

IES LM-79-08

MEASUREMENT AND TEST REPORT For

IGT LIGHTING INC.

3755 Lincoln St. Suite B, Riverside, CA 92503

Test Model: IGTFL-1510050

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution, THD, Power Factor
Test Engineer:	Daniel Duan <i>Daniel Duan</i>
Report Number:	RSZ160309505-10
Test Date:	2016-03-14 to 2016-03-17
Report Date:	2016-03-18
Reviewed By:	Jeanne Han/Safety Manager <i>Jeanne Han</i>
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Test Facility:	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.
Accreditation:	The NVLAP Lab Code is 200707-0.

STATEMENT: This test may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). The test data was only valid for the test sample(s). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

1. Product Description

General Information:

One sample was received on 2016-03-09 and used for testing.

Model Tested: IGTFLL-1510050
 Manufacturer: IGT LIGHTING INC.
 Brand Name: IGT
 Product Designation: Architectural Flood and Spot Luminaires
 Driver Model: HLG-120H-36A
 Dimmable: Non-Dimmable
 Burning Time Before Test: 0 hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 100-277 V AC 50-60 Hz
 Rated Power: 100 W
 Nominal Light Output: 11000 lm
 Nominal CCT: 5000K
 Nominal CRI: 70

2. Standards Used

IESNA LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
 ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Integrating Sphere	SENSING	SPR-600	S09008	25~50	2016-03-10	2017-03-09
Spectral photometer	SENSING	SPR3000	90902027	350nm~800nm	2016-03-10	2017-03-09
Power Meter	YOKOGAWA	WT-210	91j926132	15/30/60/150/300/600 V	2016-03-04	2017-03-03
AC Power Supply	ALL Power	APW-105N	970663	220V±10% 50HZ	2016-03-04	2017-03-03
Standard Light Source	EVERFINE	D204	01331191	24V/100W	2015-08-27	2016-08-26
Thermal Meter	SENSING	N/A	N/A	25、50	2016-03-10	2017-03-09
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~32V	2016-03-04	2017-03-03
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2016-03-04	2017-03-03
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2016-03-04	2017-03-03
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2016-03-04	2017-03-03
Goniophotometer	EVERFINE	GO-R5000	YG108492N101 20001	1600mm,3000W /10A	2016-03-10	2017-03-09

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Wireless Remote Sensor	N/A	433MHz	N/A	0 ~50 ; -20 ~60	2015-03-24	2016-03-23
Standard Light Source	EVERFINE	D908	1012003	N/A	2015-09-08	2016-09-07

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$ during measurement. And relative humidity is less than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is $U=2.1\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=32\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.1$ ($K=2$), at the 95% confidence level.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement. The standard light source has been calibrated regularly and traceable to the National Primary Standards.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the luminous intensity is $U=2.82\%$ ($K=2$), at the 95% confidence level.

Additional Test

The Additional Test item may not be covered by IESNA LM-79-2008. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$. Test voltage for THD and power factor test would be equal to rated voltage or, in case of a voltage range, maximum value of that range.

The uncertainty of power meter AC current $U=0.19\%$ of rdg, AC Voltage $U=0.15\%$ of rdg, Power $U=0.20\%$ ($K=2$), at the 95% confidence level.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.06	60	0.8162	97.38	0.994

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
12110.35	36.031	124.362	3975	-0.00315

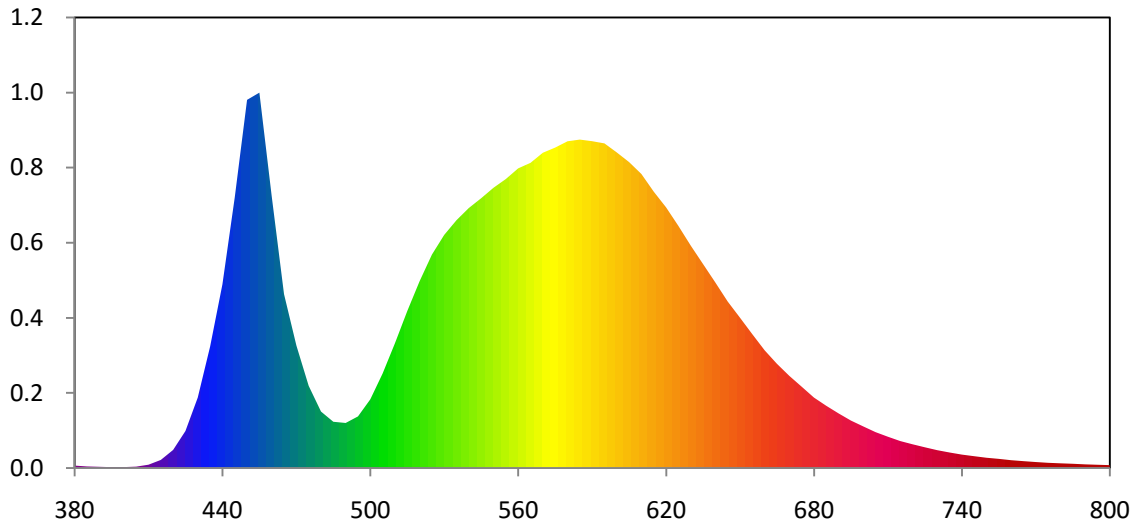
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3793	0.3694	0.2273	0.3321	0.2273	0.4981

Color Rendering Index

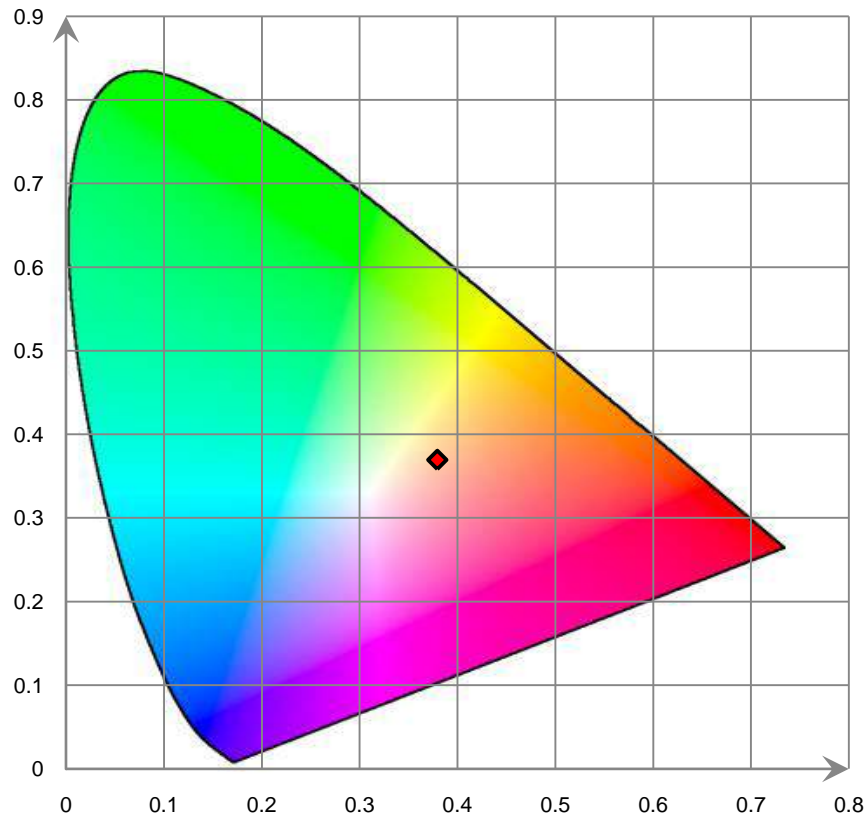
Ra			
74.1			
R1 72	R2 81	R3 86	R4 72
R5 70	R6 71	R7 82	R8 57
R9 -15	R10 53	R11 65	R12 42
R13 75	R14 91	R15 69	

Relative Spectral Power Distribution

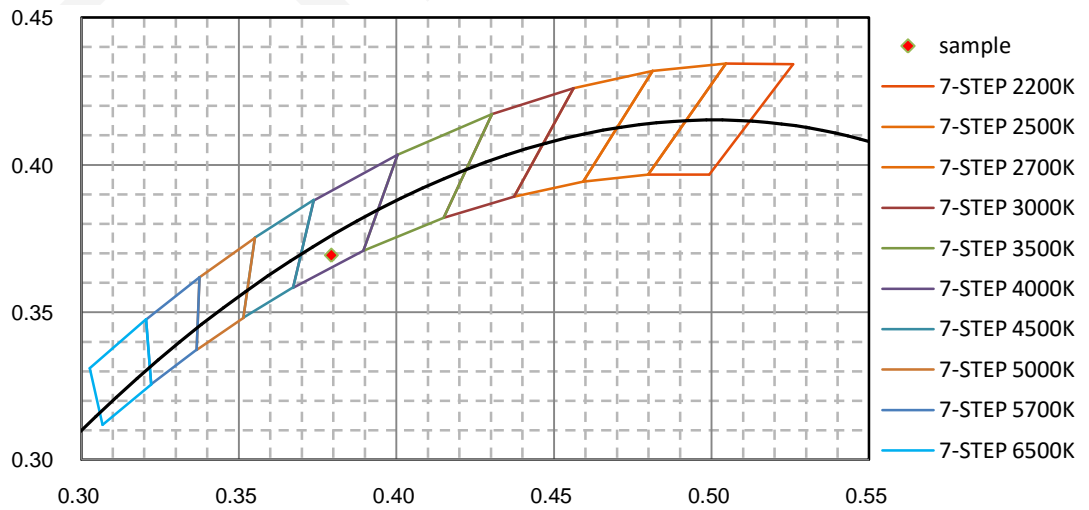


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	7.256E-03	465	4.919E-01	550	7.926E-01	635	5.769E-01	720	6.751E-02
385	4.859E-03	470	3.469E-01	555	8.173E-01	640	5.247E-01	725	5.901E-02
390	3.870E-03	475	2.326E-01	560	8.474E-01	645	4.710E-01	730	5.089E-02
395	2.837E-03	480	1.600E-01	565	8.630E-01	650	4.252E-01	735	4.431E-02
400	3.022E-03	485	1.311E-01	570	8.914E-01	655	3.786E-01	740	3.833E-02
405	4.379E-03	490	1.277E-01	575	9.061E-01	660	3.330E-01	745	3.379E-02
410	9.758E-03	495	1.463E-01	580	9.238E-01	665	2.948E-01	750	2.948E-02
415	2.327E-02	500	1.945E-01	585	9.287E-01	670	2.609E-01	755	2.628E-02
420	5.152E-02	505	2.676E-01	590	9.241E-01	675	2.304E-01	760	2.248E-02
425	1.051E-01	510	3.532E-01	595	9.179E-01	680	1.996E-01	765	1.982E-02
430	1.996E-01	515	4.442E-01	600	8.924E-01	685	1.763E-01	770	1.734E-02
435	3.437E-01	520	5.284E-01	605	8.651E-01	690	1.547E-01	775	1.511E-02
440	5.198E-01	525	6.036E-01	610	8.314E-01	695	1.345E-01	780	1.370E-02
445	7.652E-01	530	6.594E-01	615	7.815E-01	700	1.180E-01		
450	1.041E+00	535	7.011E-01	620	7.371E-01	705	1.018E-01		
455	1.061E+00	540	7.354E-01	625	6.846E-01	710	8.886E-02		
460	7.688E-01	545	7.631E-01	630	6.292E-01	715	7.660E-02		

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.0 hour**

Test orientation: **Downward**

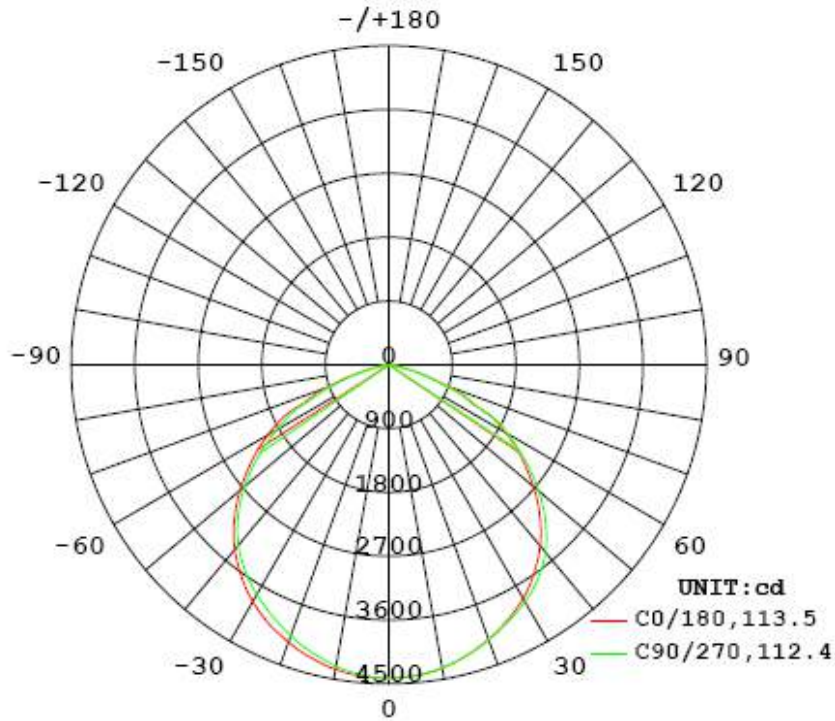
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.13	60	0.8134	97.09	0.9936

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
12138	125.02	4418	1.28	1.30

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	113.5	114.6	112.4	114.7	113.8
Field Angle (10% I _{max}):	149.8	151.0	149.3	150.7	150.2

Luminous Intensity (cd) Distribution Data

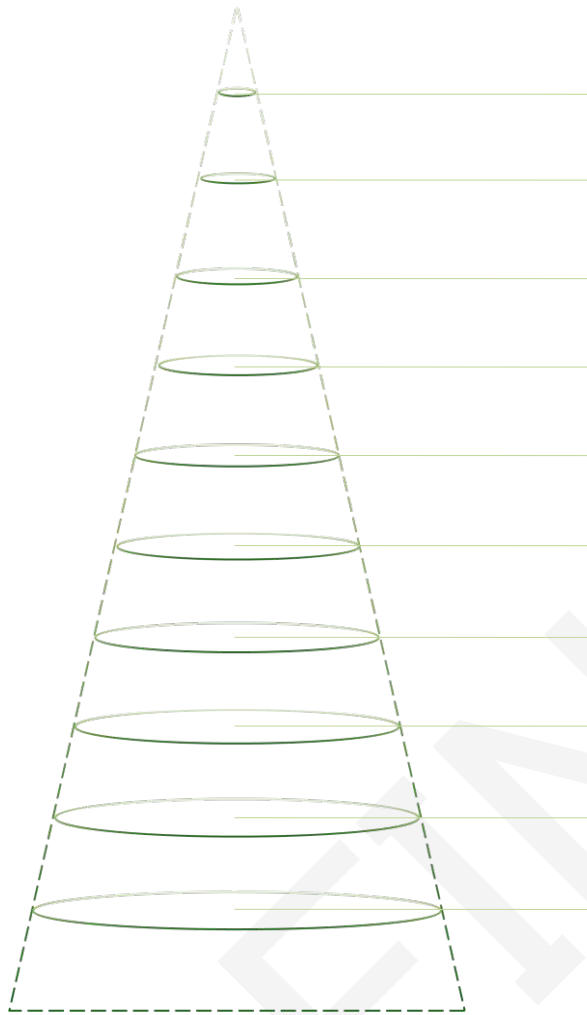
C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	4417	4417	4417	4417	4417	4417	4417	4417
5.0°	4407	4405	4399	4392	4390	4388	4391	4395
10.0°	4363	4353	4342	4325	4316	4317	4322	4332
15.0°	4277	4266	4241	4218	4203	4203	4215	4230
20.0°	4162	4143	4103	4078	4068	4061	4069	4099
25.0°	4028	3991	3939	3922	3911	3895	3893	3935
30.0°	3860	3810	3747	3744	3745	3716	3697	3746
35.0°	3645	3599	3539	3544	3552	3516	3482	3525
40.0°	3401	3358	3309	3312	3321	3281	3252	3281
45.0°	3100	3078	3053	3035	3024	3002	2991	2990
50.0°	2758	2744	2753	2700	2673	2666	2686	2644
55.0°	2375	2362	2389	2311	2268	2275	2317	2256
60.0°	1987	1972	1971	1881	1848	1845	1894	1873
65.0°	1498	1554	1511	1465	1373	1429	1437	1448
70.0°	931	1003	1069	930	810	902	998	898
75.0°	461	525	513	459	405	416	419	400
80.0°	125	158	138	117	87	106	95	102
85.0°	11	11	9	7	5	6	7	9
90.0°	3	3	1	0	0	0	1	1
95.0°	1	1	1	1	1	1	1	1
100.0°	1	1	1	1	1	1	1	1
105.0°	1	1	1	1	1	1	1	1
110.0°	1	1	1	1	1	1	1	1
115.0°	1	1	1	1	1	1	1	1
120.0°	1	1	1	1	1	1	1	1
125.0°	2	1	1	2	2	2	2	2
130.0°	2	2	2	2	2	2	2	2
135.0°	2	2	2	2	2	2	2	2
140.0°	3	3	3	3	3	3	3	3
145.0°	3	3	3	4	4	4	3	3
150.0°	4	4	4	4	4	4	4	4
155.0°	4	4	4	5	5	5	5	5
160.0°	5	5	5	5	5	5	5	5
165.0°	5	5	5	5	5	5	5	5
170.0°	4	4	4	4	4	5	5	5
175.0°	4	4	4	4	4	4	4	4
180.0°	4	4	4	4	4	4	4	4

Luminous Intensity (cd) Distribution Data (cont.)

C γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	4417	4417	4417	4417	4417	4417	4417	4417
5.0°	4398	4399	4401	4403	4404	4407	4408	4408
10.0°	4341	4344	4345	4344	4343	4352	4359	4363
15.0°	4247	4253	4248	4245	4245	4257	4268	4283
20.0°	4125	4125	4115	4120	4128	4138	4142	4168
25.0°	3975	3965	3950	3973	3998	3997	3991	4021
30.0°	3804	3783	3761	3812	3858	3845	3814	3846
35.0°	3585	3569	3557	3631	3682	3665	3621	3642
40.0°	3331	3325	3341	3405	3448	3443	3408	3408
45.0°	3025	3037	3086	3115	3139	3157	3160	3132
50.0°	2671	2695	2785	2758	2771	2805	2861	2802
55.0°	2301	2316	2408	2349	2356	2393	2490	2416
60.0°	1908	1929	1966	1918	1952	1965	2061	2030
65.0°	1322	1507	1495	1467	1378	1549	1569	1611
70.0°	814	952	1059	888	883	970	1141	1040
75.0°	416	438	470	467	406	490	530	510
80.0°	88	126	129	107	97	129	147	150
85.0°	10	9	7	6	5	6	8	10
90.0°	0	0	0	0	0	0	0	1
95.0°	0	0	0	0	0	0	0	0
100.0°	1	1	1	1	1	1	1	0
105.0°	1	1	1	1	1	1	1	1
110.0°	1	1	1	1	1	1	1	1
115.0°	1	1	1	1	1	1	1	1
120.0°	1	1	1	1	1	1	1	1
125.0°	1	1	1	1	1	1	1	1
130.0°	2	2	2	2	2	2	2	2
135.0°	2	2	2	2	2	2	2	2
140.0°	2	2	2	2	2	2	2	2
145.0°	2	2	2	3	2	2	2	2
150.0°	3	3	3	3	3	3	3	3
155.0°	3	3	3	3	3	3	3	3
160.0°	3	3	3	3	3	3	3	3
165.0°	3	3	3	3	3	3	3	3
170.0°	3	3	3	3	3	3	3	3
175.0°	4	4	4	3	3	3	3	4
180.0°	4	4	4	4	4	4	4	4

Average Area Illumination Figure

Angle: 113.8°. Flux out: 9569.0 lm.



Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	153.40	5138.0	17736.0
1.0	306.80	1285.0	4434.0
1.5	460.20	570.9	1971.0
2.0	613.60	321.1	1109.0
2.5	767.00	205.5	709.4
3.0	920.40	142.7	492.7
3.5	1073.80	104.9	362.0
4.0	1227.20	80.3	277.1
4.5	1380.60	63.4	219.0
5.0	1534.00	51.4	177.4

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	105.4	0.87
5-10	312.7	2.57
10-15	509.2	4.20
15-20	688.8	5.67
20-25	847.0	6.98
25-30	980.4	8.08
30-35	1085.6	8.94
35-40	1157.5	9.54
40-45	1190.0	9.80
45-50	1173.9	9.67
50-55	1106.0	9.12
55-60	990.3	8.15
60-65	834.2	6.88
65-70	611.1	5.03
70-75	363.4	3.00
75-80	145.3	1.19
80-85	24.0	0.20
85-90	2.6	0.02
90-95	0.3	0.00
95-100	0.4	0.01
100-105	0.5	0.00
105-110	0.5	0.01
110-115	0.6	0.00
115-120	0.6	0.00
120-125	0.6	0.01
125-130	0.7	0.01
130-135	0.8	0.00
135-140	0.8	0.01
140-145	0.9	0.01
145-150	0.9	0.00
150-155	0.9	0.01
155-160	0.8	0.01
160-165	0.6	0.00
165-170	0.5	0.01
170-175	0.3	0.00
175-180	0.1	0.00

Deg	Flux (lm)	%
0-5	105.4	0.87
0-10	418.1	3.44
0-15	927.3	7.64
0-20	1616.1	13.31
0-25	2463.1	20.29
0-30	3443.5	28.37
0-35	4529.0	37.31
0-40	5686.6	46.85
0-45	6876.6	56.65
0-50	8050.5	66.32
0-55	9156.5	75.44
0-60	10146.8	83.59
0-65	10980.9	90.47
0-70	11592.1	95.50
0-75	11955.4	98.50
0-80	12100.8	99.69
0-85	12124.8	99.89
0-90	12127.4	99.91
0-95	12127.6	99.91
0-100	12128.0	99.92
0-105	12128.5	99.92
0-110	12129.0	99.93
0-115	12129.5	99.93
0-120	12130.1	99.93
0-125	12130.8	99.94
0-130	12131.4	99.95
0-135	12132.2	99.95
0-140	12133.1	99.96
0-145	12133.9	99.97
0-150	12134.9	99.97
0-155	12135.8	99.98
0-160	12136.6	99.99
0-165	12137.2	99.99
0-170	12137.7	100.00
0-175	12137.9	100.00
0-180	12138.0	100.00

[Additional Test]

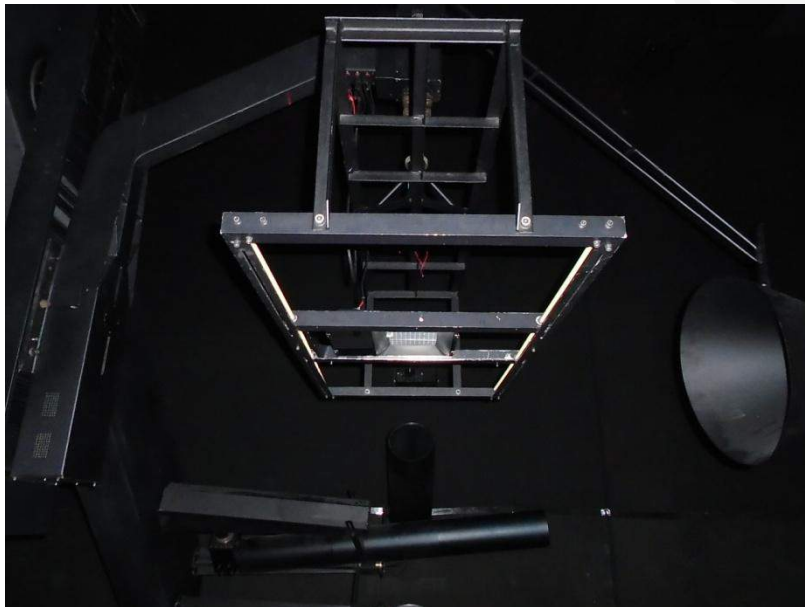
Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	277.0	60	0.9231
Power Factor:	100.0	60	0.9977
Total Harmonic Distortion:	277.0	60	13.27%
Total Harmonic Distortion:	120.0	60	7.10%
Total Harmonic Distortion:	100.0	60	6.92%

6. Product Photo





7. Product Test orientation in the Goniophotometer



*****END OF REPORT*****