



Report No.: GZE160886-H

NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

DONGGUAN THAILIGHT SEMICONDUCTOR LIGHTING CO.,LTD

(Brand Name: THAILIGHT)

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

High-bay Luminaires for Commercial and Industrial Buildings

Model name(s): TLHBE100XYZZ

Remark: The letter "X" in the model name stands for CCT as bellow :
4=4000K, 5=5000K; "YY" stands for mounting option as bellow : YK=
Yoke, PD=Knuckle ; "ZZ" stands for housing color as bellow :
BK=Black, WH=White.

Representative (Tested) Model: TLHBE1004YKBK
TLHBE1005YKBK

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

Test & Report By:

Johnson Sun

Engineer: Johnson Sun

Update: Sep.14, 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.

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

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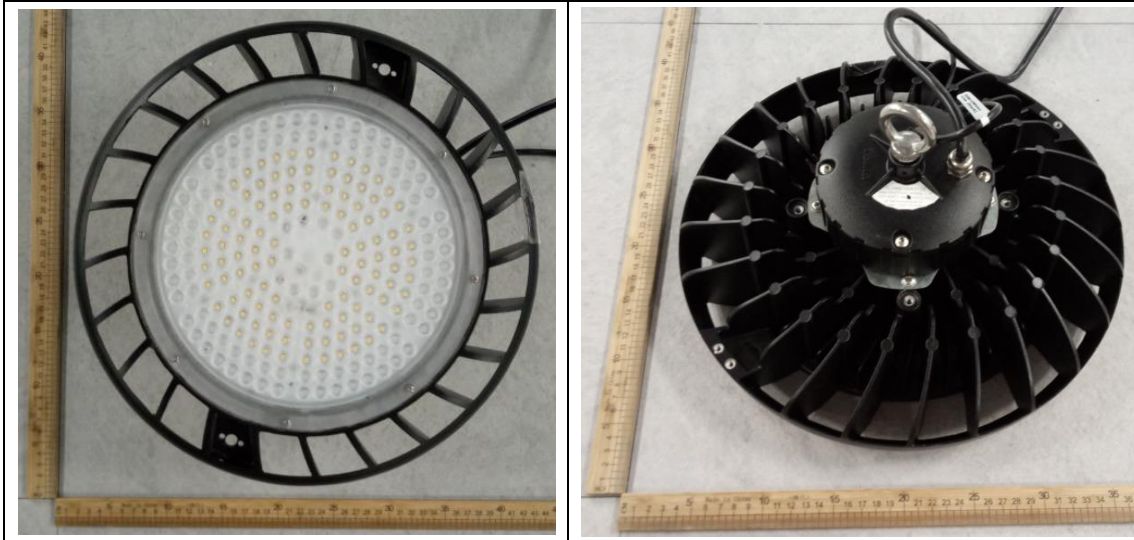
Fax: 8620-32290422

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

1.1 Product Information:

Organization Name	DONGGUAN THAILIGHT SEMICONDUCTOR LIGHTING CO.,LTD	
Brand Name	THAILIGHT	
Model Number	TLHBE100XYZZ	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	High-bay Luminaires for Commercial and Industrial Buildings	
Rated Voltage / Frequency	120 -277Vac, 50/60 Hz	
Nominal Power	100W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,5000K	
LED Manufacturer	Philips Lumileds	
LED Model	LUXEON 3030 2D	
Sample Number	GZE160886-H1(4000K);H2(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	: Sep.08,2016
Date of Test	: Sep.10,2016
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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, 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.

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.

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 QD25)

Test date	2016-09-10	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	TLHBE1004YKBBK		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160886-	120.0	60	0.8180	97.40	0.9922	7.49
H1	277.0	60	0.3809	102.1	0.9677	9.90
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

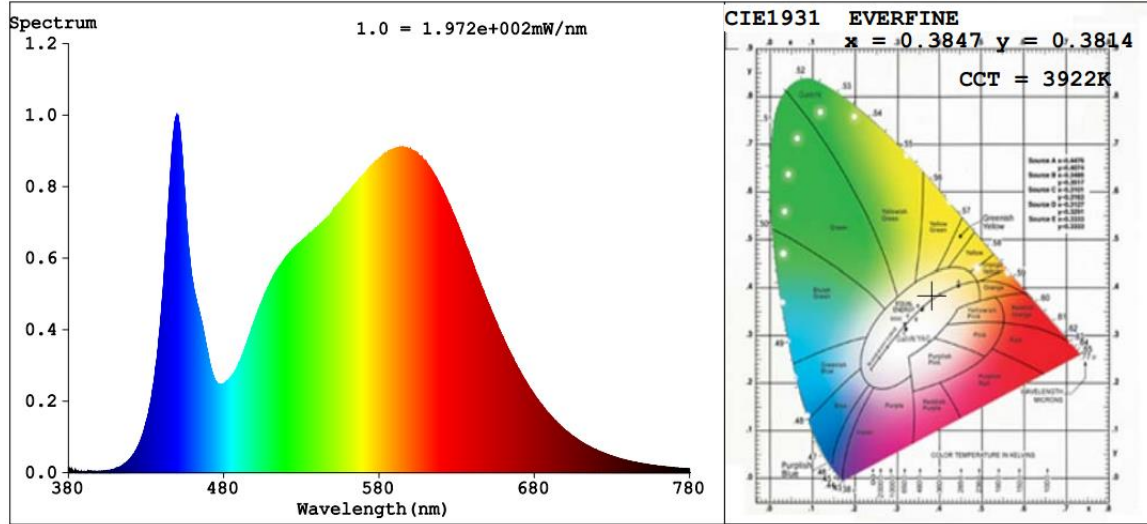
Chromaticity Measurement - Sphere-Spectroradiometer Method :

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	9
Frequency (Hz)	60	R2	89	R10	73
CCT (K)	3922	R3	94	R11	81
Duv	0.0010	R4	82	R12	62
Chromaticity (x, y)	x=0.3847 y=0.3814	R5	81	R13	83
Chromaticity (u', v')	u'=0.2260 v'=0.5043	R6	84	R14	97
Color Rendering Index (CRI)	82.8	R7	86	R15	75
R9	9	R8	65	--	--

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)	12707	12992	$\geq 10000 (-10\%)$	
Luminous Efficacy (lm/W)	130.46	127.25	Standard: $\geq 105(-3\%)$	Premium: $\geq 130(-3\%)$
Zonal lumens in the 20-50 °zone (%)	55.4	--	$\geq 30(-10)$	
Beam Angle (°)	92.0	--	--	
Center Beam Candle Power (cd)	6080	--	--	

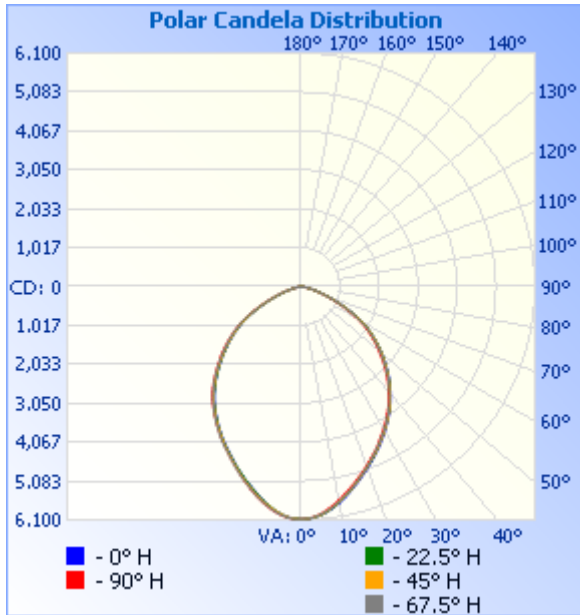
Spectral Power Distribution & Chromaticity Diagram



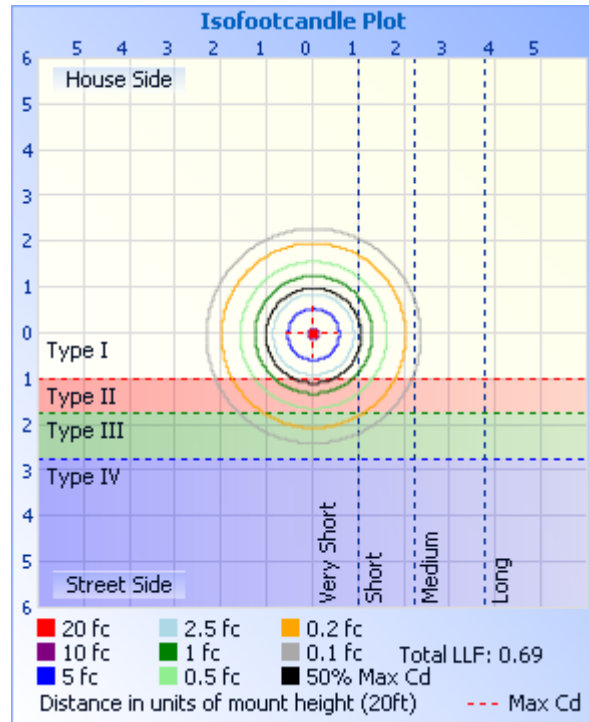
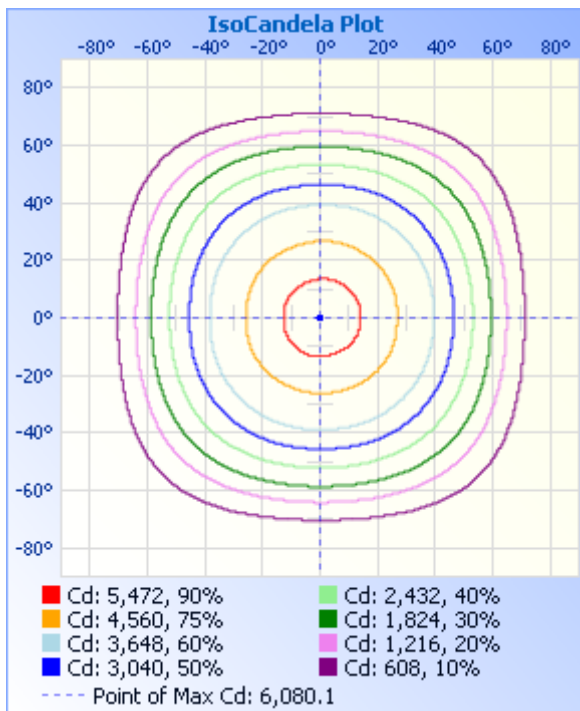
Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	4,219.0	33.2%
0-40	6,697.2	52.7%
0-60	11,101.2	87.4%
60-90	1,603.6	12.6%
70-100	445.2	3.5%
90-120	0	0%
0-90	12,704.8	100%
90-180	0	0%
0-180	12,704.8	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	561.7	4.4%	90-100	0	0%
10-20	1,509.2	11.9%	100-110	0	0%
20-30	2,148.1	16.9%	110-120	0	0%
30-40	2,478.2	19.5%	120-130	0	0%
40-50	2,416.7	19.0%	130-140	0	0%
50-60	1,987.3	15.6%	140-150	0	0%
60-70	1,158.3	9.1%	150-160	0	0%
70-80	387.3	3.0%	160-170	0	0%
80-90	58.0	0.5%	170-180	0	0%



Center Beam fc	Beam Width
21.0 fc	35.3 ft 35.2 ft
5.3 fc	70.5 ft 70.4 ft
2.3 fc	105.8 ft 105.6 ft
1.3 fc	141.0 ft 140.8 ft
0.8 fc	176.3 ft 176.1 ft
0.6 fc	211.5 ft 211.3 ft



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C (DEG) γ (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	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080	6080
5	5990	5992	5999	5999	5984	5985	5979	5970	5954	5963	5956	5971	5968	5961	5966	5986
10	5732	5743	5745	5751	5743	5721	5708	5700	5657	5683	5683	5698	5676	5677	5698	5725
15	5374	5412	5403	5412	5396	5380	5373	5367	5320	5348	5321	5348	5320	5322	5356	5378
20	5002	5051	5041	5052	5050	5027	5023	5015	4981	4999	4967	4970	4968	4971	4991	5016
25	4651	4698	4688	4711	4710	4692	4691	4669	4649	4651	4621	4617	4616	4627	4633	4665
30	4314	4358	4358	4374	4367	4346	4346	4328	4299	4302	4280	4284	4273	4285	4289	4325
35	3967	4003	3999	4027	4011	3995	3999	3972	3939	3945	3925	3929	3914	3923	3942	3964
40	3596	3615	3609	3635	3627	3612	3607	3587	3545	3555	3531	3534	3515	3519	3545	3574
45	3143	3174	3186	3212	3208	3190	3186	3161	3121	3114	3086	3063	3060	3061	3091	3123
50	2687	2714	2738	2760	2762	2761	2749	2721	2673	2659	2630	2608	2598	2599	2620	2654
55	2220	2258	2284	2313	2314	2313	2301	2270	2232	2206	2186	2150	2138	2142	2159	2200
60	1726	1769	1798	1822	1831	1822	1807	1772	1729	1701	1671	1644	1641	1646	1668	1710
65	1153	1191	1221	1246	1253	1237	1222	1195	1151	1123	1092	1076	1072	1079	1099	1127
70	667	695	717	734	739	729	716	698	667	648	629	615	611	616	628	652
75	342	356	373	377	380	376	364	361	340	327	323	310	310	316	318	334
80	152	159	171	169	171	172	162	164	153	145	144	135	136	140	139	150
85	46.7	50.0	52.5	43.0	43.9	47.6	50.3	52.5	46.2	42.1	39.5	28.0	25.7	29.5	37.1	44.1
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BUG Rating: B3-U0-G1

Zone	Lumens	Luminaire %
FL - Front-Low(0-30)	2120	16.7
FM - Front-Medium(30-60)	3494.3	27.5
FH - Front-High(60-80)	811.36	6.4
FVH - Front-Very High(80-90)	31.946	0.3
Total Forward Light	6457.6	50.8

BL - Back-Low(0-30)	2099.3	16.5
BM - Back-Medium(30-60)	3389.4	26.7
BH - Back-High(60-80)	734.27	5.8
BVH - Back-Very High(80-90)	26.02	0.2
Total Back Light	6249	49.2

UL - Uplight-Low(90-100)	0	0.0
UH - Uplight-High(100-180)	0	0.0
Total Up Light	0	0.0

BUG(Back,Up,Glare) Rating	B3-U0-G1
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Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	6249	0	6249
Street Side	6457.6	0	6457.6

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-09-10	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	TLHBE1005YKBBK		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160886-	120.0	60	0.8358	99.54	0.9925	7.26
H2	277.0	60	0.3886	104.2	0.9679	9.78
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

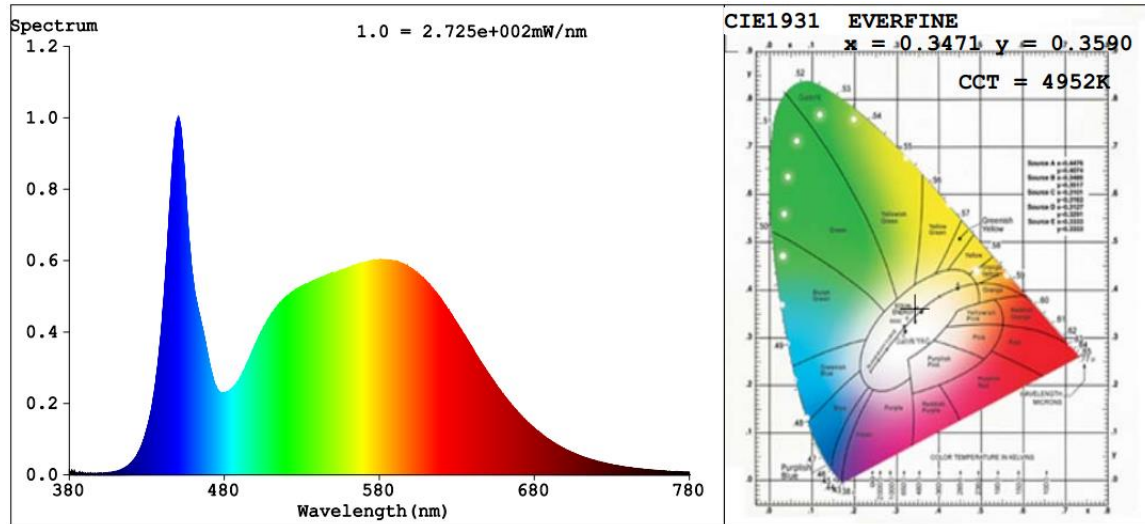
Chromaticity Measurement - Sphere-Spectroradiometer Method :

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	9
Frequency (Hz)	60	R2	88	R10	70
CCT (K)	4952	R3	92	R11	81
Duv	0.0029	R4	82	R12	56
Chromaticity (x, y)	x=0.3471 y=0.3590	R5	81	R13	82
Chromaticity (u', v')	u'=0.2099 v'=0.4885	R6	82	R14	96
Color Rendering Index (CRI)	82.8	R7	88	R15	75
R9	9	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)	13092	13385	>=10000 (-10%)	
Luminous Efficacy (lm/W)	131.53	128.45	Standard: >= 105(-3%)	Premium: >= 130(-3%)

Spectral Power Distribution & Chromaticity Diagram



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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 *******