

LM-79-08 Test Report

For

P.Q.L., Inc.

(Brand Name: Superior Life®)

2285 Ward Avenue / Simi Valley, CA 93065

Outdoor Pole/Arm-Mounted Area and Roadway Luminaires

Model name(s): 83920, 83921

Representative (Tested) Model: 83920 (3000K) 83921 (5000K)

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

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Jan.04,2017

Review By:

Tommy Liang

Manager: Tommy Liang

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

1.1 Product Information:

Organization Name	P.Q.L., Inc.	
Brand Name	Superior Life®	
Model Number	83920, 83921	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Outdoor Pole/Arm-Mounted Area and Roadway Luminaires	
Rated Voltage / Frequency	120-277Vac, 50/60 Hz	
Nominal Power	24W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,4500K,5000K	
LED Manufacturer	Philips Lumileds	
LED Model	LUXEON 3030 2D	
Sample Number	GZE1612102-L1(3000K);L2(5000K)	
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	Dec.29,2016
Date of Test	Dec.30,2016
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	QD25

1.3 Test Methods

<p>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.</p>
<p>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° C ± 1° 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.</p>
<p>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° C ± 1° 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.</p>

2.1 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2016-12-30	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	83920 (3000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161210	120.0	60	0.2098	24.88	0.9883	6.59
2-L1	277.0	60	0.0990	24.97	0.9110	9.17
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

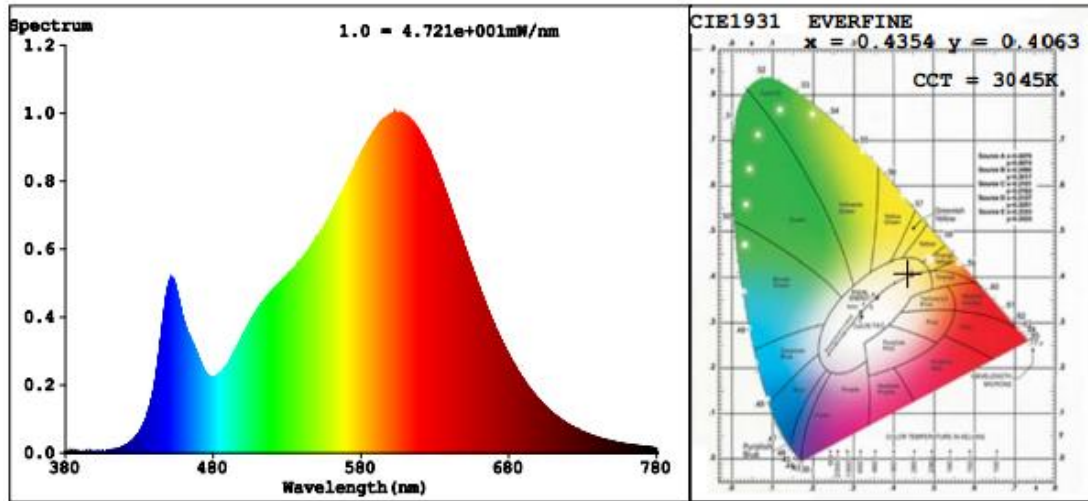
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	12
Frequency (Hz)	60	R2	92	R10	81
CCT (K)	3045	R3	97	R11	81
Duv	0.0011	R4	81	R12	71
Chromaticity (x, y)	x=0.4354 y=0.4063	R5	82	R13	84
Chromaticity (u', v')	u'=0.2486 v'=0.5220	R6	90	R14	99
Color Rendering Index (CRI)	83.7	R7	84	R15	75
R9	12	R8	61	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	2691.6	2678.3	>=1000 (±10%)	
Luminous Efficacy (lm/W)	108.18	107.26	Standard: >= 90(-3%)	Premium: >= 110(-3%)
Zonal lumens in the 0-90° zone (%)	99.9	--	>=100(-1)	
Zonal lumens in the 80-90° zone (%)	0.3	--	<=10(+3)	
Beam Angle (°)	81.1	--	--	
Center Beam Candle Power (cd)	365	--	--	

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	401.1	14.9%
0-40	869.8	32.3%
0-60	2,230.5	82.9%
60-90	459.4	17.1%
70-100	60.8	2.3%
90-120	0.5	0%
0-90	2,689.9	99.9%
90-180	1.5	0.1%
0-180	2,691.4	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	36.0	1.3%	90-100	0.1	0%
10-20	119.0	4.4%	100-110	0.1	0%
20-30	246.0	9.1%	110-120	0.2	0%
30-40	468.8	17.4%	120-130	0.3	0%
40-50	604.7	22.5%	130-140	0.3	0%
50-60	756.0	28.1%	140-150	0.2	0%
60-70	398.7	14.8%	150-160	0.1	0%
70-80	51.9	1.9%	160-170	0.1	0%
80-90	8.8	0.3%	170-180	0.0	0%

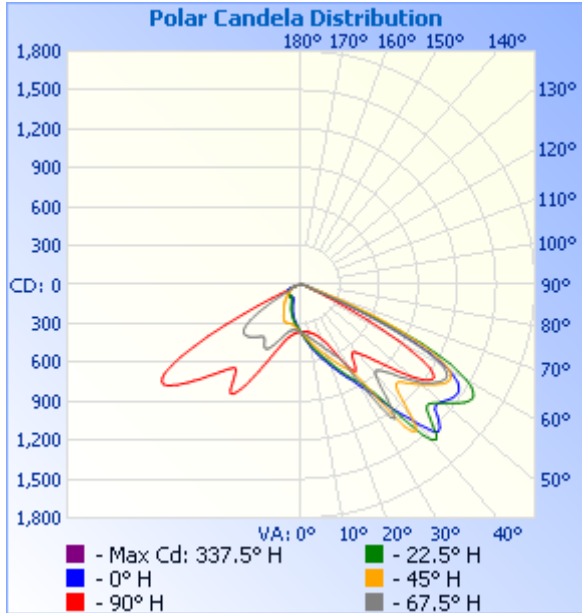
Laboratory: Standard-Tech Co. Ltd Testing Center
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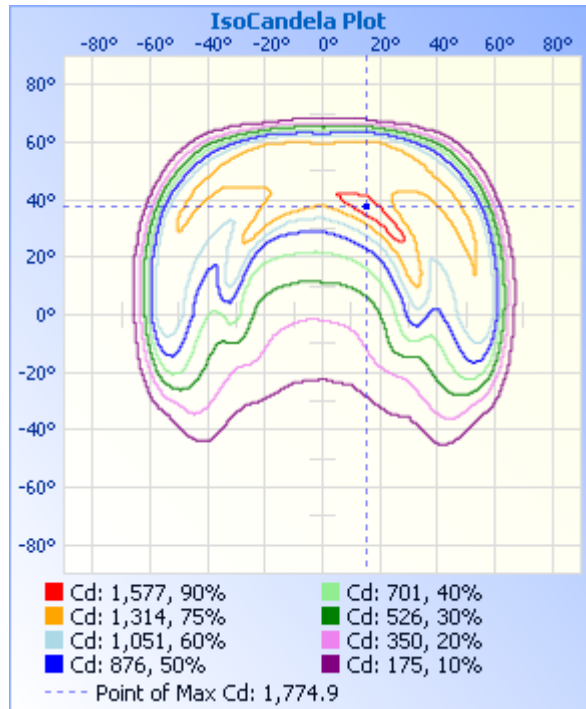
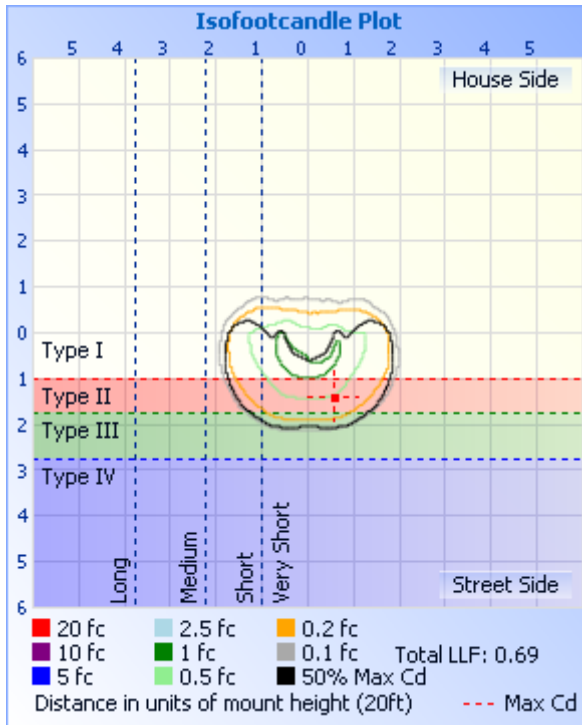
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	1.26 fc	12.5 ft	49.3 ft
34.0ft	0.32 fc	25.0 ft	98.6 ft
51.0ft	0.14 fc	37.6 ft	147.8 ft
68.0ft	0.08 fc	50.1 ft	197.1 ft
85.0ft	0.05 fc	62.6 ft	246.4 ft
102.0ft	0.04 fc	75.1 ft	295.7 ft

■ Vert. Spread: 40.4°
■ Horiz. Spread: 110.8°



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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	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
1	380	378	376	368	361	355	357	358	359	360	361	362	362	365	372	377	380
2	392	389	384	372	360	351	349	348	349	350	355	360	364	371	381	389	392
3	403	400	392	376	360	347	343	341	339	341	350	358	366	376	391	401	403
4	416	410	399	382	361	344	336	332	332	335	344	356	369	383	400	411	416
5	427	423	409	386	362	341	331	324	323	327	340	355	371	391	412	424	427
6	442	433	419	392	364	339	326	317	314	321	335	354	374	398	421	438	442
7	456	446	427	399	366	337	320	309	307	313	331	353	379	407	434	449	456
8	469	460	438	405	368	335	315	301	298	305	327	353	383	417	446	464	469
9	486	472	449	412	372	334	311	295	289	299	323	354	388	426	458	477	486
10	502	486	458	418	374	333	306	287	281	292	320	355	394	438	472	493	502
11	514	498	470	427	379	333	301	280	272	284	317	357	400	448	487	509	514
12	531	513	480	435	382	333	298	272	263	278	314	361	408	462	499	522	531
13	547	527	492	442	386	333	293	264	255	270	313	364	417	476	516	538	547
14	560	539	505	452	391	334	290	258	245	263	311	370	426	487	529	556	560
15	578	555	516	460	396	335	286	250	235	257	310	378	438	503	547	570	578
16	592	569	530	471	403	337	283	242	228	249	311	385	450	518	566	588	592
17	609	586	545	482	409	339	279	235	218	241	312	397	467	537	582	604	609
18	624	604	557	492	418	344	276	226	210	234	313	408	487	560	604	624	624
19	646	619	573	506	429	347	272	218	200	226	314	422	506	579	623	646	646
20	662	638	586	517	439	352	269	211	190	219	314	437	532	605	648	665	662
21	683	655	604	532	453	359	265	202	182	211	314	451	556	628	670	689	683
22	700	676	619	545	466	369	262	196	173	202	314	470	589	661	697	711	700
23	722	700	637	562	486	380	258	187	165	195	313	486	618	697	725	738	722
24	746	718	656	576	506	390	254	178	156	186	311	506	659	730	751	761	746
25	765	741	672	592	537	402	249	171	148	180	307	522	694	776	786	792	765
26	790	761	693	612	568	410	245	163	142	171	301	540	742	816	815	818	790
27	812	788	709	631	613	420	241	155	136	163	293	552	794	875	855	856	812
28	834	810	728	665	652	426	236	149	130	158	286	561	839	932	888	886	834

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29	864	835	744	715	699	430	231	143	127	151	276	564	892	1022	937	925	864
30	900	857	773	809	735	427	226	138	123	146	267	562	930	1107	989	959	900
31	926	887	806	889	773	422	221	133	121	141	258	551	970	1215	1071	1007	926
32	966	915	866	1006	786	412	217	129	119	137	250	536	993	1300	1150	1053	966
33	1000	961	947	1123	769	405	211	125	118	134	244	516	998	1412	1272	1121	1000
34	1052	1006	1080	1234	736	401	206	123	118	131	237	504	972	1492	1386	1186	1052
35	1102	1075	1211	1261	692	401	201	121	118	129	232	495	916	1517	1522	1283	1102
36	1177	1156	1351	1192	667	405	195	119	118	127	226	495	873	1453	1610	1372	1177
37	1222	1275	1413	1100	655	410	190	118	118	125	220	500	833	1320	1678	1493	1222
38	1276	1382	1433	990	660	418	184	117	119	124	215	508	820	1210	1686	1592	1276
39	1330	1498	1400	924	675	426	179	116	119	123	208	516	825	1104	1631	1702	1330
40	1404	1559	1302	884	692	433	173	116	120	122	203	526	843	1056	1539	1766	1404
41	1460	1585	1206	877	717	442	167	115	120	120	197	533	864	1031	1397	1775	1460
42	1524	1557	1113	888	740	451	162	114	120	120	191	543	895	1033	1295	1725	1524
43	1548	1485	1073	908	772	460	156	114	121	119	185	551	922	1051	1211	1652	1548
44	1537	1425	1057	937	810	467	151	114	122	119	179	561	958	1069	1182	1553	1537
45	1501	1369	1061	959	843	476	146	114	123	119	173	568	988	1095	1171	1483	1501
46	1460	1347	1082	999	892	483	140	114	124	119	166	573	1027	1129	1181	1430	1460
47	1409	1346	1112	1045	935	492	136	115	125	120	159	577	1069	1159	1195	1413	1409
48	1393	1366	1137	1078	993	498	131	115	126	120	154	579	1105	1194	1213	1412	1393
49	1397	1390	1169	1123	1041	502	126	116	126	121	147	579	1150	1221	1230	1422	1397
50	1408	1424	1195	1162	1101	502	122	115	126	120	142	576	1186	1257	1255	1443	1408
51	1424	1451	1227	1205	1145	500	119	115	126	120	136	569	1229	1279	1277	1463	1424
52	1439	1487	1250	1233	1193	491	116	115	126	120	131	559	1261	1301	1304	1491	1439
53	1454	1516	1280	1261	1224	480	113	114	126	119	126	539	1292	1314	1320	1514	1454
54	1464	1548	1305	1282	1245	456	109	113	125	119	121	509	1308	1328	1334	1539	1464
55	1468	1569	1333	1305	1247	424	107	113	124	118	117	477	1309	1335	1343	1557	1468
56	1465	1583	1349	1319	1225	391	103	111	124	117	112	430	1288	1337	1351	1561	1465
57	1448	1582	1358	1328	1183	343	101	110	123	115	108	386	1250	1334	1351	1555	1448
58	1423	1561	1358	1326	1100	301	98	108	122	113	104	326	1171	1320	1341	1538	1423
59	1371	1529	1343	1302	984	248	95	106	121	111	101	278	1083	1291	1324	1504	1371

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60	1313	1470	1317	1264	870	208	93	105	119	109	98	223	946	1235	1289	1467	1313
61	1220	1384	1262	1181	709	165	90	103	117	107	95	175	821	1148	1237	1405	1220
62	1123	1297	1181	1084	579	132	87	100	115	105	92	145	654	1051	1179	1336	1123
63	972	1162	1097	929	428	112	85	98	114	103	89	118	491	896	1087	1223	972
64	794	1028	972	786	324	95	84	96	112	100	87	103	371	754	996	1104	794
65	638	826	860	602	220	86	82	94	111	97	85	90	249	564	865	923	638
66	448	637	709	463	160	78	79	91	109	94	82	82	178	421	748	749	448
67	316	392	581	313	110	72	75	87	106	91	78	77	120	273	589	493	316
68	203	241	419	199	82	68	71	84	103	87	75	72	87	187	456	310	203
69	151	127	301	137	70	64	65	79	100	82	69	69	72	115	295	154	151
70	113	85	185	90	61	61	62	73	92	76	64	65	61	84	194	88	113
71	94	61	122	70	57	57	58	68	87	71	61	61	56	62	115	63	94
72	79	55	75	58	54	54	55	63	82	65	58	58	52	52	72	55	79
73	71	54	56	54	51	51	53	57	78	59	55	54	48	47	54	53	71
74	64	53	47	52	48	48	50	52	75	53	51	52	45	43	45	52	64
75	53	50	43	51	43	44	46	47	69	48	47	48	41	41	42	50	53
76	45	44	42	47	40	41	42	42	59	43	43	44	38	39	40	44	45
77	39	40	40	41	36	37	38	35	52	36	38	41	35	35	39	38	39
78	34	34	37	36	32	34	34	29	43	30	35	37	31	30	36	33	34
79	30	29	31	29	28	30	29	22	31	24	30	33	29	26	30	29	30
80	24	26	24	23	24	26	24	17	22	17	24	29	26	23	24	25	24
81	20	21	20	20	21	22	19	13	9	13	20	25	23	20	19	21	20
82	13	16	16	17	17	17	16	8	9	8	16	21	19	18	16	16	13
83	9	11	13	14	15	13	13	7	12	8	14	16	16	15	13	12	9
84	6	8	9	11	11	10	9	4	8	5	9	12	14	12	10	8	6
85	4	5	6	8	8	7	5	2	4	2	6	9	11	9	7	6	4
86	2	2	4	6	5	5	3	1	1	1	3	6	8	7	4	3	2
87	1	1	1	3	2	2	1	0	0	0	1	4	5	5	2	1	1
88	1	1	1	1	0	1	0	0	0	0	0	1	2	2	1	1	1
89	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
114	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
116	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
117	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
118	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0
119	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0
120	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
121	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0

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122	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
123	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
124	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
125	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
126	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
127	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0
128	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
129	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
130	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
131	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
132	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
133	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
134	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
135	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
136	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
137	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
138	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
139	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
140	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
141	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
142	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
143	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
144	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
145	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
146	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
147	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
148	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
149	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0
150	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0
151	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
152	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0

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153	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
154	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
155	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
157	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
164	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
167	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
171	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
176	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178	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
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-12-30	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	83921 (5000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161210	120.0	60	0.2182	25.67	0.9805	6.99
2-L2	277.0	60	0.1030	25.77	0.9036	9.59
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

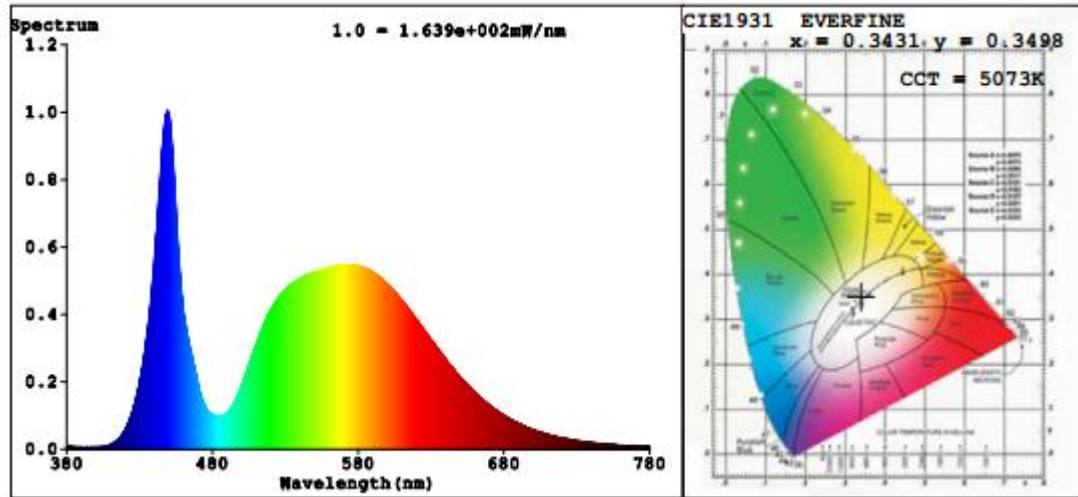
Chromaticity Measurement - Sphere-Spectroradiometer Method :

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	72	R9	0
Frequency (Hz)	60	R2	78	R10	47
CCT (K)	5073	R3	81	R11	72
Duv	-0.0001	R4	75	R12	45
Chromaticity (x, y)	x=0.3431 y=0.3498	R5	73	R13	73
Chromaticity (u', v')	u'=0.2108 v'=0.4835	R6	70	R14	89
Color Rendering Index (CRI)	73.8	R7	81	R15	68
R9	0	R8	60	--	--

Photometric Measurement– Sphere-Spectroradiometer Method :

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	2865	2855	>=1000 (±10%)	
Luminous Efficacy (lm/W)	111.62	110.77	Standard: >= 90(-3%)	Premium: >= 110(-3%)

Spectral Power Distribution & Chromaticity Diagram



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2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
83920 (3000K)	3000K	2691.6	24.88	108.18
839XX (3500K)	3500K	2735 ^{*1}	25.28 ^{*2}	108.19 ^{*3}
893XX (4000K)	4000K	2778 ^{*1}	25.28 ^{*2}	109.89 ^{*3}
839XX (4500K)	4500K	2822 ^{*1}	25.28 ^{*2}	111.63 ^{*3}
83921 (5000K)	5000K	2865	25.67	111.62

*1: This value is calculated and the calculation formula is as below:

$$2735 = (2865 - 2691.6) / 4 + 2691.6$$

$$2778 = (2865 - 2691.6) / 4 + 2735$$

$$2822 = (2865 - 2691.6) / 4 + 2778$$

*2: This value is calculated and the calculation formula is as below:

$$25.28 = (24.88 + 25.67) / 2$$

*3: This value is calculated and the calculation formula is as below:

$$108.19 = 2735 / 25.28$$

$$109.89 = 2778 / 25.28$$

$$111.63 = 2822 / 25.28$$

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

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

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