113	30	26	26	25	27	38	27	32	33	29	29	23	31	38	25	29	30
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116	21	18	17	17	14	27	19	23	25	23	21	16	19	27	19	20	21
117	20	17	16	14	10	24	17	20	22	20	19	14	14	25	17	19	20
118	18	16	14	13	10	22	15	17	20	18	17	13	12	23	15	16	18
119	17	14	13	12	9	20	14	16	18	16	16	13	12	22	14	15	17
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122	15	12	12	11	9	17	12	13	15	13	13	12	11	19	13	13	15
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124	14	12	11	11	9	17	12	13	13	13	13	12	10	18	12	13	14
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127	13	12	12	11	8	16	11	13	13	12	12	11	11	17	12	13	13
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130	12	12	11	11	8	15	12	13	12	12	11	10	9	17	11	13	12
131	12	12	12	11	9	15	11	13	11	12	11	10	9	16	11	13	12
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161	5	5	3	4	3	5	4	5	5	4	4	4	4	5	4	5	5
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168	5	4	3	3	2	2	3	4	5	4	3	3	3	4	3	4	5
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173	3	3	2	3	1	1	2	3	4	3	3	2	2	4	2	4	3
174	3	3	3	3	2	1	2	2	3	3	3	2	2	4	3	3	3
175	3	2	3	3	0	1	2	2	2	3	3	2	2	3	2	3	3
176	3	3	2	2	0	2	2	2	2	2	2	2	1	3	2	2	3
177	3	3	2	2	0	0	1	2	2	2	2	2	1	2	2	2	3
178	2	1	2	2	0	0	1	2	2	1	2	2	0	2	2	2	2
179	2	2	2	2	0	1	1	1	2	1	2	2	0	1	1	2	2
180	2	2	2	2	0	0	1	1	2	2	2	2	0	1	1	2	2

BUG Rating

Lum. Classification System (LCS)

<u>LCS Zone</u>	<u>Lumens</u>	<u>%Lamp</u>	<u>%Lum</u>
FL (0-30)	119.7	3.6	3.6
FM (30-60)	832.6	25.3	25.3
FH (60-80)	498.3	15.1	15.1
FVH (80-90)	102.5	3.1	3.1
BL (0-30)	119.9	3.6	3.6
BM (30-60)	832.1	25.3	25.3
BH (60-80)	503.5	15.3	15.3
BVH(80-90)	105.4	3.2	3.2
UL (90-100)	79.8	2.4	2.4
UH (100-180)	97.5	3.0	3.0
Total	3291.3	99.9	100.0
BUG Rating	B2-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 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLRD-R-14/19/24W-3CCT-PC (Setting at 4000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC221202	120.0	60	0.188	22.39	0.995	4.49
9E-B2	277.0	60	0.093	24.21	0.943	8.87
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

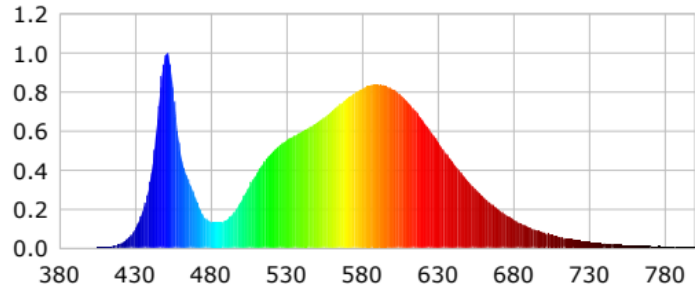
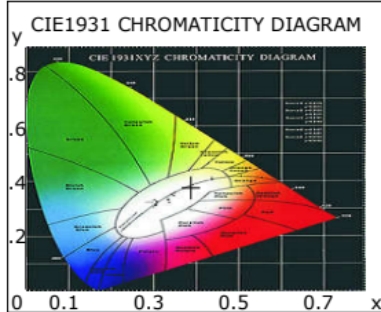
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	72	R9	-25
Frequency (Hz)	60	R2	83	R10	59
CCT (K)	3824	R3	91	R11	69
Duv	-0.0002	R4	73	R12	46
Chromaticity (x, y)	x=0.3883 y=0.3810	R5	72	R13	74
Chromaticity (u', v')	u(u')=0.2286 v'=0.5046	R6	76	R14	95
Color Rendering Index (CRI)	75	R7	81	R15	66
R9	-25	R8	52	--	--
Rf	77	--	--	--	--
Rg	94	--	--	--	--
Rcs,h1(%)	-16				

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3393.7	3507.3	>=500(-10%)
Luminous Efficacy (lm/W)	151.57	144.87	Premium: >= 120(-3%)
Most worst Luminous/Highest Watts	140.18		

Spectral Power Distribution & Chromaticity Diagram

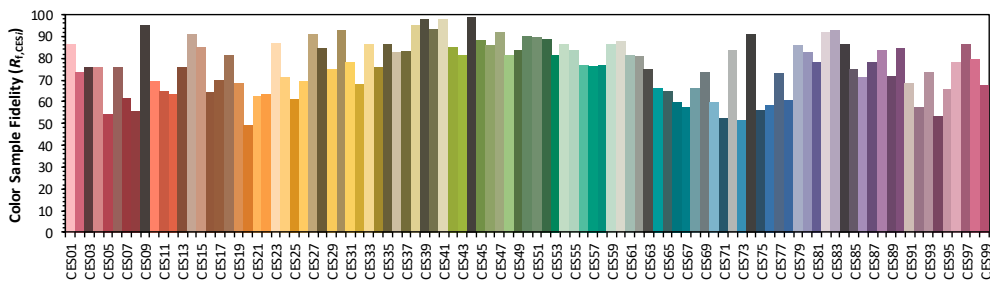
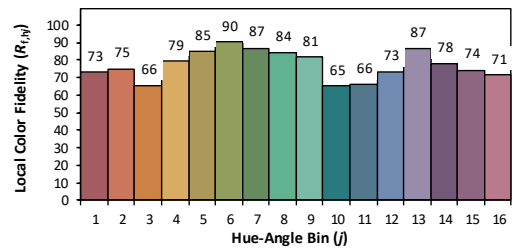
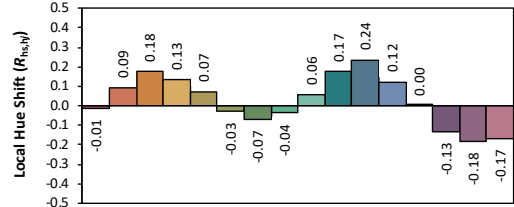
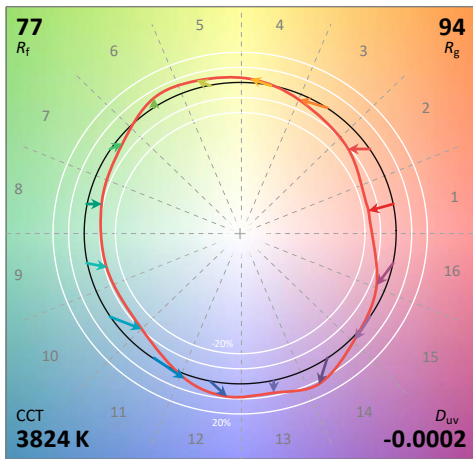
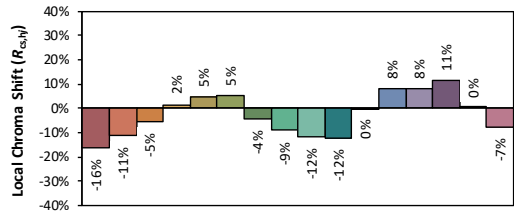
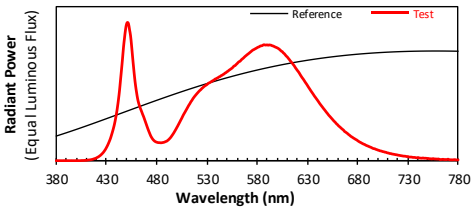


WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0002	0.0111	535	0.5225	33.2835	690	0.1963	12.5021
385	0.0004	0.0281	540	0.5505	35.0666	695	0.1684	10.7302
390	0.0003	0.0192	545	0.5749	36.6256	700	0.1450	9.2383
395	0.0006	0.0414	550	0.5967	38.0145	705	0.1237	7.8799
400	0.0009	0.0563	555	0.6177	39.3483	710	0.1067	6.7996
405	0.0015	0.0958	560	0.6435	40.9945	715	0.0902	5.7441
410	0.0029	0.1864	565	0.6693	42.6397	720	0.0774	4.9305
415	0.0083	0.5296	570	0.7018	44.7079	725	0.0661	4.2080
420	0.0204	1.3008	575	0.7346	46.7965	730	0.0565	3.5989
425	0.0457	2.9132	580	0.7665	48.8259	735	0.0480	3.0584
430	0.0954	6.0761	585	0.7961	50.7115	740	0.0407	2.5933
435	0.1849	11.7774	590	0.8172	52.0568	745	0.0341	2.1747
440	0.3416	21.7586	595	0.8319	52.9949	750	0.0304	1.9392
445	0.6594	42.0075	600	0.8374	53.3422	755	0.0241	1.5372
450	0.9877	62.9166	605	0.8309	52.9297	760	0.0233	1.4862
455	0.8320	52.9982	610	0.8154	51.9456	765	0.0202	1.2862
460	0.4924	31.3705	615	0.7888	50.2478	770	0.0168	1.0683
465	0.3557	22.6572	620	0.7498	47.7665	775	0.0153	0.9776
470	0.2562	16.3191	625	0.7042	44.8597	780	0.0122	0.7764
475	0.1675	10.6728	630	0.6527	41.5782	785	0.0107	0.6792
480	0.1341	8.5437	635	0.5982	38.1090	790	0.0105	0.6670
485	0.1302	8.2918	640	0.5445	34.6865	795	0.0069	0.4396
490	0.1417	9.0252	645	0.4893	31.1670	800	0.0063	0.3985
495	0.1795	11.4351	650	0.4377	27.8844			
500	0.2393	15.2411	655	0.3874	24.6814			
505	0.3080	19.6206	660	0.3411	21.7266			
510	0.3751	23.8955	665	0.2989	19.0379			
515	0.4357	27.7550	670	0.2606	16.6014			
520	0.4846	30.8723	675	0.2268	14.4462			
525	0.5225	33.2835	680	0.1963	12.5021			
530	0.5505	35.0666	685	0.1684	10.7302			

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



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

x	0.3883	CIE 13.3-1995 (CRI) R_a 75 R_g -25
y	0.3810	
u'	0.2286	
v'	0.5046	

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 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLRD-R-14/19/24W-3CCT-PC (Setting at 5000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC221202	120.0	60	0.193	22.99	0.993	4.50
9E-B2	277.0	60	0.095	24.81	0.942	8.86
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

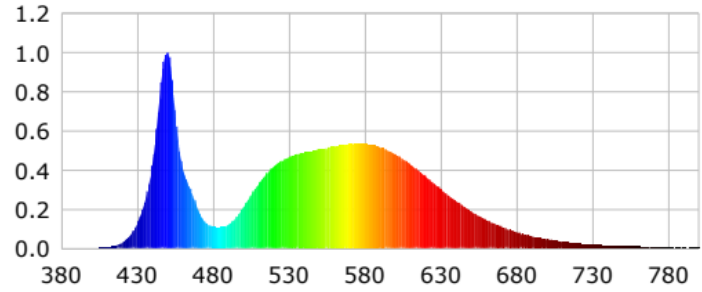
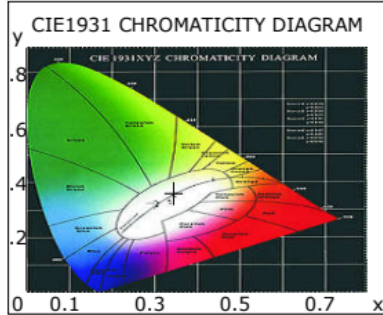
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	71	R9	-30
Frequency (Hz)	60	R2	79	R10	49
CCT (K)	5073	R3	84	R11	71
Duv	0.0036	R4	74	R12	44
Chromaticity (x, y)	x=0.3437 y=0.3577	R5	72	R13	72
Chromaticity (u', v')	u(u')=0.2081 v'=0.4874	R6	71	R14	91
Color Rendering Index (CRI)	73	R7	82	R15	65
R9	-30	R8	56	--	--
Rf	75	--	--	--	--
Rg	95	--	--	--	--
Rcs,h1(%)	-17				

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3409.4	3514.6	>=1000(-10%)
Luminous Efficacy (lm/W)	148.30	141.66	Premium: >= 120(-3%)
Most worst Luminous/Highest Watts	137.42		

Spectral Power Distribution & Chromaticity Diagram



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0002	0.0203	535	0.4454	39.7533	690	0.1098	9.7977
385	0.0010	0.0900	540	0.4650	41.5025	695	0.0948	8.4639
390	0.0012	0.1073	545	0.4786	42.7111	700	0.0819	7.3135
395	0.0006	0.0505	550	0.4903	43.7610	705	0.0704	6.2830
400	0.0008	0.0695	555	0.4974	44.3940	710	0.0613	5.4702
405	0.0021	0.1840	560	0.5047	45.0476	715	0.0526	4.6933
410	0.0043	0.3840	565	0.5123	45.7227	720	0.0450	4.0135
415	0.0116	1.0392	570	0.5199	46.4035	725	0.0390	3.4825
420	0.0279	2.4942	575	0.5268	47.0128	730	0.0320	2.8559
425	0.0606	5.4104	580	0.5309	47.3855	735	0.0271	2.4213
430	0.1231	10.9891	585	0.5344	47.6948	740	0.0232	2.0721
435	0.2321	20.7126	590	0.5324	47.5196	745	0.0205	1.8289
440	0.4224	37.7019	595	0.5263	46.9712	750	0.0169	1.5086
445	0.7713	68.8397	600	0.5161	46.0586	755	0.0144	1.2847
450	1.0000	89.2500	605	0.4999	44.6187	760	0.0131	1.1735
455	0.7040	62.8325	610	0.4798	42.8181	765	0.0118	1.0549
460	0.4121	36.7780	615	0.4545	40.5644	770	0.0098	0.8732
465	0.3044	27.1679	620	0.4282	38.2170	775	0.0085	0.7584
470	0.2012	17.9615	625	0.3982	35.5401	780	0.0073	0.6520
475	0.1312	11.7081	630	0.3665	32.7071	785	0.0067	0.5964
480	0.1096	9.7854	635	0.3335	29.7605	790	0.0054	0.4845
485	0.1067	9.5220	640	0.3017	26.9238	795	0.0031	0.2738
490	0.1185	10.5732	645	0.2703	24.1248	800	0.0025	0.2254
495	0.1566	13.9761	650	0.2410	21.5103			
500	0.2099	18.7294	655	0.2142	19.1154			
505	0.2692	24.0254	660	0.1891	16.8736			
510	0.3274	29.2232	665	0.1658	14.7941			
515	0.3780	33.7338	670	0.1440	12.8538			
520	0.4178	37.2896	675	0.1264	11.2782			
525	0.4454	39.7533	680	0.1098	9.7977			
530	0.4650	41.5025	685	0.0948	8.4639			

TM30

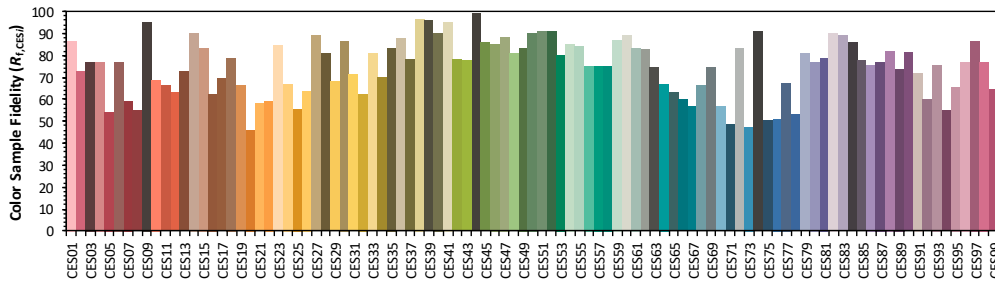
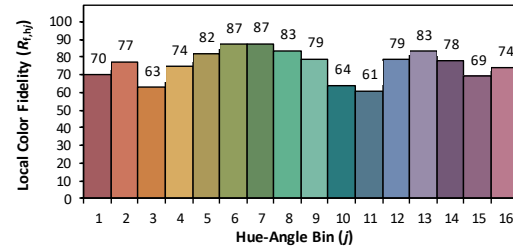
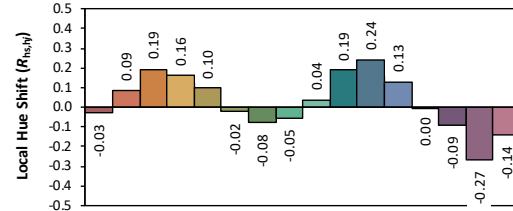
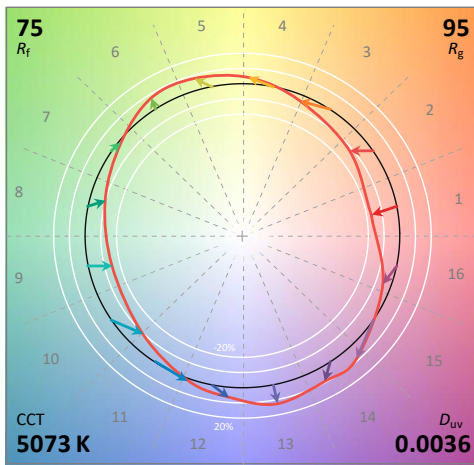
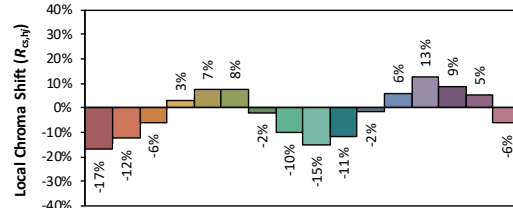
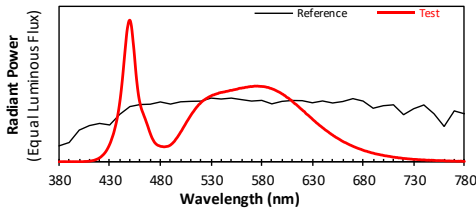
ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-XXE-13H-9D1-00-0-0

Manufacturer: P.Q.L., Inc.

Date: 2022/12/23

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



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

x 0.3437
 y 0.3577
 u' 0.2081
 v' 0.4874

CIE 13.3-1995 (CRI)
 R_a 73
 R_g -30

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
Goniophotometric 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 *****