

**LM-79-08 Test Report**

For

**DONGGUAN THAILIGHT  
SEMICONDUCTOR LIGHTING CO.,LTD****(Brand Name: THAILIGHT)**

Sanhui Ind. Area, Cunwei, Hengli, Dongguan, China.

**Parking Garage Luminaires**Model name(s): TLCLC45XYZZ-P  
TLCLC45XYZZ-P(M)

Remark: X=CCT(4=4000K,5=5000K,6=5700K)

YY=Mounting Option(PD=Pendant, CL=Ceiling)

ZZ=Housing Color (use 2 digits to indicate all of color) ; M= represents the product with occupancy sensor or photocontrol.

Representative (Tested) Model: TLCLC454CLZZ-P  
TLCLC456CLZZ-P

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

Test &amp; Report By:

*Jack Luo*

Engineer: Jack Luo

Update: Jan.19, 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

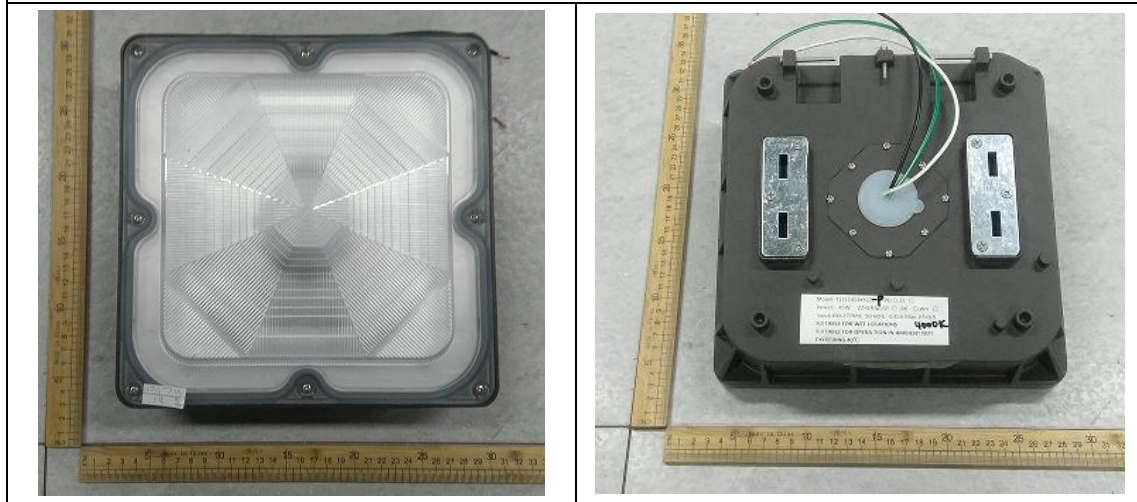
Fax: 8620-32290422

<http://www.standard-tech.com>

**1.1 Product Information:**

Organization Name	DONGGUAN THAILIGHT SEMICONDUCTOR LIGHTING CO.,LTD	
Brand Name	THAILIGHT	
Model Number	TLCLC45XYZZ-P, TLCLC45XYZZ-P(M)	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Parking Garage Luminaires	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	45W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,5000K,5700K	
LED Manufacturer	Philips Lumileds	
LED Model	L130-2780003000W21	
Sample Number	GZE170137-A1(4000K),A2(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	: Jan.11,2017
Date of Test	: Jan.12,2017
Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> </ol>
Reference Work Instruction	QD25

**1.3 Test Methods**

<p><b>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</b>  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><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b>  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><b>3) Electrical Measurements:</b>  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)

<b>Test date</b>	2017-01-12	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	TLCLC454CLZZ-P		

**Electrical Measurement :**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170137-	120.0	60	0.3806	45.38	0.9935	10.12
A1	277.0	60	0.1772	45.62	0.9294	11.59
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

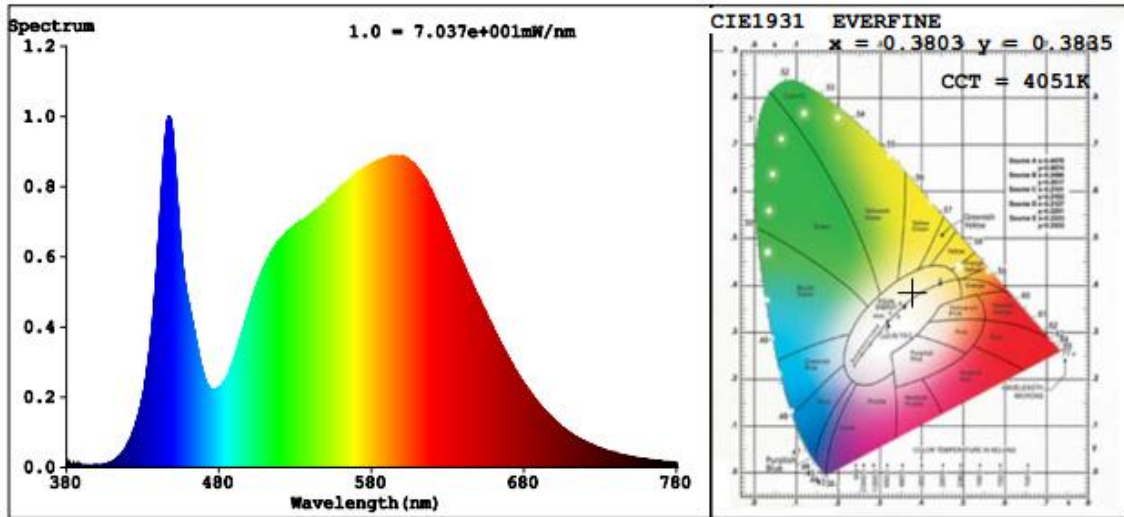
**Chromaticity Measurement - Sphere-Spectroradiometer Method :**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	10
Frequency (Hz)	60	R2	87	R10	69
CCT (K)	4051	R3	92	R11	82
Duv	0.0032	R4	83	R12	62
Chromaticity (x, y)	x=0.3803 y=0.3835	R5	81	R13	82
Chromaticity (u', v')	u'=0.2223 v'=0.5045	R6	82	R14	96
Color Rendering Index (CRI)	82.4	R7	87	R15	74
R9	10	R8	67	--	--

**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)	4367.7	4366.5	>=2000 (-10%)	
Luminous Efficacy (lm/W)	96.25	95.71	Standard: >= 90(-3%)	Premium: >= 110(-3%)
Zonal lumens in the 60-80 °zone (%)	27.7	--	>=30(-3)	
Zonal lumens in the 70-80 °zone (%)	11.0	--	<=25(-3)	
Beam Angle ( ° )	164.3	--	--	
Center Beam Candle Power (cd)	571	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

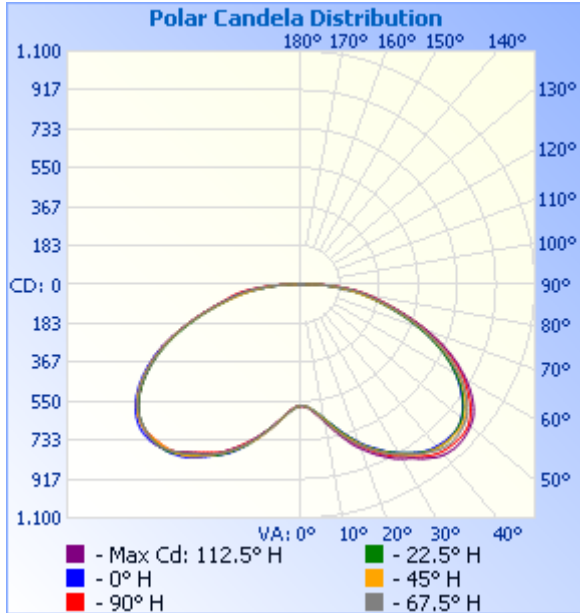


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	674.6	15.4%
0-40	1,288.5	29.5%
0-60	2,917.3	66.8%
60-90	1,428.5	32.7%
70-100	710.3	16.3%
90-120	18.5	0.4%
0-90	4,345.8	99.5%
90-180	21.7	0.5%
0-180	4,367.5	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	58.9	1.3%	90-100	11.6	0.3%
10-20	210.1	4.8%	100-110	5.5	0.1%
20-30	405.5	9.3%	110-120	1.4	0%
30-40	613.9	14.1%	120-130	1.2	0%
40-50	785.8	18.0%	130-140	0.9	0%
50-60	843.0	19.3%	140-150	0.5	0%
60-70	729.8	16.7%	150-160	0.3	0%
70-80	479.1	11.0%	160-170	0.2	0%
80-90	219.6	5.0%	170-180	0.1	0%

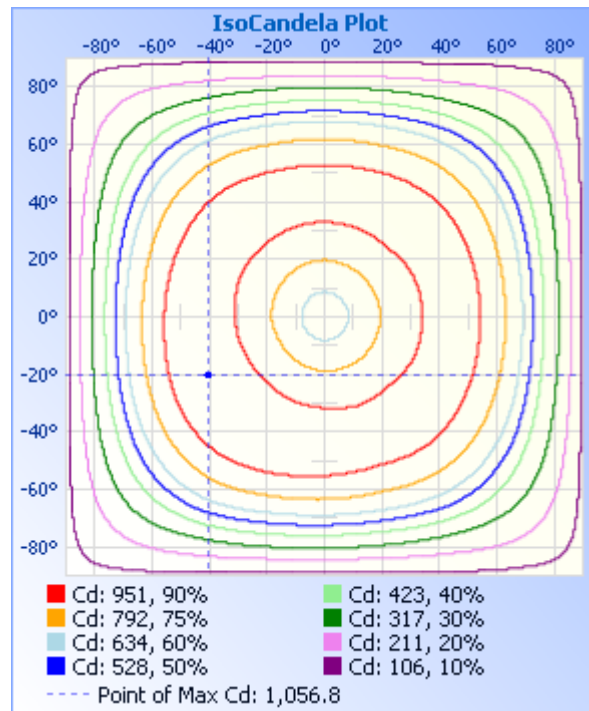
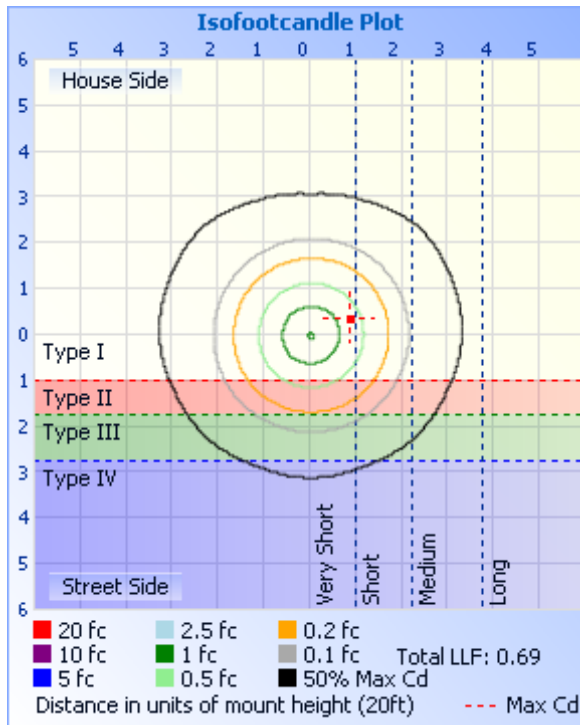
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	1.98 fc	81.7 ft	101.7 ft
34.0ft	0.49 fc	163.5 ft	203.5 ft
51.0ft	0.22 fc	245.2 ft	305.2 ft
68.0ft	0.12 fc	326.9 ft	406.9 ft
85.0ft	0.08 fc	408.7 ft	508.6 ft
102.0ft	0.05 fc	490.4 ft	610.4 ft

■ Vert. Spread: 134.8°  
■ Horiz. Spread: 143.0°



**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>

Table--1 UNIT: cd

C (DEG) y (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5
0	571	571	571	571	571	571	571	571	571	571	571	571	571	571	571	571
5	597	596	594	593	592	591	592	594	595	597	598	599	600	600	599	599
10	661	660	654	648	644	643	648	656	658	660	661	663	664	664	665	664
15	733	733	731	721	714	717	725	732	735	742	746	741	736	738	742	739
20	802	806	804	799	790	794	798	803	808	822	823	822	818	816	811	811
25	869	870	866	867	855	861	866	869	878	890	895	888	883	882	875	875
30	913	921	926	923	916	917	923	924	933	947	953	943	938	928	933	925
35	963	965	978	970	965	968	974	971	989	1001	1005	995	987	975	979	968
40	998	1008	1001	1005	993	1002	1001	1014	1029	1046	1032	1037	1009	1009	999	1007
45	1003	1013	1004	1008	1002	1005	1009	1025	1039	1056	1048	1041	1022	1008	1006	1011
50	991	988	987	987	984	985	998	1007	1028	1039	1040	1024	1005	987	993	987
55	935	934	931	928	924	929	944	952	971	989	988	969	949	932	942	936
60	848	842	843	835	840	841	858	863	883	896	899	877	860	841	851	847
65	739	727	726	718	729	724	742	748	767	777	783	754	741	721	732	730
70	594	588	589	581	593	587	605	609	625	630	638	609	592	579	591	588
75	447	443	441	439	447	443	455	462	474	475	476	453	439	430	437	441
80	339	324	306	313	323	316	316	333	349	341	327	322	319	309	303	321
85	225	213	193	190	192	191	198	216	226	219	203	188	182	180	191	208
90	77.5	73.1	77.9	70.8	86.9	79.0	86.1	82.4	85.7	78.4	75.6	55.3	68.7	58.1	75.0	70.8
95	1.06	0.85	0.69	11.6	16.0	12.3	0.74	0.85	1.66	0.90	0.74	9.42	13.4	8.87	7.79	0.79
100	28.2	16.3	1.11	1.02	0.75	1.02	1.16	15.7	29.3	15.2	1.48	2.15	3.37	2.61	1.56	16.0
105	16.0	10.6	1.43	0.78	0.80	0.69	1.59	10.4	15.5	10.2	0.85	1.00	0.79	1.54	0.95	10.1
110	3.98	2.66	1.22	0.79	0.90	0.91	1.27	1.80	4.64	3.70	0.84	0.86	0.84	1.21	0.79	1.27
115	1.74	1.75	1.42	1.04	1.16	1.06	1.28	1.57	2.80	1.32	0.84	0.72	1.01	1.07	0.77	1.21
120	1.71	1.70	1.44	1.22	1.32	3.67	1.33	1.54	1.30	1.22	0.84	0.88	1.16	1.01	0.75	1.00
125	1.69	1.65	1.47	1.47	1.54	3.14	1.43	1.52	1.26	1.11	0.78	0.95	1.36	1.17	0.74	0.91
130	1.66	1.60	1.22	1.44	1.57	2.60	1.38	1.49	1.22	0.87	0.69	1.03	1.29	1.24	0.74	0.81
135	1.60	1.43	1.07	1.42	1.59	2.07	1.22	1.32	1.08	0.79	0.53	0.90	1.22	1.10	0.74	0.71
140	1.38	1.22	0.95	1.39	1.56	1.54	1.11	1.15	0.85	0.79	0.53	0.85	1.03	0.85	0.74	0.62
145	1.17	0.80	0.74	1.27	1.20	1.26	0.74	0.64	0.78	0.66	0.53	0.74	0.90	0.71	0.74	0.53
150	1.01	0.76	0.76	1.17	1.13	1.19	0.67	0.59	0.63	0.55	0.53	0.52	0.69	0.67	0.70	0.49
155	0.64	0.63	0.73	1.06	1.06	0.95	0.64	0.55	0.59	0.49	0.53	0.52	0.58	0.66	0.57	0.52
160	0.58	0.53	0.69	0.95	0.90	0.79	0.61	0.42	0.55	0.44	0.37	0.42	0.57	0.69	0.58	0.52
165	0.58	0.41	0.58	0.69	0.69	0.71	0.58	0.27	0.54	0.48	0.48	0.47	0.56	0.73	0.53	0.53
170	0.58	0.45	0.56	0.57	0.64	0.66	0.58	0.47	0.54	0.50	0.49	0.53	0.54	0.76	0.57	0.55
175	0.55	0.47	0.54	0.54	0.64	0.64	0.58	0.42	0.53	0.52	0.52	0.53	0.53	0.69	0.62	0.57
180	0.53	0.48	0.53	0.53	0.69	0.63	0.58	0.26	0.53	0.53	0.47	0.53	0.53	0.69	0.63	0.58

**2.2 Electrical, Photometric and Chromaticity Measurements**

*(Refer to Work Instruction QD25)*

<b>Test date</b>	2017-01-12	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	TLCLC456CLZZ-P		

**Electrical Measurement :**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170137-	120.0	60	0.3826	45.59	0.9929	10.25
A2	277.0	60	0.1781	45.85	0.9295	11.61
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement - Sphere-Spectroradiometer Method :**

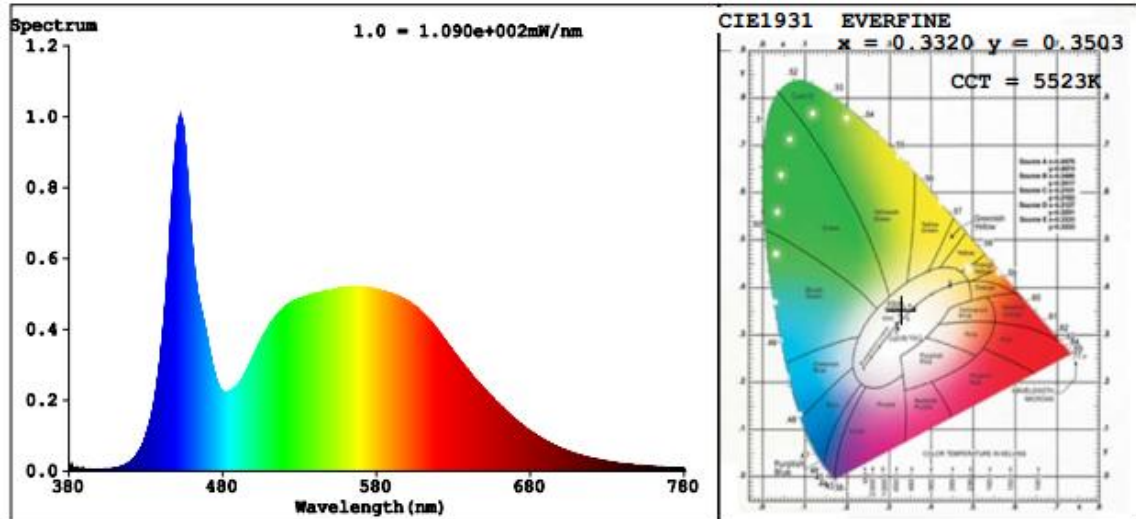
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	6
Frequency (Hz)	60	R2	87	R10	70
CCT (K)	5523	R3	92	R11	80
Duv	0.0049	R4	82	R12	56
Chromaticity (x, y)	x=0.3320 y=0.3503	R5	81	R13	82
Chromaticity (u', v')	u'=0.2031 v'=0.4821	R6	82	R14	96
Color Rendering Index (CRI)	82.6	R7	88	R15	75
R9	6	R8	68	--	--

**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)	4586	4563	>=2000 (-10%)	
Luminous Efficacy (lm/W)	100.59	99.52	Standard: >= 95(-3%)	Premium: >= 115(-3%)



**Spectral Power Distribution & Chromaticity Diagram**



**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>

**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 \*\*\*\*\***

**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>