NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

CEA GROUP INTERNATIONAL CO.,LTD

(Brand Name: CEA/EAEC)

Sanjiali Industrial Zone Zhucheng Road Panshi North baixiang Yueqing Zhejiang China

Outdoor Pole/Arm-mounted Area and Roadway Luminaires

Model name(s): STL1-100

Representative (Tested) Model: STL1-100(2700K)
STL1-100(5700K)

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

Test & Report By:

Jack Luo

Engineer: Jack Luo

Date: Sept.08,2016

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.

1.1 Product Information:

Organization Name	CEA GROUP INTERNATIONAL CO.,LTD	
Brand Name	CEA/EAEC	
Model Number	STL1-100	
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	100-277Vac, 50/60 Hz	
Nominal Power	100W	
Rated Initial Lamp Lumen	--	
Declared CCT	2700K,3000K,3500K,4000K,4500K,5000K, 5700K	
LED Manufacturer	Zhongshan Dongguan Star Photoelectric Techology Co.,Ltd	
LED Model	5730	
Sample Number	STD160711NB-BG1(2700K),BG2(5700K)	
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	Aug.20,2016
Date of Test	Aug.25,2016
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	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 °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.
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.
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 QD25)

Test date	2016-08-25	Test Ambient:	25.2 ℃
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	STL1-100(2700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD160711	120.0	60	0.8582	102.1	0.9914	7.95
NB-BG1	277.0	60	0.4175	102.2	0.8838	14.03
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

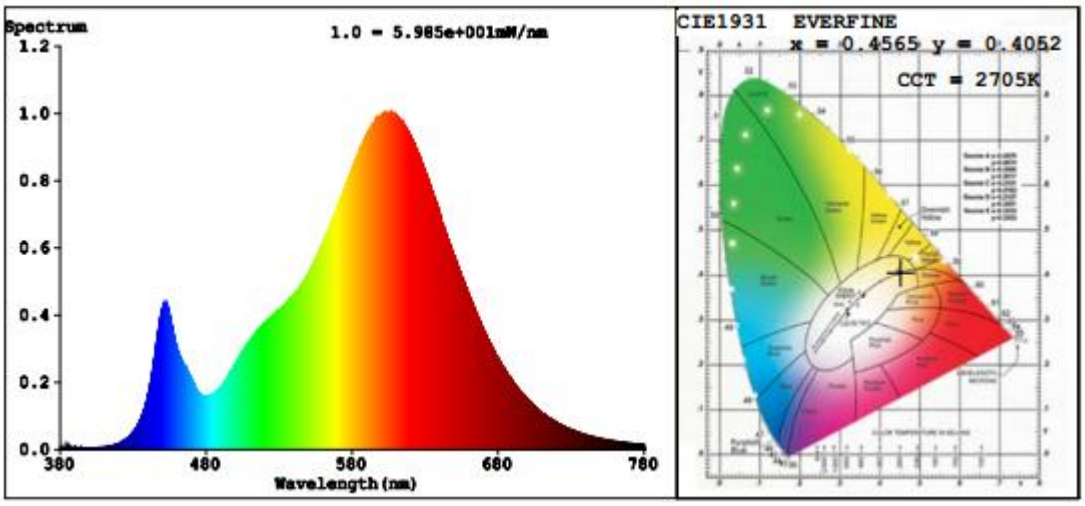
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	2705
Duv	-0.0017
Chromaticity (x, y)	x=0.4565 y=0.4052
Chromaticity (u', v')	u'=0.2628 v'=0.5248
Color Rendering Index (CRI)	80.0
R9	0

Special Color Rendering Indices			
R1	79	R9	0
R2	91	R10	81
R3	94	R11	76
R4	77	R12	74
R5	79	R13	82
R6	90	R14	97
R7	79	R15	70
R8	52	--	--

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)	9966.0	9947.1	>=10000(-10%)	
Luminous Efficacy (lm/W)	97.61	97.33	Standard: >= 100(-3%)	Premium: >= 120(-3%)
Zonal lumens in the 0-90 °zone (%)	99.8	--	>= 100(-1)	
Zonal lumens in the 80-90 °zone (%)	0.3		<=10(+3)	
Beam Angle ( )	105.9	--	--	
Center Beam Candle Power (cd)	4015	--	--	

Spectral Power Distribution & Chromaticity Diagram

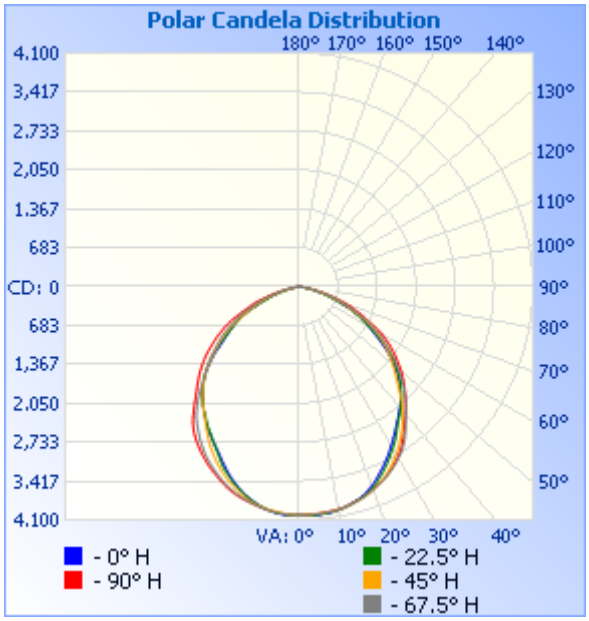


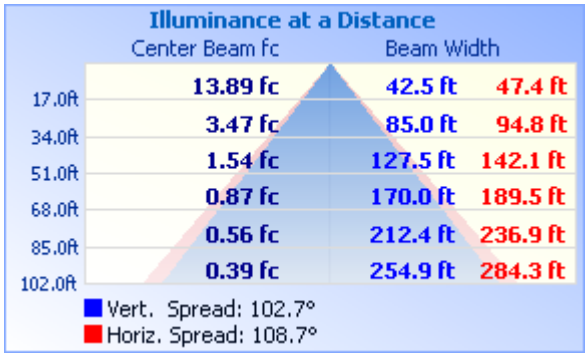
Zonal Lumen Tabulation

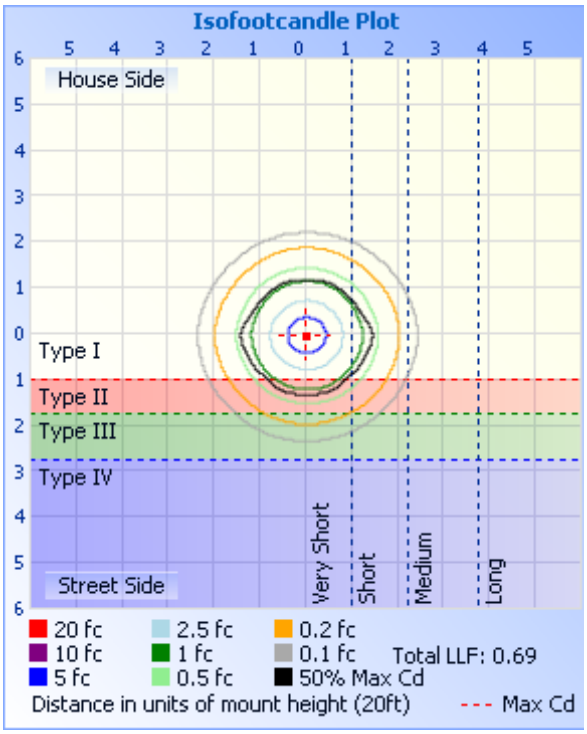
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	3,081.6	30.9%
0-40	4,977.4	50%
0-60	8,481.1	85.1%
60-90	1,467.1	14.7%
70-100	419.6	4.2%
90-120	2.8	0%
0-90	9,948.3	99.8%
90-180	16.1	0.2%
0-180	9,964.4	100%

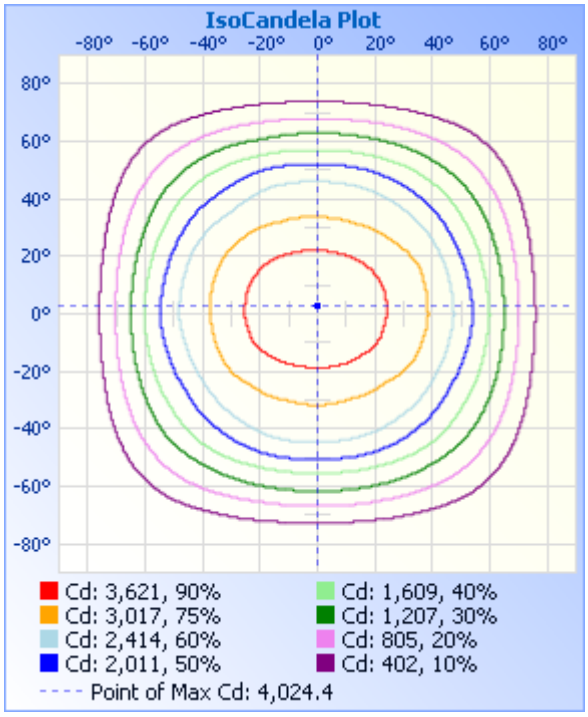
Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	380.4	3.8%	90-100	0.1	0%
10-20	1,085.7	10.9%	100-110	0.8	0%
20-30	1,615.5	16.2%	110-120	2.0	0%
30-40	1,895.8	19.0%	120-130	3.0	0%
40-50	1,900.4	19.1%	130-140	3.1	0%
50-60	1,603.3	16.1%	140-150	2.8	0%
60-70	1,047.6	10.5%	150-160	2.3	0%
70-80	391.8	3.9%	160-170	1.5	0%
80-90	27.8	0.3%	170-180	0.6	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	4015	4015	4015	4015	4015	4015	4015	4015	4015	4015	4015	4015	4015	4015	4015	4015	4015
1	4017	4018	4012	4015	4014	4014	4014	4012	4015	4014	4011	4015	4015	4016	4015	4018	4017
2	4021	4019	4009	4016	4010	4012	4016	4011	4018	4014	4006	4014	4011	4016	4013	4019	4021
3	4024	4021	4008	4012	4006	4009	4016	4009	4017	4010	3999	4010	4005	4014	4007	4017	4024
4	4023	4020	4003	4008	4001	4008	4014	4006	4014	4005	3990	4001	3999	4005	4006	4013	4023
5	4021	4016	3998	4001	3998	4002	4008	4000	4004	3995	3980	3994	3992	3998	4000	4009	4021
6	4016	4012	3992	3998	3994	3995	4002	3989	3993	3988	3969	3986	3983	3993	3995	4003	4016
7	4015	4009	3992	3994	3986	3988	3993	3975	3976	3970	3959	3976	3971	3985	3994	3998	4015
8	4008	4003	3991	3988	3981	3981	3978	3958	3959	3952	3951	3963	3958	3973	3986	3988	4008
9	3997	3992	3988	3984	3976	3971	3963	3940	3939	3933	3939	3949	3946	3962	3977	3979	3997
10	3984	3981	3983	3978	3968	3961	3943	3920	3916	3913	3922	3933	3931	3953	3965	3966	3984
11	3971	3968	3970	3969	3959	3948	3922	3895	3885	3886	3905	3915	3917	3937	3949	3952	3971
12	3951	3952	3956	3957	3946	3935	3901	3864	3856	3861	3885	3898	3903	3923	3933	3937	3951
13	3933	3935	3941	3942	3930	3918	3881	3835	3825	3830	3861	3881	3885	3909	3914	3920	3933
14	3913	3919	3924	3926	3910	3899	3855	3804	3792	3799	3833	3861	3868	3891	3894	3906	3913
15	3892	3899	3905	3908	3890	3883	3826	3770	3756	3766	3802	3841	3851	3873	3872	3888	3892
16	3865	3879	3888	3887	3871	3862	3797	3732	3720	3724	3770	3820	3833	3855	3852	3861	3865
17	3835	3854	3870	3869	3851	3837	3766	3692	3678	3686	3733	3796	3814	3830	3830	3833	3835
18	3802	3825	3846	3845	3828	3813	3735	3653	3630	3649	3699	3769	3792	3809	3805	3801	3802
19	3763	3795	3823	3821	3810	3786	3701	3615	3586	3610	3663	3742	3766	3786	3778	3771	3763
20	3720	3759	3797	3795	3787	3757	3665	3574	3538	3568	3626	3713	3738	3759	3753	3733	3720
21	3678	3720	3767	3770	3763	3729	3627	3526	3488	3521	3586	3681	3707	3728	3721	3693	3678
22	3633	3677	3736	3746	3735	3706	3589	3477	3438	3477	3546	3646	3675	3699	3688	3647	3633
23	3586	3632	3704	3722	3706	3674	3548	3428	3386	3427	3503	3611	3641	3669	3652	3601	3586
24	3534	3588	3669	3692	3678	3638	3506	3376	3333	3369	3456	3574	3609	3636	3612	3554	3534
25	3487	3539	3630	3661	3648	3600	3460	3324	3281	3311	3411	3537	3577	3599	3570	3504	3487
26	3435	3489	3587	3628	3613	3557	3419	3271	3234	3253	3360	3499	3545	3563	3525	3453	3435
27	3386	3436	3542	3597	3576	3516	3364	3220	3190	3200	3310	3461	3510	3530	3478	3404	3386
28	3334	3384	3495	3561	3538	3476	3308	3169	3149	3151	3259	3421	3476	3492	3431	3351	3334
29	3280	3331	3446	3521	3501	3436	3253	3121	3110	3105	3208	3380	3436	3450	3380	3297	3280

30	3228	3280	3400	3484	3459	3392	3196	3080	3069	3057	3156	3334	3397	3409	3326	3240	3228
31	3174	3232	3350	3443	3413	3340	3142	3040	3028	3015	3101	3288	3357	3369	3271	3184	3174
32	3121	3177	3298	3398	3364	3289	3093	2998	2990	2976	3041	3241	3320	3329	3216	3129	3121
33	3070	3119	3243	3348	3306	3237	3035	2958	2948	2936	2981	3192	3279	3285	3160	3073	3070
34	3020	3059	3188	3296	3248	3180	2980	2918	2904	2893	2925	3138	3237	3241	3104	3016	3020
35	2973	3001	3127	3236	3190	3117	2925	2878	2859	2845	2871	3085	3190	3194	3052	2964	2973
36	2925	2950	3069	3168	3128	3051	2877	2834	2814	2801	2815	3034	3143	3144	2994	2913	2925
37	2881	2904	3008	3100	3067	2980	2829	2790	2770	2760	2769	2981	3090	3092	2933	2866	2881
38	2837	2859	2947	3034	3009	2904	2782	2747	2723	2721	2726	2924	3026	3040	2872	2820	2837
39	2794	2813	2884	2970	2957	2834	2734	2701	2675	2678	2680	2862	2960	2985	2807	2772	2794
40	2749	2765	2820	2907	2906	2768	2681	2654	2625	2629	2629	2791	2885	2916	2749	2723	2749
41	2703	2720	2750	2848	2853	2706	2629	2606	2576	2579	2576	2717	2809	2841	2691	2678	2703
42	2656	2672	2677	2792	2798	2642	2573	2557	2529	2526	2523	2642	2735	2766	2631	2631	2656
43	2605	2625	2602	2739	2741	2579	2512	2505	2479	2471	2474	2563	2663	2685	2575	2585	2605
44	2554	2573	2527	2681	2682	2513	2449	2452	2426	2421	2423	2482	2597	2603	2520	2531	2554
45	2504	2520	2454	2619	2624	2448	2381	2398	2370	2369	2366	2405	2538	2525	2462	2480	2504
46	2453	2468	2387	2552	2569	2381	2314	2340	2309	2313	2308	2331	2480	2447	2402	2428	2453
47	2399	2411	2321	2484	2514	2314	2247	2281	2243	2253	2248	2261	2420	2371	2343	2370	2399
48	2338	2354	2262	2416	2458	2252	2181	2221	2174	2194	2181	2195	2366	2297	2287	2312	2338
49	2272	2293	2205	2345	2399	2186	2117	2154	2101	2126	2108	2128	2309	2225	2227	2252	2272
50	2203	2232	2146	2276	2344	2124	2058	2082	2024	2055	2036	2061	2249	2154	2156	2187	2203
51	2128	2166	2089	2205	2282	2059	2002	2005	1940	1983	1962	1996	2189	2089	2080	2118	2128
52	2053	2097	2033	2138	2215	1995	1940	1923	1850	1903	1892	1929	2127	2024	2008	2051	2053
53	1974	2027	1976	2069	2151	1933	1879	1833	1756	1817	1824	1864	2064	1954	1934	1978	1974
54	1889	1950	1917	1995	2092	1872	1816	1738	1671	1725	1758	1801	1997	1883	1862	1902	1889
55	1802	1871	1859	1926	2029	1808	1749	1646	1601	1631	1692	1737	1928	1810	1795	1823	1802
56	1721	1782	1798	1854	1963	1749	1680	1562	1538	1544	1629	1674	1858	1737	1727	1740	1721
57	1639	1689	1733	1785	1894	1685	1609	1493	1476	1472	1561	1610	1787	1670	1658	1657	1639
58	1558	1601	1669	1711	1826	1620	1530	1429	1414	1411	1494	1547	1717	1603	1589	1574	1558
59	1491	1513	1604	1637	1752	1550	1449	1364	1348	1352	1417	1478	1648	1532	1516	1486	1491
60	1428	1425	1530	1563	1679	1483	1364	1299	1286	1287	1334	1410	1578	1463	1441	1410	1428
61	1363	1345	1452	1490	1600	1417	1272	1231	1223	1221	1246	1343	1509	1394	1365	1340	1363

62	1298	1275	1373	1421	1508	1347	1185	1159	1162	1155	1156	1273	1436	1325	1282	1276	1298
63	1236	1203	1288	1342	1404	1272	1112	1090	1092	1082	1072	1203	1361	1255	1202	1209	1236
64	1165	1134	1202	1255	1321	1189	1049	1020	1011	1006	998	1139	1278	1188	1121	1146	1165
65	1087	1067	1114	1161	1244	1097	985	945	913	932	931	1066	1179	1119	1037	1082	1087
66	1003	1004	1029	1083	1170	1027	921	859	812	847	865	975	1088	1049	964	1009	1003
67	916	932	953	1011	1099	957	857	760	746	745	802	891	1011	964	898	927	916
68	823	853	886	940	1022	891	793	679	686	658	742	818	938	883	832	833	823
69	746	762	813	870	952	823	727	621	628	598	682	754	872	812	765	737	746
70	684	674	731	802	880	751	650	567	574	542	618	693	796	741	707	653	684
71	625	606	660	737	806	679	565	512	509	491	541	628	723	674	644	591	625
72	560	550	598	673	722	598	483	455	418	441	458	560	631	600	566	535	560
73	492	495	529	606	631	518	420	377	363	367	384	471	561	529	479	475	492
74	412	433	450	514	563	435	369	317	319	302	336	401	497	442	404	407	412
75	356	362	382	447	495	381	323	275	273	260	286	334	437	376	352	340	356
76	308	301	329	374	416	328	270	234	206	222	241	283	357	322	306	291	308
77	254	257	281	302	354	268	209	175	173	164	185	228	304	269	253	247	254
78	199	209	225	251	297	223	167	143	129	133	141	187	245	218	200	198	199
79	161	156	166	206	234	175	133	101	97	94	111	145	197	178	155	153	161
80	114	122	133	156	187	126	92	77	63	69	76	110	149	131	121	118	114
81	70	85	98	119	138	92	68	48	41	44	54	73	110	94	83	75	70
82	29	49	67	81	99	65	44	29	23	26	34	49	75	67	59	39	29
83	9	18	43	55	66	41	27	16	12	15	21	30	48	42	34	11	9
84	6	7	24	34	41	24	15	10	10	10	12	17	29	26	14	6	6
85	3	4	8	18	24	13	8	7	7	7	8	10	16	14	6	3	3
86	0	1	4	9	10	7	5	4	3	4	6	6	8	8	3	1	0
87	0	0	1	4	4	3	2	1	0	1	3	4	5	3	0	0	0
88	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0
89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	0	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	0
93	0	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	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	3	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	0
98	0	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	0
100	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
101	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0
102	0	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0
103	0	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0
104	0	0	0	1	1	1	0	0	0	0	1	1	1	1	0	0	0
105	0	0	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0
106	0	0	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0
107	0	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0
108	0	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	0
109	1	1	1	1	2	1	1	1	1	1	1	2	2	2	1	1	1
110	1	1	1	2	2	2	1	1	1	1	1	2	3	2	1	1	1
111	1	1	1	2	2	2	1	1	1	1	1	2	3	2	1	1	1
112	1	1	2	2	2	2	1	1	1	1	1	2	3	2	1	1	1
113	1	1	2	2	2	2	2	1	2	1	2	2	3	2	2	1	1
114	1	1	2	2	2	2	2	1	2	1	2	2	3	3	2	1	1
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180	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-08-25	Test Ambient:	25.2 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	STL1-100(5700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD160711	120.0	60	0.8504	101.3	0.9927	7.52
NB-BG2	277.0	60	0.4187	102.8	0.8864	14.71
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

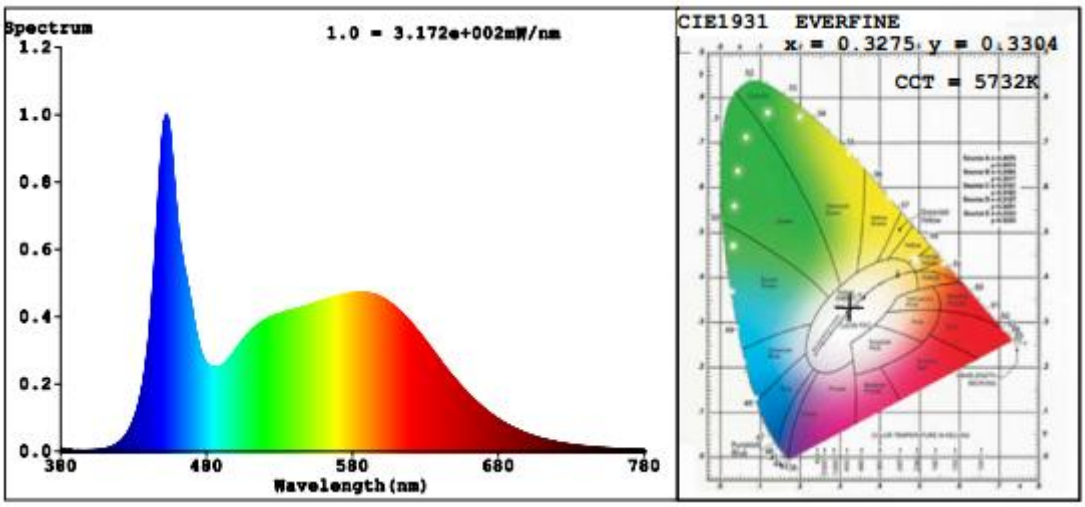
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	5732
Duv	-0.0033
Chromaticity (x, y)	x=0.3275 y=0.3304
Chromaticity (u', v')	u'=0.2076 v'=0.4713
Color Rendering Index (CRI)	87.36
R9	29

Special Color Rendering Indices			
R1	88	R9	29
R2	93	R10	83
R3	94	R11	86
R4	87	R12	64
R5	87	R13	90
R6	87	R14	97
R7	88	R15	85
R8	74	--	--

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)	10392	10491	>=10000(-10%)	
Luminous Efficacy (lm/W)	102.59	102.05	Standard: >= 100(-3%)	Premium: >= 120(-3%)

Spectral Power Distribution & Chromaticity Diagram



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 ********