LCTECH

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Test report of

IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Rendered to:
LIGHT EFFICIENT DESIGN, DIV OF TADD LLC.
188 S. Northwest Highway Cary, IL 60013

For products:
LED Lamp

Models No.:
LED-8030M40-MHBC

Test Date:	From Sep. 12, 2016 to Sep. 13, 2016
Test Item:	Total luminous flux, Luminous Efficacy, Electrical values, Luminous Intensity Distribution, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.
Test Lab.:	**LCTECH (Zhongshan) Testing Service Co., Ltd** 2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China Tel:+86-760-22833366 Fax:+86-760-22833399 E-mail:Service@lccert.com http://www.lccert.com
Template No.:	LC-RT-PL/LM79-08/01
Test Note:	

Complied by:		**Reviewed by:**	
Bowen Pang	Bowen Pang	**Richard Li**	
Project Engineer		**Technical Manager**	
Sep. 27, 2016		**Sep. 27, 2016**	

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Table of Contents

1. General

1.1 Product Information

Brand Name	-
Product Type	LED Lamp
Model Number	LED-8030M40-MHBC
Rated Inputs	277V, 60Hz
Rated Power	210 W
Rated Light output	N/A
Declared CCT	4000K
Ballast	M59
LED Package, Array or Module	Model: SPMWHX1228FXXXXXXXX, manufactured by SAMSUNG ELECTRONICS CO., LTD
Receipt Samples	1 unit
Date of Receipt Samples	Sep. 7, 2016
Note	-

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377-2011	Specifications for the Chromaticity of Solid State Lighting Products
ANSI C82.77-2002	Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
CIE Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004	Colorimetry
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-923	CHP-500	2016-02-04	2017-02-03
AC Power supply	LC-I-987	APW-110N	2016-02-04	2017-02-03
Power analyzer	LC-I-928	WT210	2016-01-24	2017-01-24
Power analyzer	LC-I-954	WT210	2016-02-04	2017-02-03
Multimeter	LC-I-972	Fluke 17B	2016-08-10	2017-08-09
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-I-917	24V100W	2015-10-09	2016-10-08
Luminous Flux Standard Lamp	LC-I-946	110V/200W	2015-10-17	2016-10-16
Goniophotometer(with mirror)	LC-I-902	GMS2000	2016-05-07	2017-05-07
Wireless temperature transmitter	LC-I-978	DWRF-B	2016-02-03	2017-02-02
Wireless temperature transmitter	LC-I-979	DWRF-B	2016-02-03	2017-02-02

2. Test conducted and method

The lamp was operated at least 2 hours to reach stabilization and temperature equilibrium before test.

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at 25 °C ± 1°C; the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (50 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within±0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Electrical Instrumentation

The calibration uncertainties of the instruments for AC voltage and current were less than 0.2 percent, and the calibration uncertainty of the AC power meter was less than 0.5 percent(95 % confidence interval, k=2).

2.5 Color Measurement Method

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these by software automatically.

2.6 Total Luminous Flux Measurement Method

Total luminous flux was measured type C goniophotometer system.

Light intensity distribution was measured by a type C goniophotometer (with mirror) which can keep the sample in burn position when the tests conduct, and the total luminous flux was calculated from the intensity data by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

Luminous intensity distribution was measured by a mirror-type goniophotometer (Type C) which can keep the sample in burn position when the tests conduct, and the kinds of graph were generated by software automatically.

2.8 Spatial Non-uniformity of Chromaticity

The customer did not require this measurement.

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	277.00V~60Hz	277.06V~60Hz
Input Current(A)	1.309	1.301
Total Power(W)	207.8	208.2
Power Factor	0.573	0.578
I-THD(%)	33.08	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	18619.43
Luminaire Efficacy(Lm/W)	-	89.44
Correlated Color Temperature (CCT)(K)	3939	-
Color Rendering Index (CRI)	83.1	-
R9	10	-
Chromaticity Coordinate (x,y)	x=0.3830 y=0.3777	-
Chromaticity Coordinate (u,v)	u=0.2264 v=0.3349	-
Chromaticity Coordinate (u',v')	u'= 0.2264 v'=0.5024	-
Duv	-0.00029	-
Central intensity(cd)	-	4305.826
Beam angle	-	110.4°
Spacing Criteria(0-180°)	-	1.40
Spacing Criteria(90-270°)	-	1.36
Zone Lumens between 0-60 °	-	56.20%
Zone Lumens between60-90 °	-	21.00%
Zone Lumens between 90-120 °	-	13.40%
Zone Lumens between 120-180 °	-	9.40%

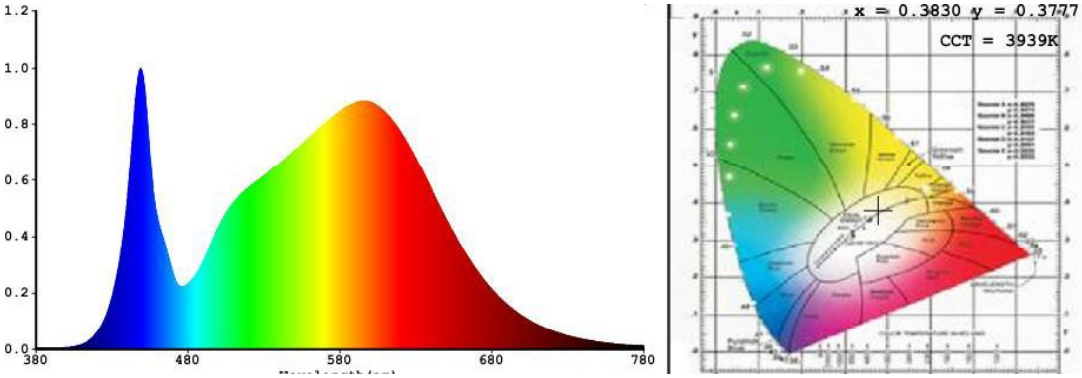
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
81	89	94	83	82	84	86	65
R9	R10	R11	R12	R13	R14	R15	-
10	73	82	65	83	97	76	-

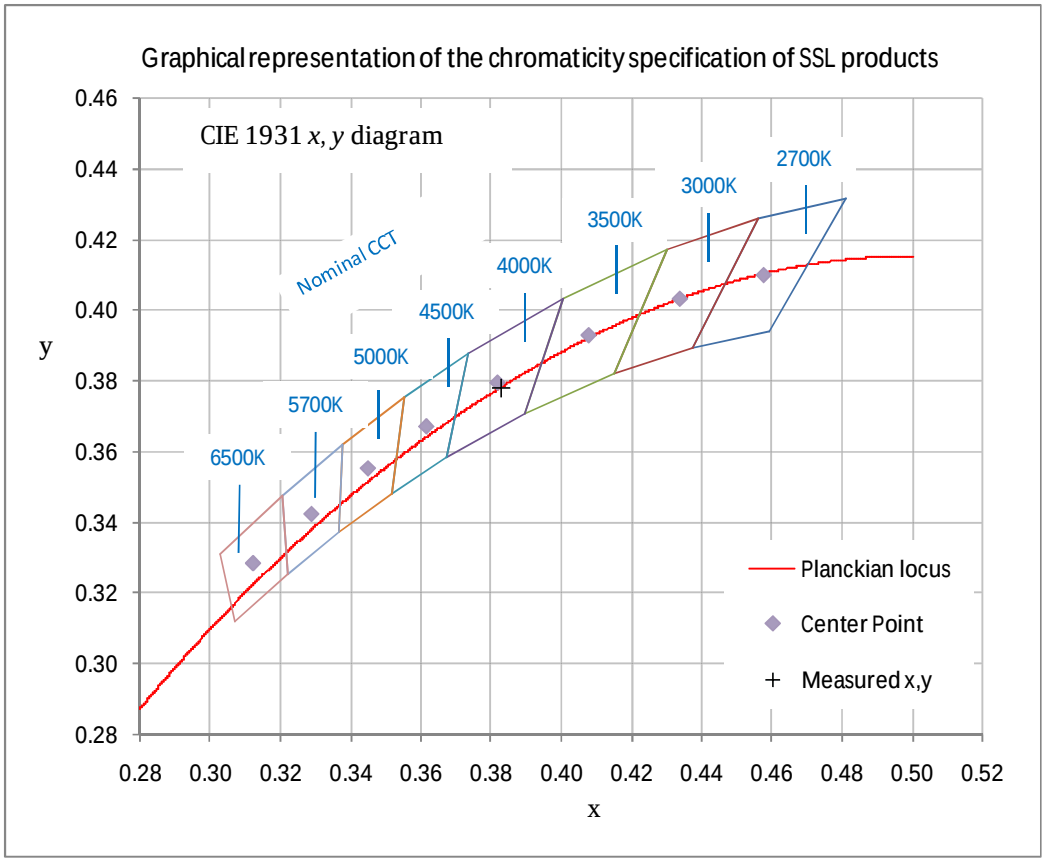
Note: N.A.

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Semi-Direct	Basic Luminous Shape	Circular w/ Sides
Spacing Criteria (0-180°)	1.40	Luminous Diameter	0.22 m
Spacing Criteria (90-270°)	1.36	Luminous Height	0.07 m
Spacing Criteria (Diagonal)	1.46		
Test Distance	29.54 m		

4.4 Zonal Lumen Summary

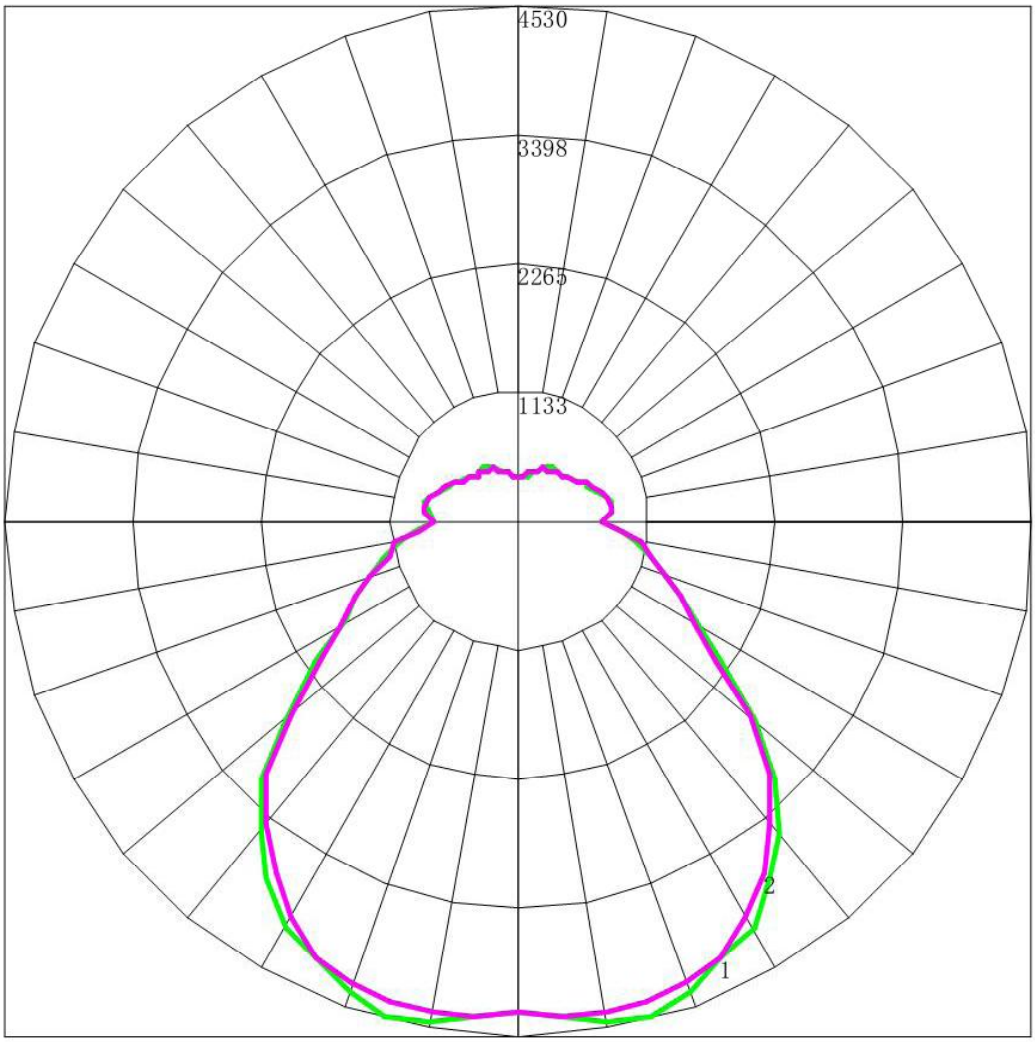
Zone	Lumens	%Lamp	%Fixt
0-20	1681.12	9.00	9.00
0-30	3638.07	19.50	19.50
0-40	6037.99	32.40	32.40
0-60	10460.74	56.20	56.20
0-80	13373.49	71.80	71.80
0-90	14376.25	77.20	77.20
10-90	13957.04	75.00	75.00
20-40	4356.87	23.40	23.40
20-50	6800.47	36.50	36.50
40-70	6019.82	32.30	32.30
60-80	2912.75	15.60	15.60
70-80	1315.69	7.10	7.10
80-90	1002.75	5.40	5.40
90-110	1773.55	9.50	9.50
90-120	2490.53	13.40	13.40
90-130	3062.64	16.40	16.40
90-150	3845.23	20.70	20.70
90-180	4243.18	22.80	22.80
110-180	2469.63	13.30	13.30
0-180	18619.43	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

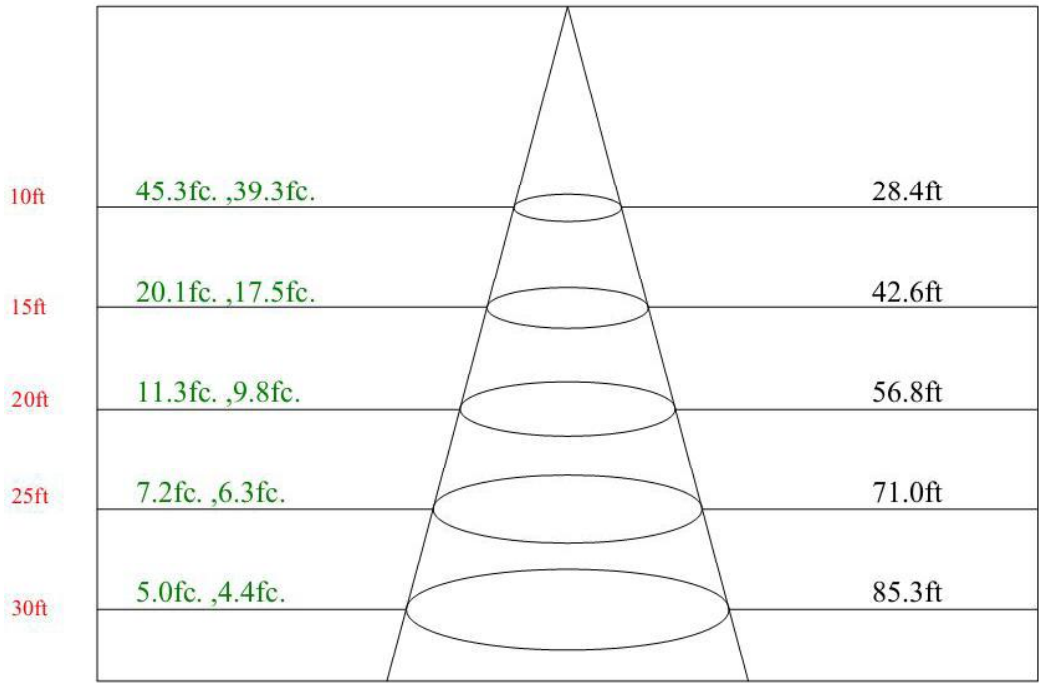
Zone	Lumens
0-10	419.20
10-20	1261.92
20-30	1956.96
30-40	2399.91
40-50	2443.6
50-60	1979.15
60-70	1597.06
70-80	1315.69
80-90	1002.75
90-100	898.87
100-110	874.68
110-120	716.98
120-130	572.10
130-140	431.63
140-150	350.96
150-160	236.28
160-170	124.73
170-180	36.94

4.5 Polar Curves

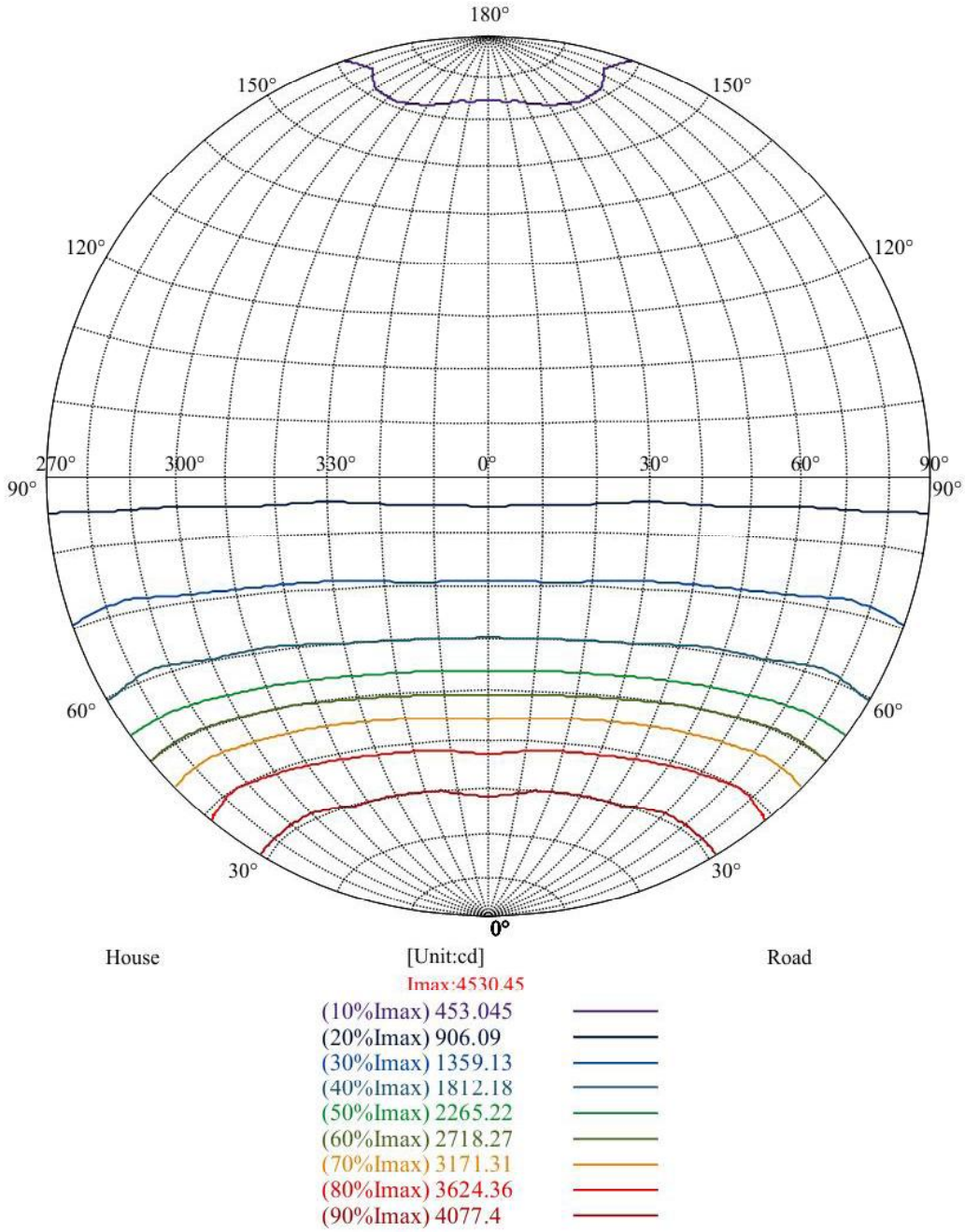


Maximum Candela = 4530.45 Located At Horizontal Angle = 30, Vertical Angle = 15
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

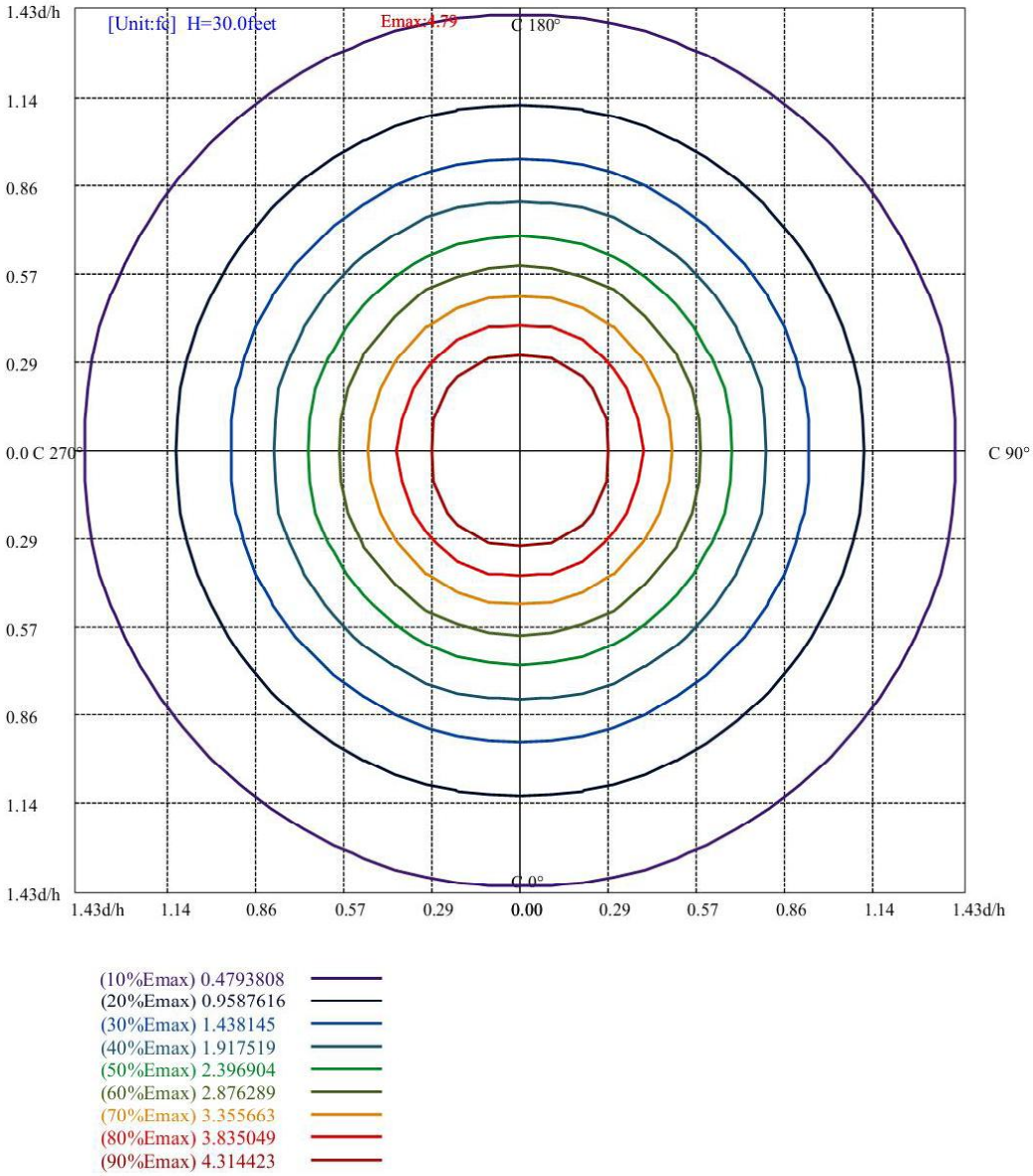
4.6 Lux distance Curve



4.7 ISO candela diagram on circular web



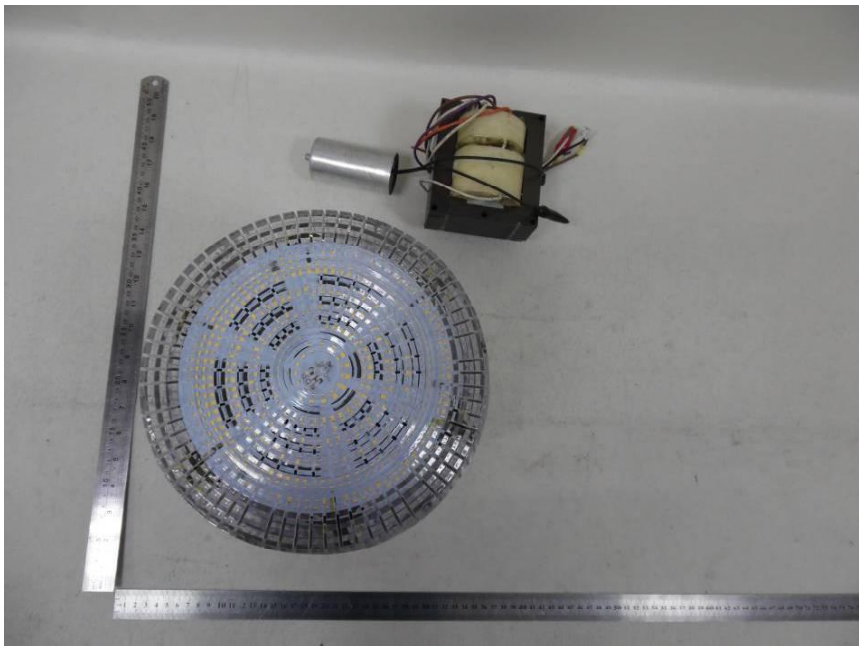
4.8 ISO illuminance diagram



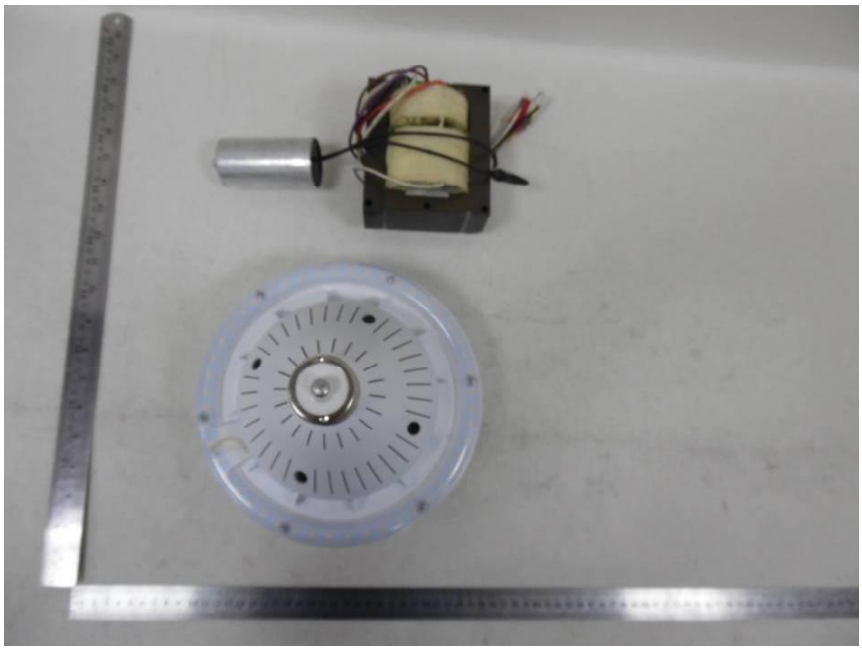
4.9 Candela Tabulation

	0	15	30	45	60	75	90
0	4305.826	4305.826	4305.826	4305.826	4305.826	4305.826	4305.826
5	4361.508	4379.187	4365.684	4344.348	4334.116	4331.596	4357.847
10	4475.483	4485.707	4485.842	4491.824	4472.910	4461.957	4397.503
15	4495.495	4523.753	4530.450	4512.406	4473.974	4457.632	4372.345
20	4386.740	4434.962	4427.188	4373.644	4322.868	4323.949	4327.146
25	4234.047	4269.482	4294.146	4226.743	4209.877	4191.503	4211.164
30	4136.168	4121.047	4142.589	4068.998	4079.611	4077.061	4003.506
35	3850.360	3885.085	3860.206	3817.027	3795.349	3813.584	3756.618
40	3558.027	3623.858	3592.229	3571.701	3550.536	3535.417	3448.754
45	3198.265	3259.952	3217.661	3207.773	3184.305	3162.945	3119.144
50	2705.823	2744.740	2727.291	2722.755	2678.313	2647.847	2639.440
55	2171.619	2188.062	2167.386	2156.088	2153.715	2158.607	2130.313
60	1777.012	1869.253	1822.008	1846.174	1812.920	1813.667	1817.333
65	1592.912	1626.463	1645.039	1606.310	1607.589	1597.101	1575.647
70	1373.488	1418.728	1392.076	1392.660	1409.480	1379.635	1386.537
75	1204.831	1267.417	1236.323	1252.711	1237.029	1227.637	1199.303
80	1059.404	1133.091	1110.896	1117.119	1105.538	1103.816	1097.862
85	919.371	906.254	917.502	906.096	932.528	903.277	895.448
90	744.710	753.932	752.184	736.981	745.451	733.439	752.304
95	813.356	852.938	850.555	844.714	849.662	841.961	820.145
100	847.767	890.303	870.530	866.763	871.668	851.456	833.747
105	811.529	857.227	839.491	839.567	819.100	831.822	807.737
110	727.788	799.177	775.927	788.275	763.459	781.941	758.018
115	682.111	718.467	726.783	717.377	715.392	712.417	708.513
120	681.546	694.540	683.394	679.942	688.360	678.068	672.140
125	621.687	650.896	629.623	648.596	653.305	632.490	614.448
130	570.789	599.953	590.717	585.966	590.723	579.542	574.409
135	522.589	564.147	540.578	544.698	539.583	546.961	531.129
140	541.991	561.504	562.963	550.380	554.801	550.237	543.324
145	552.954	587.243	577.355	575.440	572.246	557.154	538.250
150	524.286	553.768	552.670	547.269	548.220	530.074	514.414
155	499.620	523.242	519.582	517.654	509.761	500.269	499.703
160	458.424	483.478	465.220	459.881	465.595	476.636	477.786
165	429.104	442.844	425.005	423.905	432.006	445.994	448.918
170	387.733	410.353	403.280	390.994	426.311	431.846	420.434
175	366.417	383.691	373.460	351.781	361.831	365.235	365.130
180	394.706	394.706	394.706	394.706	394.706	394.706	394.706

Appendix 1 Product Photo



Picture 1



Picture 2

****End of test report****