

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): 83922, 83923

Representative (Tested) Model: 83922 (3000K) 83923 (5000K)

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

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Jan.06,2017

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

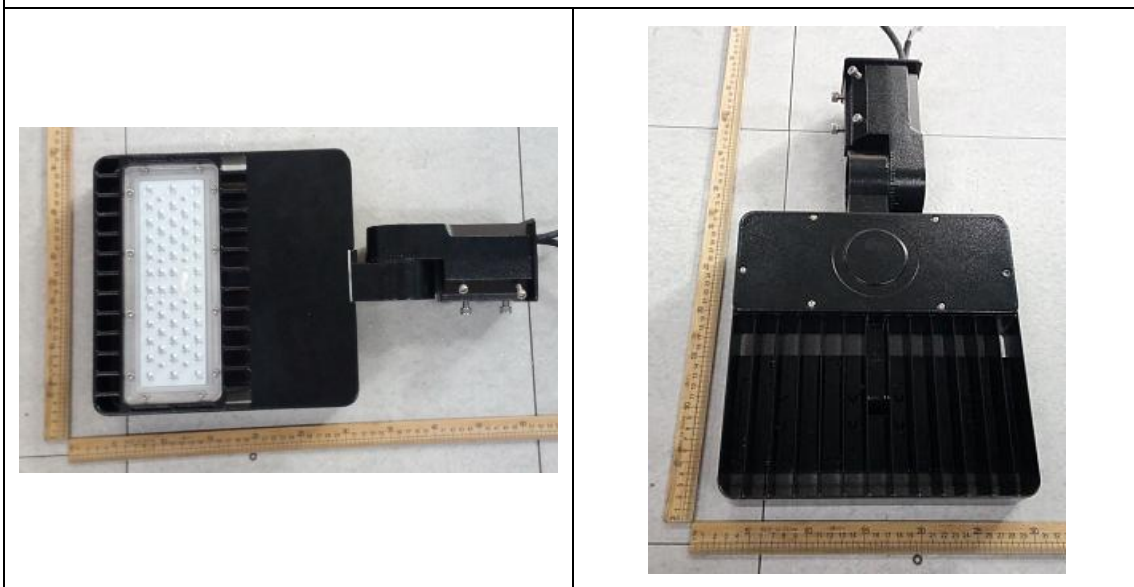
Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

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	83922, 83923	
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	48W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,4500K,5000K	
LED Manufacturer	Philips Lumileds	
LED Model	LUXEON 3030 2D	
Sample Number	GZE1612102-Y1(3000K);Y2(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**1) Photometric and Light Distribution Measurement – Goniophotometer Method:**

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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.

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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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.

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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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 QD25)

Test date	2016-12-30	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	83922 (3000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161210	120.0	60	0.4223	50.30	0.9926	7.19
2-Y1	277.0	60	0.1981	49.72	0.9060	10.57
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

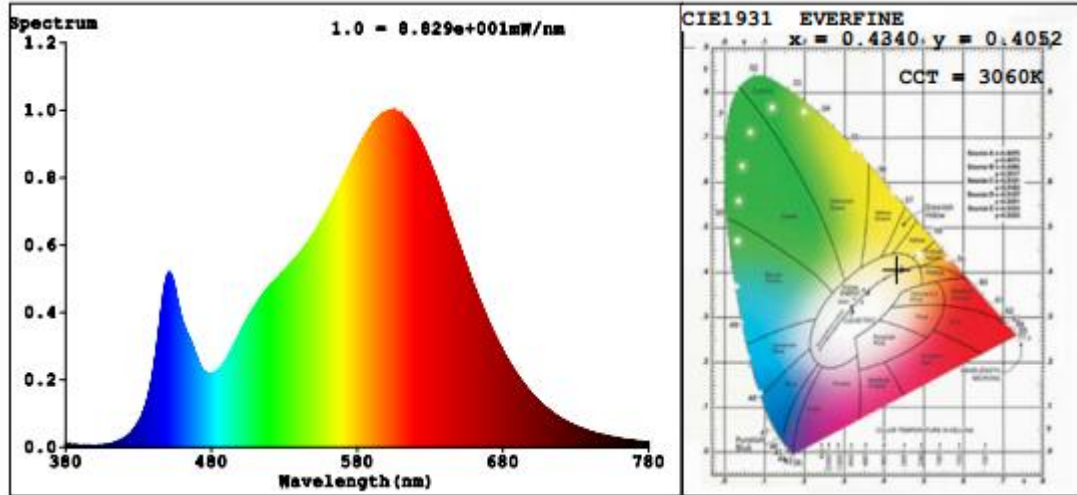
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	11
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	3060	R3	97	R11	80
Duv	0.0009	R4	81	R12	71
Chromaticity (x, y)	x=0.4340 y=0.4052	R5	82	R13	84
Chromaticity (u', v')	u'=0.2482 v'=0.5214	R6	89	R14	99
Color Rendering Index (CRI)	83.3	R7	84	R15	74
R9	11	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)	5132.6	5112.2	>=1000 (±10%)	
Luminous Efficacy (lm/W)	102.04	102.82	Standard: >= 95(-3%)	Premium: >= 115(-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 (°)	79.2	--	--	
Center Beam Candle Power (cd)	716	--	--	

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	820.5	16%
0-40	1,813.5	35.3%
0-60	4,395.5	85.6%
60-90	732.3	14.3%
70-100	115.2	2.2%
90-120	1.5	0%
0-90	5,127.9	99.9%
90-180	4.2	0.1%
0-180	5,132.1	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	70.5	1.4%	90-100	0.4	0%
10-20	234.5	4.6%	100-110	0.4	0%
20-30	515.5	10.0%	110-120	0.6	0%
30-40	993.0	19.3%	120-130	0.7	0%
40-50	1,197.5	23.3%	130-140	0.7	0%
50-60	1,384.5	27.0%	140-150	0.6	0%
60-70	617.6	12.0%	150-160	0.4	0%
70-80	97.3	1.9%	160-170	0.2	0%
80-90	17.4	0.3%	170-180	0.1	0%

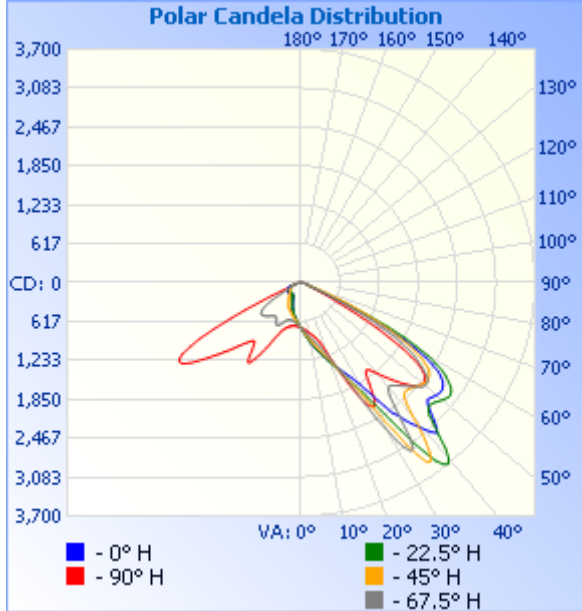
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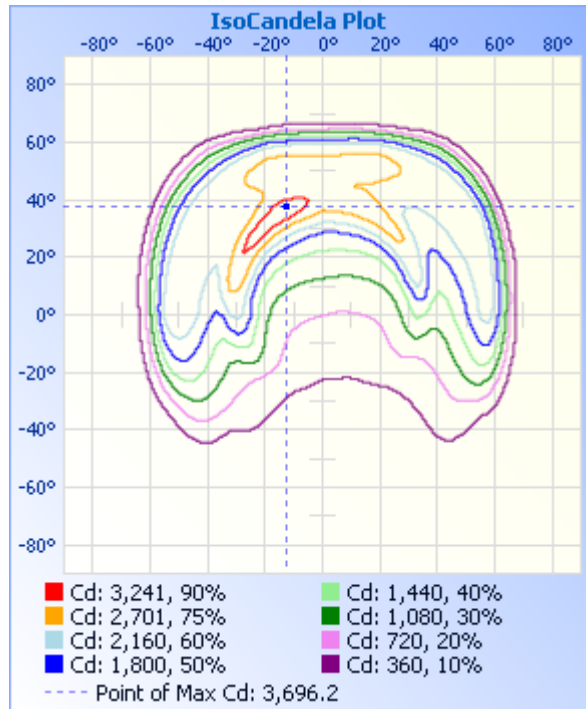
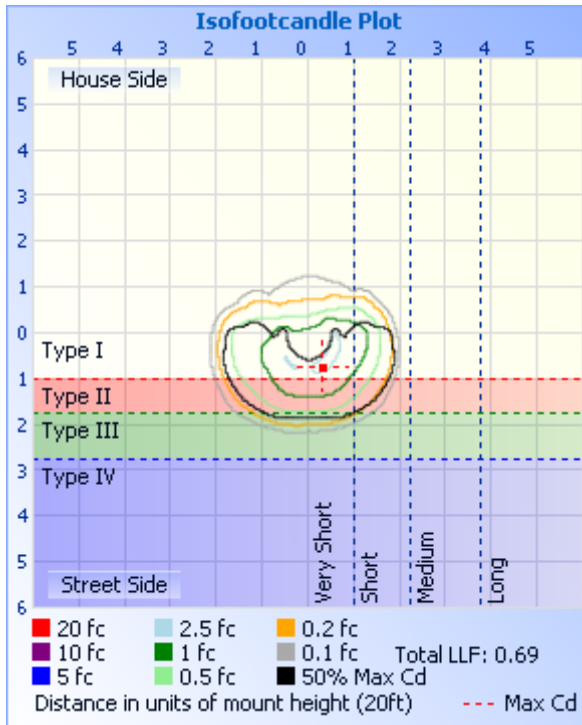
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	2.48 fc	11.3 ft	45.0 ft
34.0ft	0.62 fc	22.6 ft	90.0 ft
51.0ft	0.28 fc	33.9 ft	135.0 ft
68.0ft	0.15 fc	45.2 ft	180.1 ft
85.0ft	0.10 fc	56.6 ft	225.1 ft
102.0ft	0.07 fc	67.9 ft	270.1 ft

■ Vert. Spread: 36.8°
■ Horiz. Spread: 105.9°



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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	716	716	716	716	716	716	716	716	716	716	716	716	716	716	716	716	716
1	742	744	739	731	718	696	698	699	701	702	703	706	709	703	721	733	742
2	767	768	760	747	726	695	690	683	680	681	685	693	703	707	732	754	767
3	786	793	781	759	733	693	680	667	665	665	672	683	699	712	746	771	786
4	813	815	800	776	743	693	672	656	647	647	655	672	696	719	762	793	813
5	841	842	824	794	753	695	666	643	630	629	639	662	692	725	775	817	841
6	865	871	850	810	765	695	660	633	617	616	628	654	691	734	793	837	865
7	897	895	872	832	775	699	655	621	601	599	615	646	691	743	812	864	897
8	928	926	900	854	790	704	652	609	585	582	604	639	691	752	828	892	928
9	954	958	928	872	803	708	649	600	573	569	591	634	692	764	849	916	954
10	987	984	952	896	819	712	646	589	557	553	579	629	695	774	866	946	987
11	1021	1016	983	921	835	719	643	577	540	536	570	623	698	787	889	977	1021
12	1046	1043	1008	941	849	729	642	568	526	523	559	619	701	802	912	1000	1046
13	1078	1077	1039	968	868	737	641	556	509	506	548	616	707	815	931	1029	1078
14	1114	1113	1071	991	886	750	642	547	495	493	539	614	712	833	956	1053	1114
15	1143	1142	1097	1020	912	770	645	535	477	476	529	613	720	848	982	1082	1143
16	1180	1181	1134	1052	943	788	649	522	458	458	521	613	730	868	1005	1108	1180
17	1213	1214	1165	1082	974	816	656	512	444	445	511	614	739	892	1036	1144	1213
18	1256	1258	1206	1127	1025	856	665	498	425	428	503	618	752	912	1063	1182	1256
19	1296	1303	1253	1179	1080	895	677	487	411	414	495	623	764	940	1100	1212	1296
20	1330	1340	1296	1229	1165	950	690	472	392	397	488	632	784	965	1129	1252	1330
21	1373	1391	1356	1302	1273	999	701	458	377	383	482	641	802	997	1166	1287	1373
22	1412	1436	1410	1367	1372	1072	714	446	358	366	474	656	832	1025	1197	1333	1412
23	1460	1497	1482	1463	1500	1131	720	431	343	353	467	671	863	1066	1238	1380	1460
24	1500	1550	1548	1555	1609	1202	725	419	325	337	458	692	910	1113	1284	1419	1500
25	1553	1627	1638	1684	1757	1257	723	403	308	324	451	714	956	1156	1326	1475	1553
26	1598	1697	1717	1803	1885	1322	714	390	295	309	439	731	1023	1218	1381	1526	1598
27	1657	1791	1829	1999	2043	1365	697	374	280	294	430	749	1102	1280	1426	1590	1657
28	1713	1873	1934	2202	2151	1379	679	358	269	284	418	759	1170	1385	1491	1645	1713

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29	1793	1986	2109	2476	2235	1369	655	346	257	272	405	769	1257	1500	1556	1724	1793
30	1862	2088	2290	2659	2269	1337	637	331	249	263	395	771	1323	1675	1667	1794	1862
31	1976	2237	2552	2915	2263	1276	618	319	241	254	383	764	1403	1829	1781	1896	1976
32	2077	2393	2748	3078	2199	1221	607	306	235	247	373	750	1466	2046	1963	1994	2077
33	2227	2603	3065	3183	2056	1158	597	296	232	242	361	724	1517	2255	2151	2138	2227
34	2361	2818	3295	3171	1925	1125	591	284	229	237	351	697	1508	2500	2422	2276	2361
35	2522	3092	3477	3008	1797	1109	582	276	228	234	339	681	1427	2577	2589	2474	2522
36	2594	3306	3494	2703	1741	1116	574	267	228	232	330	672	1322	2453	2793	2613	2594
37	2728	3535	3382	2467	1731	1133	564	259	228	230	320	670	1251	2244	2891	2833	2728
38	2838	3651	3210	2274	1759	1160	552	253	229	229	309	675	1198	1995	2881	3001	2838
39	2931	3696	2991	2191	1820	1185	542	247	230	227	301	682	1188	1842	2758	3151	2931
40	3039	3631	2719	2156	1879	1219	529	243	231	225	292	692	1204	1732	2546	3206	3039
41	3138	3489	2545	2164	1958	1246	518	239	232	224	285	700	1231	1693	2307	3185	3138
42	3200	3261	2433	2200	2023	1279	502	237	233	223	276	712	1278	1693	2164	3056	3200
43	3148	3085	2394	2233	2108	1305	488	235	234	222	270	723	1320	1719	2068	2920	3148
44	3019	2919	2385	2273	2176	1332	469	234	236	223	263	737	1379	1759	2045	2764	3019
45	2895	2845	2394	2314	2259	1352	452	234	237	223	256	753	1432	1795	2057	2683	2895
46	2786	2816	2412	2371	2320	1364	431	234	240	223	251	764	1504	1854	2091	2648	2786
47	2733	2819	2433	2408	2390	1372	408	235	243	225	246	776	1581	1922	2121	2657	2733
48	2735	2837	2459	2460	2446	1371	389	236	245	226	241	784	1644	1978	2162	2687	2735
49	2761	2869	2479	2521	2480	1361	363	237	247	227	237	793	1729	2050	2198	2736	2761
50	2781	2900	2504	2546	2501	1341	343	238	247	228	232	799	1801	2114	2248	2778	2781
51	2800	2927	2517	2556	2503	1302	317	237	248	229	229	801	1895	2189	2289	2831	2800
52	2806	2953	2525	2543	2487	1257	298	237	248	228	226	799	1973	2240	2344	2876	2806
53	2802	2956	2520	2500	2453	1182	276	236	248	228	223	791	2072	2296	2384	2913	2802
54	2775	2935	2506	2416	2373	1085	255	234	248	228	218	771	2166	2343	2427	2941	2775
55	2738	2893	2471	2338	2276	995	240	232	247	227	214	747	2229	2400	2459	2938	2738
56	2670	2814	2420	2236	2104	868	225	230	245	226	210	707	2284	2440	2490	2904	2670
57	2591	2729	2329	2145	1919	758	215	227	244	224	205	663	2299	2482	2502	2855	2591
58	2442	2636	2239	2008	1649	621	204	224	242	222	200	595	2266	2508	2496	2755	2442
59	2298	2480	2101	1840	1416	518	195	219	240	219	194	531	2188	2505	2470	2651	2298

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60	2086	2326	1964	1680	1126	404	189	214	238	216	189	445	2026	2450	2408	2520	2086
61	1880	2084	1760	1448	911	314	183	210	234	212	184	362	1841	2359	2300	2332	1880
62	1573	1861	1588	1246	677	260	177	205	229	208	179	304	1560	2162	2179	2091	1573
63	1297	1538	1356	990	519	212	171	200	225	205	173	245	1241	1939	1988	1854	1297
64	946	1174	1164	794	362	186	166	195	222	200	169	211	988	1594	1801	1500	946
65	691	874	934	574	254	166	162	189	218	196	165	182	696	1286	1526	1177	691
66	447	543	769	427	198	153	157	184	214	190	161	162	505	907	1285	754	447
67	323	351	576	288	153	145	151	177	209	184	155	151	334	643	964	467	323
68	235	211	411	212	131	136	144	171	205	178	148	139	228	396	710	242	235
69	189	150	298	152	113	130	133	163	198	170	141	130	177	265	440	161	189
70	160	112	196	119	104	123	123	154	192	162	130	123	140	172	288	115	160
71	137	101	145	103	97	116	114	146	188	155	123	117	124	133	177	101	137
72	125	94	101	90	91	110	107	137	175	146	115	111	112	110	128	95	125
73	112	91	86	84	86	104	103	127	160	138	108	105	106	99	97	92	112
74	101	86	78	79	80	99	97	107	150	119	104	98	103	94	84	90	101
75	85	77	73	76	74	92	93	94	140	108	99	94	97	92	78	84	85
76	74	69	69	68	67	85	87	85	129	99	95	87	91	90	74	77	74
77	66	60	62	59	60	79	80	71	113	86	88	82	83	81	74	67	66
78	55	52	55	53	55	72	70	59	101	74	76	75	74	68	71	58	55
79	47	45	46	46	48	64	60	48	81	63	69	68	67	57	60	51	47
80	36	36	39	41	43	57	52	36	57	46	58	62	58	46	49	42	36
81	27	30	32	35	36	48	44	28	37	36	47	54	51	40	37	34	27
82	18	21	25	29	30	40	35	20	19	23	39	47	43	33	31	26	18
83	12	16	20	24	25	29	28	14	16	16	30	37	35	29	24	18	12
84	8	9	13	18	19	20	19	11	19	14	23	27	30	23	17	12	8
85	5	5	9	14	15	15	12	6	14	8	17	21	23	18	12	6	5
86	3	2	4	9	9	10	8	3	7	4	10	15	18	13	6	3	3
87	2	1	2	4	5	6	3	1	1	1	5	10	12	8	3	2	2
88	1	1	1	1	1	1	1	1	1	1	1	4	6	4	1	1	1
89	1	1	1	1	0	1	1	1	1	1	1	1	2	1	1	1	1
90	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1

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

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122	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0
123	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0
124	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0
125	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0
126	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0
127	0	0	0	1	1	1	1	1	2	1	1	1	1	1	0	0	0
128	0	0	0	1	1	1	1	1	2	2	1	1	1	1	0	0	0
129	0	0	0	1	1	1	1	1	2	2	2	1	1	1	0	0	0
130	0	0	0	1	1	1	1	1	2	2	1	1	1	1	0	0	0
131	0	0	0	1	1	1	1	1	2	2	1	1	1	1	0	0	0
132	0	0	0	1	1	1	1	1	2	1	2	1	1	1	0	0	0
133	0	0	0	1	1	1	1	1	2	2	2	1	1	1	0	0	0
134	0	0	0	1	1	1	1	1	2	2	1	1	1	1	0	0	0
135	0	0	0	1	1	1	1	1	2	2	1	1	1	1	0	0	0
136	0	0	0	1	1	1	1	1	2	2	1	1	1	1	0	0	0
137	0	0	0	1	1	1	1	1	2	2	1	1	1	1	0	0	0
138	0	0	0	1	1	1	1	1	2	2	1	1	1	1	0	0	0
139	0	0	0	1	1	1	1	1	2	2	1	1	1	1	0	0	0
140	0	0	0	1	1	1	1	1	2	2	1	1	1	1	1	0	0
141	0	0	0	1	1	1	1	1	2	2	1	1	1	1	1	0	0
142	0	0	0	1	1	1	1	1	2	2	1	1	1	1	1	0	0
143	0	0	0	1	1	1	1	1	2	2	1	1	1	1	1	0	0
144	0	0	0	1	1	1	1	1	2	1	1	1	1	1	1	0	0
145	0	0	0	1	1	1	1	1	2	1	1	1	1	1	1	0	0
146	0	0	0	1	1	1	1	1	2	1	1	1	1	1	1	0	0
147	0	0	0	1	1	1	1	1	2	1	1	1	1	1	1	0	0
148	0	0	0	1	1	1	1	1	2	1	1	1	1	1	1	0	0
149	0	0	0	1	1	1	1	1	2	1	1	1	1	1	1	0	0
150	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
151	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
152	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0

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153	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
154	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
155	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
156	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
157	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
158	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
159	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
160	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
161	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
162	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
163	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
164	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
165	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
166	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
167	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
168	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
169	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
170	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
171	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
172	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
173	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
174	1	1	1	1	1	1	1	1	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
176	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
177	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
178	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
179	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
180	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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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	83923 (5000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161210	120.0	60	0.4306	51.08	0.9886	7.94
2-Y2	277.0	60	0.2021	50.48	0.9017	11.38
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

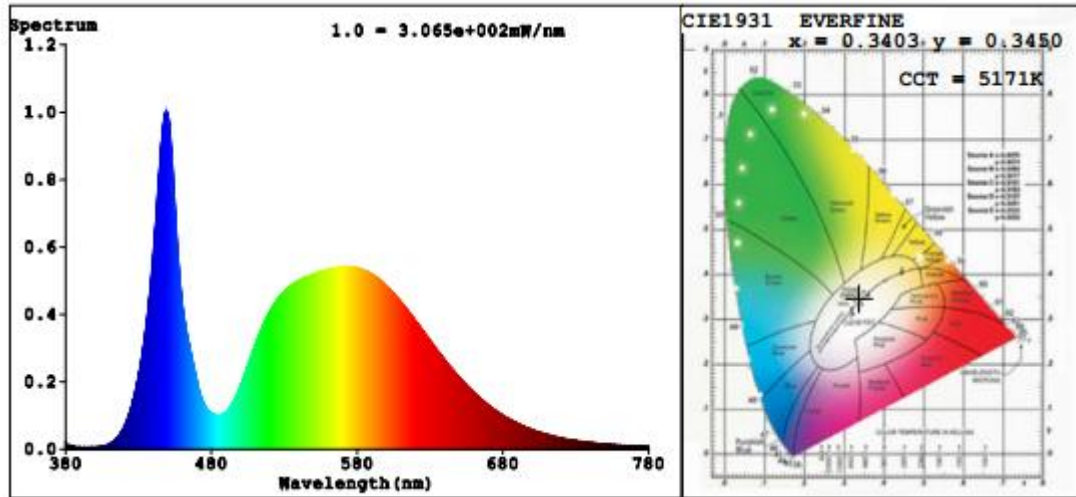
Chromaticity Measurement - Sphere-Spectroradiometer Method :

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	73	R9	0
Frequency (Hz)	60	R2	79	R10	47
CCT (K)	5171	R3	81	R11	73
Duv	-0.0014	R4	76	R12	46
Chromaticity (x, y)	x=0.3403 y=0.3450	R5	74	R13	74
Chromaticity (u', v')	u'=0.2107 v'=0.4807	R6	70	R14	89
Color Rendering Index (CRI)	74.4	R7	81	R15	69
R9	0	R8	61	--	--

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)	5378	5360	≥1000 (±10%)	
Luminous Efficacy (lm/W)	105.29	106.18	Standard: ≥95(-3%)	Premium: ≥115(-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	5132.6	50.30	102.04
839XX (3500K)	3500K	5194 ^{*1}	50.69 ^{*2}	102.47 ^{*3}
839XX (4000K)	4000K	5255 ^{*1}	50.69 ^{*2}	103.67 ^{*3}
839XX (4500K)	4500K	5317 ^{*1}	50.69 ^{*2}	104.89 ^{*3}
83921 (5000K)	5000K	5378	51.08	105.29

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

$$5194 = (5378 - 5132.6) / 4 + 5132.6$$

$$5255 = (5378 - 5132.6) / 4 + 5194$$

$$5317 = (5378 - 5132.6) / 4 + 5255$$

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

$$50.69 = (50.30 + 51.08) / 2$$

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

$$102.47 = 5194 / 50.69$$

$$103.67 = 5255 / 50.69$$

$$104.89 = 5317 / 50.69$$

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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