

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

MESTER LED LIMITED

3rd F, Building A, Sunshine Industrial Park, Hezhou, Xixiang, Bao'an District, Shenzhen China

Test Model: PL09G2440KBQH

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution
Test Engineer:	Daniel Duan
Report Number:	RSZ160108503-10
Test Date:	2016-01-15 to 2016-01-16
Report Date:	2016-01-22
Reviewed By:	Jeanne Han/Safety Manager
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008
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.

1. Product Description

General Information:

One sample was received on 2016-01-08 and used for testing.

Model Tested: PL09G2440KBQH
 Manufacturer: MESTER LED LIMITED
 Brand Name: MESTER
 Product Designation: Plugin light
 Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: AC120-277V/60Hz
 Rated Power: 9 W
 Nominal CCT: 4000K
 Nominal Lumen Output: 830 lm

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℃	2015-03-25	2016-03-24
Spectral photometer	SENSING	SPR3000	90902027	350nm~800nm	2015-03-25	2016-03-24
Power Meter	YOKOGAWA	WT-210	91j926132	15/30/60/150/300/600 V	2015-03-05	2016-03-04
AC Power Supply	ALL Power	APW-105N	970663	220V±10% 50HZ	2015-03-05	2016-03-04
Standard Light Source	EVERFINE	D204	01331191	24V/100W	2015-08-27	2016-08-26
Thermal Meter	SENSING	N/A	N/A	25、50℃	2015-03-05	2016-03-04
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~32V	2015-03-05	2016-03-04
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2015-03-05	2016-03-04
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2015-03-05	2016-03-04
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2015-03-05	2016-03-04
Goniophotometer	EVERFINE	GO- R5000	YG108492N10120001	1600mm,3000W/10A	2015-03-20	2016-03-19
Wireless Remote Sensor	N/A	433MHz	N/A	0℃~50℃;-20℃~60℃	2015-03-24	2016-03-23

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
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.

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.

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.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement.

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.

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
120.05	60	0.084	8.95	0.89

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
834.609	2.548	93.252	3977	0.0001

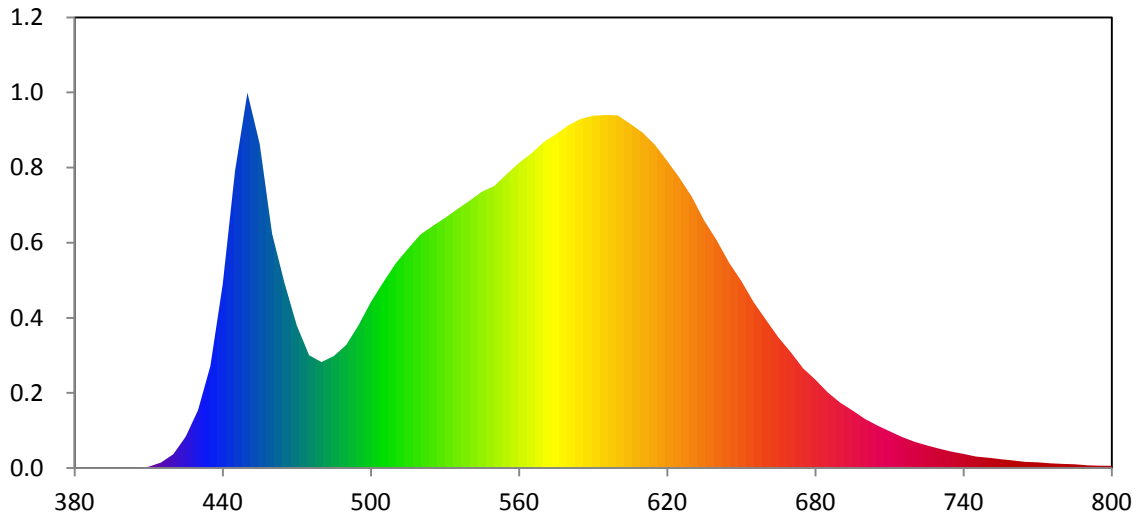
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3815	0.3776	0.2255	0.3347	0.2255	0.5021

Color Rendering Index

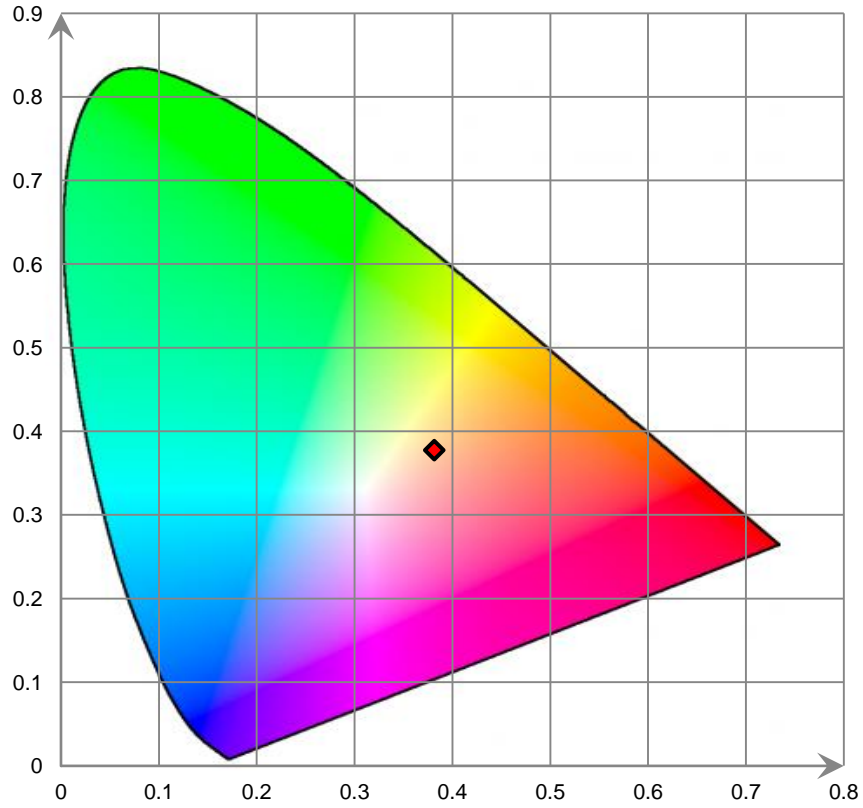
Ra			
83			
R1	R2	R3	R4
81	89	95	82
R5	R6	R7	R8
81	85	86	65
R9	R10	R11	R12
10	74	81	62
R13	R14	R15	
84	97	76	

Relative Spectral Power Distribution

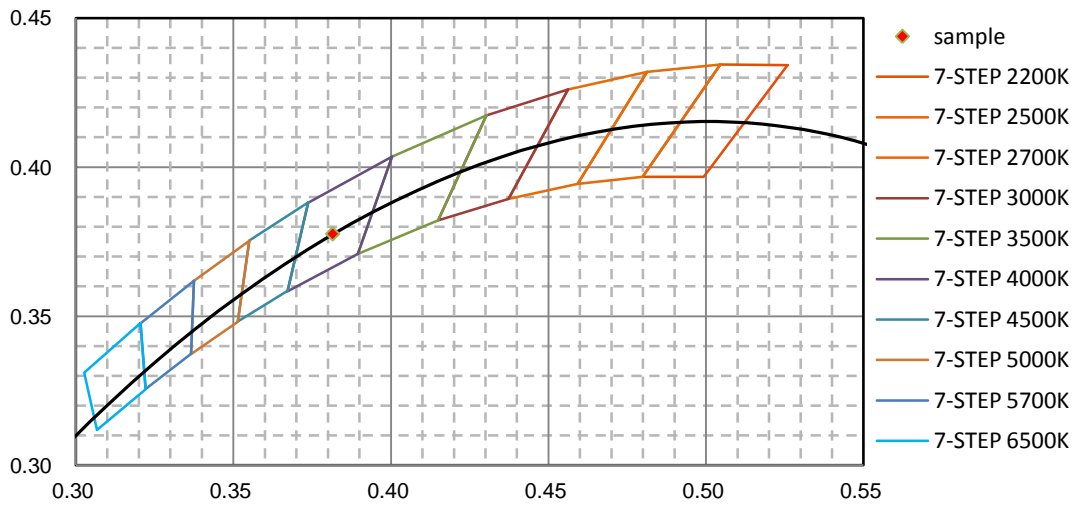


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.000E+00	465	4.203E-02	550	6.400E-02	635	5.612E-02	720	6.013E-03
385	0.000E+00	470	3.235E-02	555	6.666E-02	640	5.171E-02	725	5.181E-03
390	0.000E+00	475	2.560E-02	560	6.923E-02	645	4.664E-02	730	4.435E-03
395	0.000E+00	480	2.406E-02	565	7.138E-02	650	4.244E-02	735	3.758E-03
400	0.000E+00	485	2.543E-02	570	7.394E-02	655	3.763E-02	740	3.233E-03
405	1.511E-05	490	2.793E-02	575	7.576E-02	660	3.363E-02	745	2.636E-03
410	3.336E-04	495	3.241E-02	580	7.774E-02	665	2.967E-02	750	2.376E-03
415	1.270E-03	500	3.767E-02	585	7.921E-02	670	2.631E-02	755	2.037E-03
420	3.168E-03	505	4.213E-02	590	7.991E-02	675	2.265E-02	760	1.748E-03
425	7.121E-03	510	4.639E-02	595	8.008E-02	680	2.007E-02	765	1.423E-03
430	1.314E-02	515	4.974E-02	600	7.998E-02	685	1.718E-02	770	1.325E-03
435	2.313E-02	520	5.294E-02	605	7.809E-02	690	1.487E-02	775	1.103E-03
440	4.163E-02	525	5.490E-02	610	7.609E-02	695	1.309E-02	780	9.739E-04
445	6.740E-02	530	5.673E-02	615	7.333E-02	700	1.119E-02		
450	8.515E-02	535	5.873E-02	620	6.964E-02	705	9.699E-03		
455	7.346E-02	540	6.066E-02	625	6.579E-02	710	8.381E-03		
460	5.317E-02	545	6.269E-02	630	6.150E-02	715	7.087E-03		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

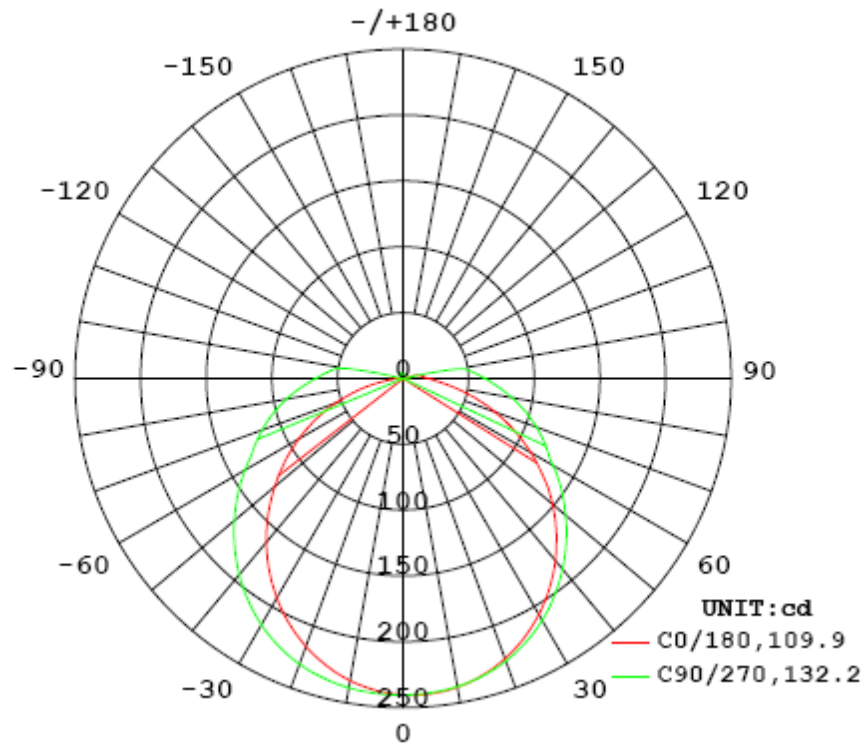
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.04	60	0.0855	9.04	0.8808

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
853.241	94.39	240.7	1.28	1.31

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	109.9	121.3	132.2	120.5	121.0
Field Angle (10% I _{max}):	164.9	200.5	203.4	199.7	192.1

Luminous Intensity (cd) Distribution Data

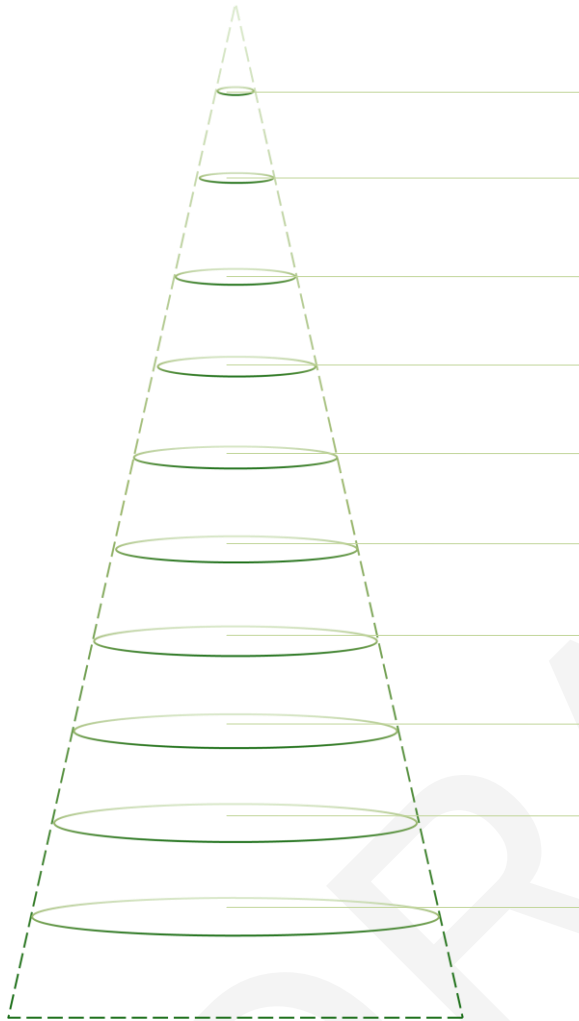
C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	240	240	240	240	240	240	240	240
5.0°	238	238	239	239	240	240	240	240
10.0°	233	234	235	237	239	239	239	238
15.0°	226	227	230	233	236	236	235	234
20.0°	217	219	224	228	231	232	230	228
25.0°	205	209	215	221	224	225	223	220
30.0°	193	197	205	212	216	217	214	210
35.0°	178	183	193	201	206	206	203	198
40.0°	162	169	180	189	194	195	191	185
45.0°	145	153	165	176	182	182	177	170
50.0°	128	137	150	162	168	168	162	155
55.0°	110	120	134	147	154	153	147	138
60.0°	92	103	118	132	139	138	131	121
65.0°	73	86	103	117	126	124	115	103
70.0°	55	69	88	106	114	112	100	86
75.0°	36	53	77	95	103	100	87	69
80.0°	20	39	66	84	90	88	75	54
85.0°	7	29	55	72	78	75	63	43
90.0°	0	20	45	62	67	63	51	33
95.0°	0	14	37	53	58	53	42	25
100.0°	0	4	19	37	44	40	30	18
105.0°	0	0	0	0	0	3	5	7
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	1	0	0	0	0	0	1
125.0°	0	2	0	0	0	0	0	1
130.0°	0	2	2	0	0	0	2	1
135.0°	0	2	5	1	0	1	3	1
140.0°	0	2	5	5	3	5	4	1
145.0°	0	1	5	6	6	5	3	1
150.0°	0	1	4	6	6	5	3	0
155.0°	0	0	3	5	5	3	2	0
160.0°	0	0	1	3	3	2	1	0
165.0°	0	0	0	1	2	1	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	240	240	240	240	240	240	240	240
5.0°	240	240	240	240	240	239	238	238
10.0°	238	238	238	238	238	236	235	233
15.0°	233	234	235	235	234	232	229	226
20.0°	227	227	229	229	228	225	221	218
25.0°	218	219	221	222	221	217	212	207
30.0°	207	209	212	213	212	208	201	195
35.0°	194	197	200	202	201	196	189	181
40.0°	180	183	188	190	189	183	175	166
45.0°	165	169	174	177	176	170	160	150
50.0°	149	153	159	163	162	155	144	132
55.0°	131	136	143	148	147	140	127	115
60.0°	112	118	126	132	132	124	111	98
65.0°	94	101	111	119	120	110	96	81
70.0°	75	84	97	107	108	99	81	64
75.0°	56	67	84	95	96	88	70	48
80.0°	39	54	72	83	84	77	59	34
85.0°	26	43	60	71	72	66	48	24
90.0°	19	33	50	60	62	56	39	16
95.0°	16	26	41	50	54	48	32	11
100.0°	13	18	30	39	42	33	16	2
105.0°	9	7	4	1	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	1	0	0	0	0	0	1
130.0°	0	1	0	0	0	0	0	1
135.0°	0	1	1	0	0	0	1	1
140.0°	0	1	2	0	0	0	3	1
145.0°	0	0	2	2	1	2	3	1
150.0°	0	0	2	3	3	3	3	0
155.0°	0	0	1	2	3	3	2	0
160.0°	0	0	0	0	2	2	1	0
165.0°	0	0	0	0	1	1	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Average Area Illumination Figure

Angle:121.0°. Flux out:574.5lm



Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	176.75	224.8	967.8
1.0	353.50	56.2	242.0
1.5	530.25	25.0	107.5
2.0	707.00	14.1	60.5
2.5	883.75	9.0	38.7
3.0	1060.50	6.2	26.9
3.5	1237.25	4.6	19.8
4.0	1414.00	3.5	15.1
4.5	1590.74	2.8	12.0
5.0	1767.49	2.2	9.7

Zonal Lumen Density Measurement

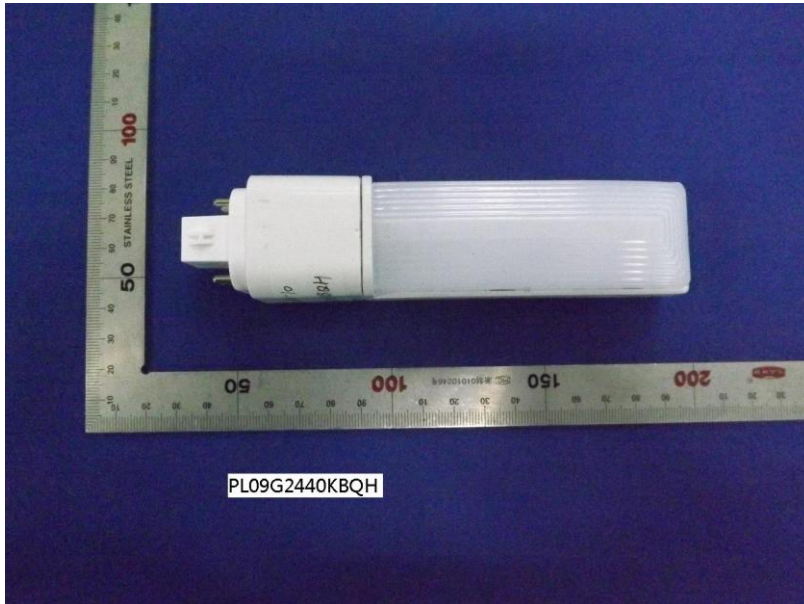
Deg	Flux (lm)	%
0-5	5.7	0.67
5-10	17.0	2.00
10-15	27.8	3.26
15-20	37.8	4.42
20-25	46.5	5.45
25-30	53.8	6.31
30-35	59.4	6.95
35-40	63.1	7.39
40-45	64.9	7.61
45-50	64.8	7.60
50-55	63.0	7.38
55-60	59.5	6.97
60-65	54.7	6.41
65-70	49.3	5.78
70-75	43.6	5.11
75-80	37.5	4.39
80-85	31.3	3.67
85-90	25.7	3.01
90-95	21.1	2.47
95-100	16.8	1.96
100-105	5.8	0.68
105-110	0.3	0.03
110-115	0.1	0.01
115-120	0.1	0.01
120-125	0.2	0.02
125-130	0.2	0.02
130-135	0.4	0.05
135-140	0.6	0.07
140-145	0.8	0.08
145-150	0.8	0.09
150-155	0.6	0.07
155-160	0.3	0.04
160-165	0.1	0.01
165-170	0.0	0.01
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	5.7	0.67
0-10	22.8	2.67
0-15	50.6	5.93
0-20	88.3	10.35
0-25	134.8	15.80
0-30	188.6	22.11
0-35	248.0	29.06
0-40	311.0	36.45
0-45	375.9	44.06
0-50	440.7	51.66
0-55	503.7	59.04
0-60	563.2	66.01
0-65	617.9	72.42
0-70	667.2	78.20
0-75	710.8	83.31
0-80	748.3	87.70
0-85	779.6	91.37
0-90	805.3	94.38
0-95	826.3	96.85
0-100	843.1	98.81
0-105	848.9	99.49
0-110	849.2	99.52
0-115	849.2	99.53
0-120	849.3	99.54
0-125	849.5	99.56
0-130	849.7	99.58
0-135	850.1	99.63
0-140	850.6	99.70
0-145	851.4	99.78
0-150	852.1	99.87
0-155	852.7	99.94
0-160	853.0	99.98
0-165	853.2	99.99
0-170	853.2	100.00
0-175	853.2	100.00
0-180	853.2	100.00

[Additional Test]

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Power Factor:	277.0	60	0.945
Total Harmonic Distortion:	277.0	60	53.41%
Total Harmonic Distortion:	120.0	60	44.27%

6. Product Photo



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