

Photometric Test Report

Relevant Standards

- IES LM-79-2008
- ANSI C82.77:2017

Prepared For RAB Lighting Inc.

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Report Number

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Test Date

2021/11/22

Issue Date

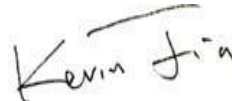
2021/11/23

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.1

Outdoor - Architectural Flood and Spot Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	1000		17411
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	150.8
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		115.5
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	5.02%
		20.00%	277V	16.31%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.994
		0.9	277V	0.866
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3045±175	3141
		4 step	3045±100	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		83
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥-40		6
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		84
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		98
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18% ≤ IES Rcs,h1 ≤ +23%		-11%
Zonal Lumen Requirement (0°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	85%		99.90%
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		120
(Goniophotometer - Section 4.2)		Non-Worst Case		277
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		0.968
(Goniophotometer - Section 4.2)		Non-Worst Case		0.475
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		115.5
(Goniophotometer - Section 4.2)		Non-Worst Case		113.9

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/11/22	FFLEDL @ 120W / 3000K	F1
2	Goniophotometer Test	2021/11/22	FFLEDL @ 120W / 3000K	F1
3	THD and PF Test	2021/11/22	FFLEDL @ 120W / 3000K	F1

Remark(If any)

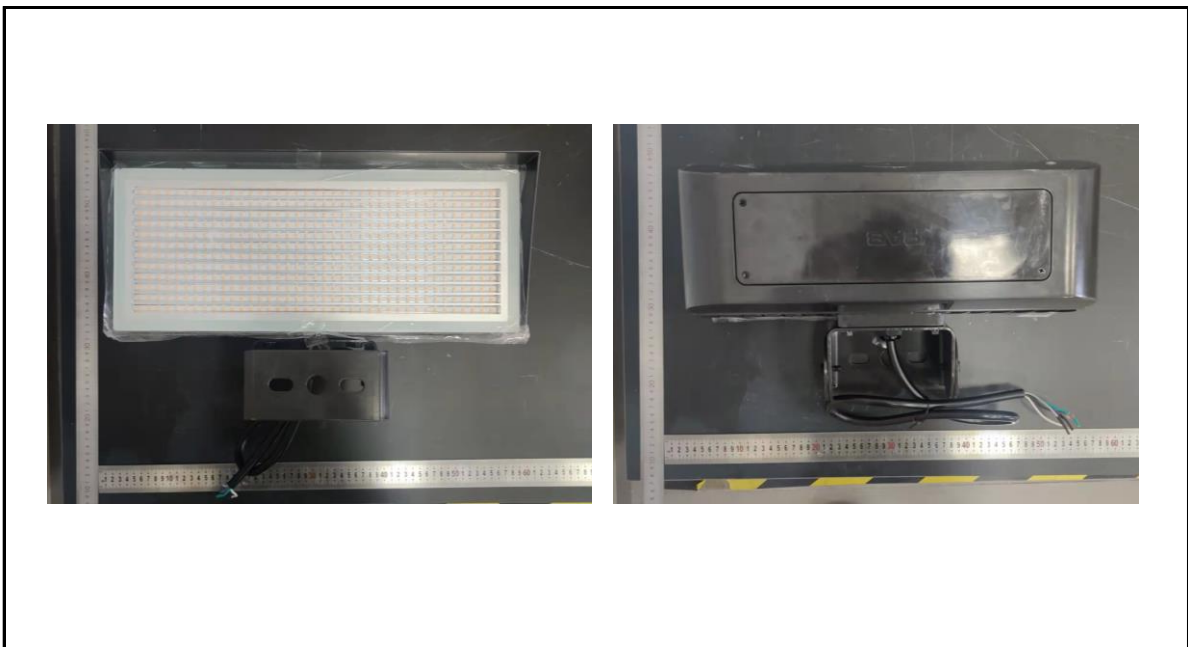
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- 2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

3.0 Production Description

Luminaire Description: FFLEDL @ 120W / 3000K

Electrical Specification: 120V-277V,50/60HZ

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	FFLEDL @ 120W / 3000K	Sample ID.	F1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.4	Humidity (%RH)	54.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.00	60	0.976	116.4	0.994
276.98	60	0.479	114.8	0.866

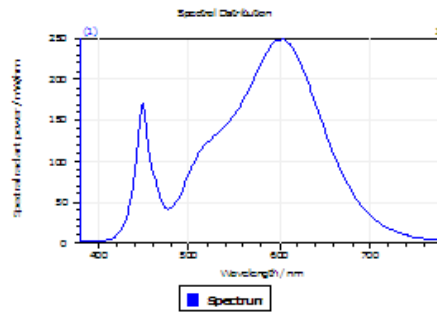
Test Result

CCT (K)	CRI	R9	Duv
3141	83	6	0.0015

Rf	Rg	IES Rcs,h1
84	98	-11%

4.1 Integrating Sphere Test

Results



Spectral values

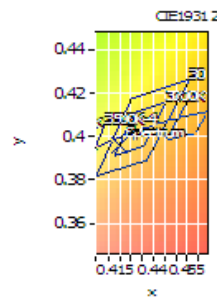
DominantWavelength	582.81 nm
Purity	0.466
PeakWavelength	601.61 nm
Radiant Power	37.59 W
Width50%	132.49 nm

Color Coordinates

Correlated Color Temperatur: 3141 K

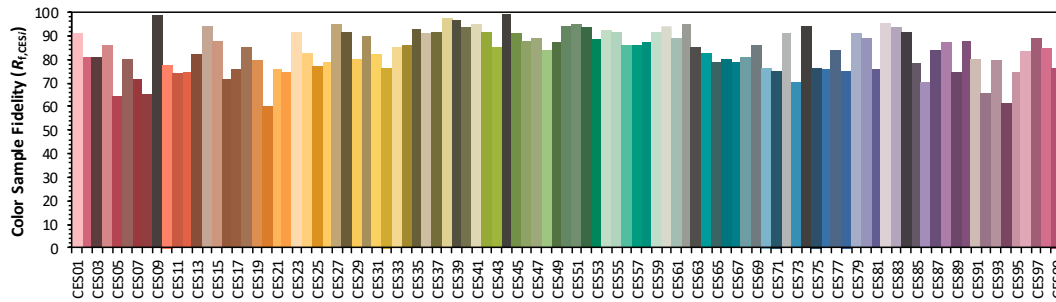
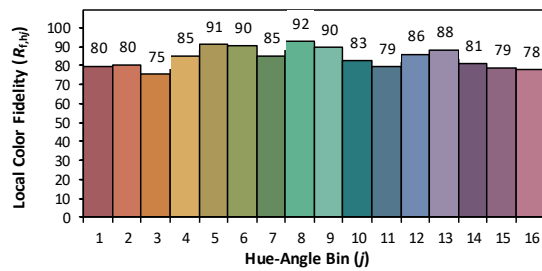
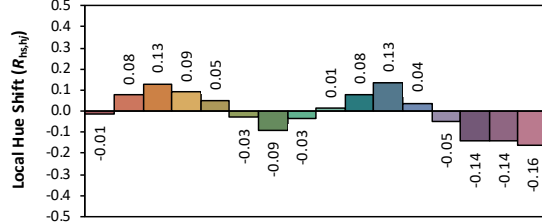
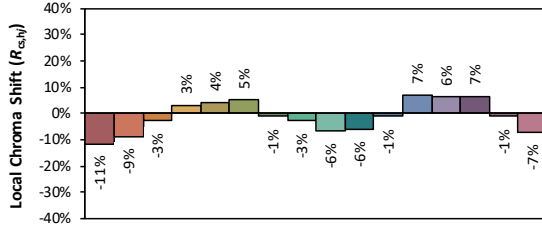
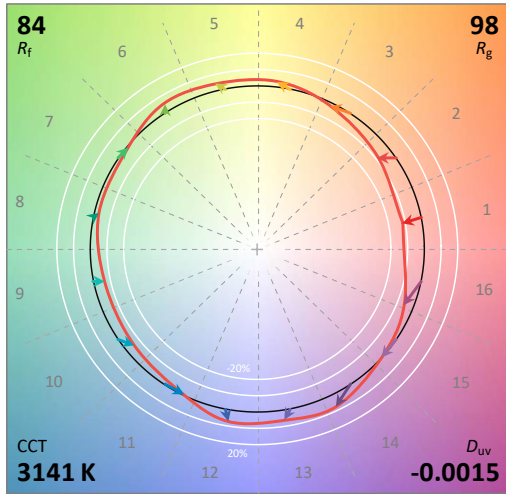
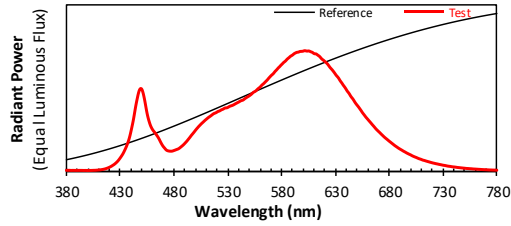
x: 0.4253 u: 0.2464 u': 0.2464
y: 0.3962 v: 0.3443 v': 0.5165

ResultsCRICRI01	81.0	ResultsCRICRI09	5.5
ResultsCRICRI02	90.2	ResultsCRICRI10	77.5
ResultsCRICRI03	96.5	ResultsCRICRI11	81.1
ResultsCRICRI04	81.2	ResultsCRICRI12	70.3
ResultsCRICRI05	81.1	ResultsCRICRI13	83.2
ResultsCRICRI06	87.4	ResultsCRICRI14	98.5
ResultsCRICRI07	83.1	ResultsCRICRI15	73.7
ResultsCRICRI08	59.6	ResultsCRICRI16	71.7
ResultsCRI	82.5		



PlanckDistance 1.5E-003

4.1 Integrating Sphere Test



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4253
 y 0.3962
 u' 0.2464
 v' 0.5165

CIE 13.3-1995 (CRI)	
R_a	82
R_g	5

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	FFLEDL @ 120W / 3000K	Sample ID.	F1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C 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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.

The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5° vertical intervals and 10° horizontal intervals.

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	119.97	60	0.968	115.5	0.994
NON-WORST CASE	276.97	60	0.475	113.9	0.866

Test Result

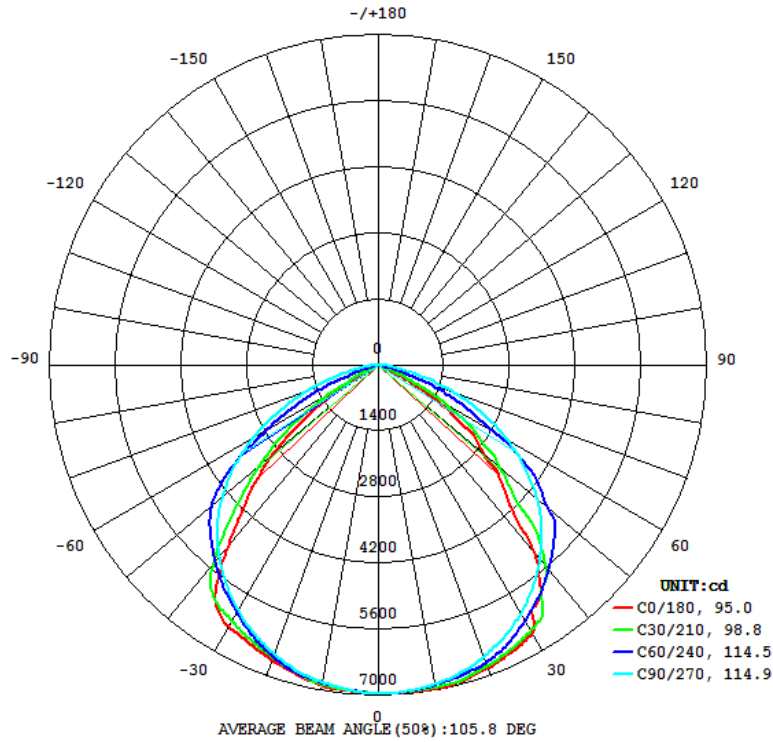
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
17411	122.1	154.7	95.0	114.9	150.8

Zonal Lumen Requirement (0°-90°)

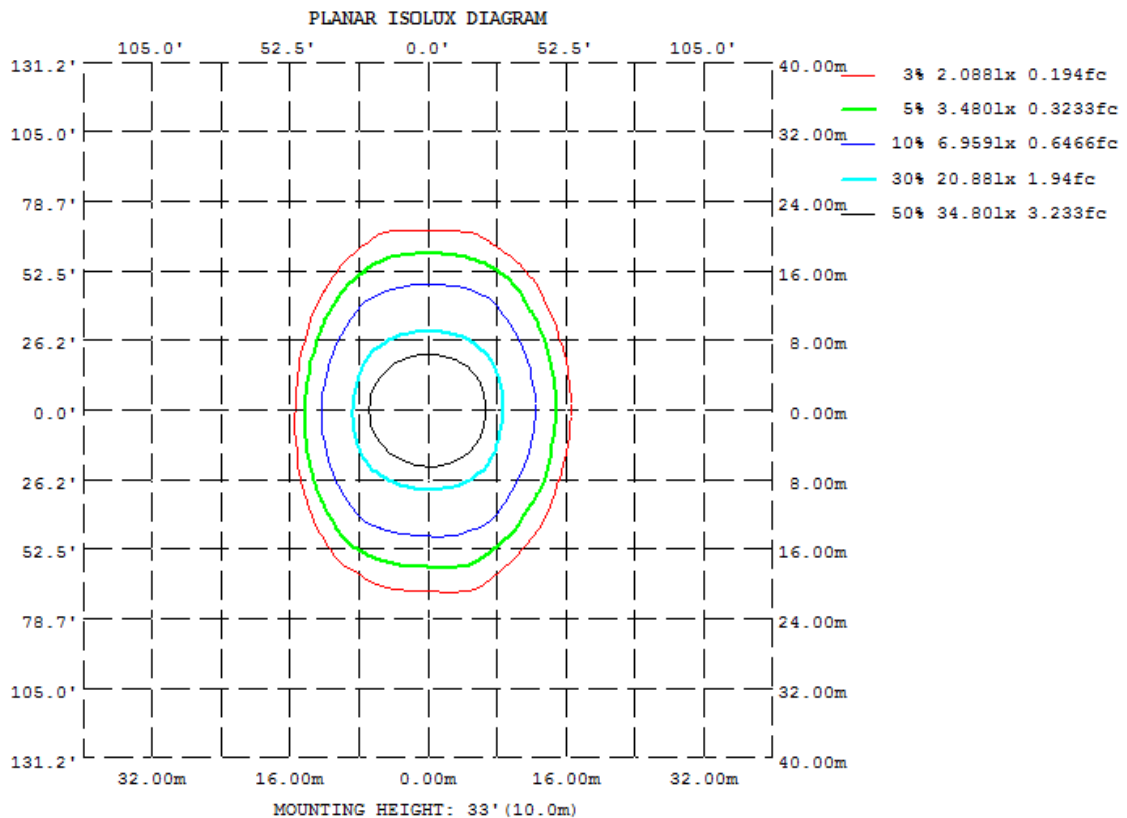
99.90%

4.2 Goniophotometer Test

Light Distribution Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	6964	6911	6864	6878	6894	6865	6832	6884
20	6830	6766	6580	6627	6644	6591	6517	6726
30	6575	6384	6080	6178	6395	6143	5992	6293
40	5191	5740	5373	5661	4989	5643	5278	5748
50	2936	4170	4438	4319	2933	3935	4336	4357
60	1165	2196	3187	2263	594.0	1935	3100	2240
70	46.26	390.8	1732	267.0	88.53	171.9	1655	538.7
80	0.1595	5.490	430.0	45.79	30.40	40.20	388.4	6.818
90	0.1287	0.4251	0.5106	5.311	4.146	4.359	0.7981	0.1600
100	0.3986	0.8558	0.9906	0.9338	0.9259	1.907	1.577	0.8338
110	0.9977	1.340	1.769	1.562	1.322	2.052	2.374	1.534
120	1.737	1.865	2.286	2.074	1.964	2.522	2.806	2.109
130	2.703	2.485	2.985	2.731	3.182	3.361	3.703	3.042
140	3.486	3.356	3.384	3.459	4.493	4.648	4.412	4.038
150	4.294	4.266	3.811	4.251	5.046	5.022	5.039	4.921
160	4.645	4.395	4.221	4.320	5.807	5.414	5.150	5.269
170	4.686	4.436	4.248	4.342	5.151	5.263	4.747	4.792
180	5.570	5.299	5.032	5.292	5.562	5.465	5.077	5.185
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	661.26	0 - 10	661.26	3.80%
10-20	1922.89	0 - 20	2584.15	14.84%
20-30	2991.05	0 - 30	5575.19	32.02%
30-40	3704.87	0 - 40	9280.06	53.30%
40-50	3622.05	0 - 50	12902.11	74.10%
50-60	2749.28	0 - 60	15651.39	89.89%
60-70	1346.70	0 - 70	16998.09	97.63%
70-80	366.87	0 - 80	17364.96	99.74%
80-90	29.06	0 - 90	17394.02	99.90%
90-100	1.83	0 - 100	17395.85	99.91%
100-110	1.39	0 - 110	17397.24	99.92%
110-120	1.82	0 - 120	17399.07	99.93%
120-130	2.28	0 - 130	17401.35	99.95%
130-140	2.70	0 - 140	17404.05	99.96%
140-150	2.66	0 - 150	17406.72	99.98%
150-160	2.23	0 - 160	17408.95	99.99%
160-170	1.37	0 - 170	17410.32	100.00%
170-180	0.47	0 - 180	17410.79	100.00%

4.2 Goniophotometer Test

Axial Candela

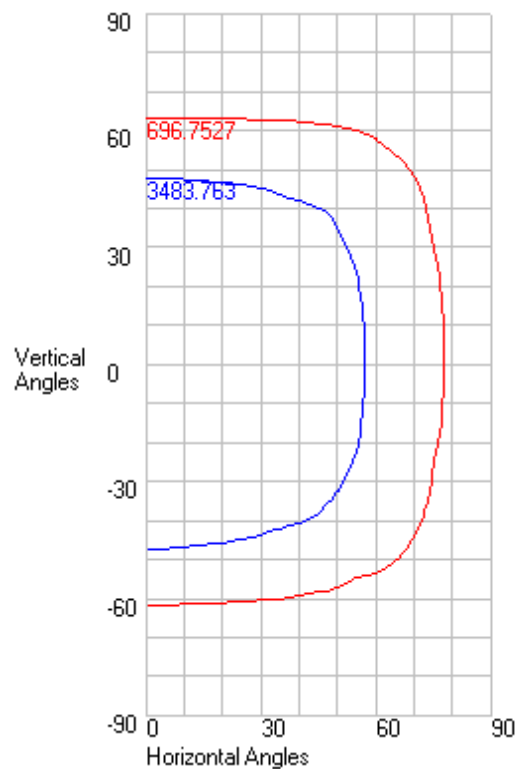
DEG.	HOR.	DEG.	VERT.
90	0.801	90	0.13
85	51.66	85	0.14
75	964.71	75	10.01
65	2372.56	65	300.75
55	3748.23	55	2200.75
47.5	4605.76	47.5	3516.86
42.5	5069.805	42.5	4309.745
37.5	5475.315	37.5	5643.615
33	5798.18	33	6103.5
29	6052.99	29	6596.45
25.5	6249.48	25.5	6697.965
22.5	6400.885	22.5	6775.285
19.5	6538.815	19.5	6836.745
17	6639.53	17	6873.02
15	6708.22	15	6919.93
13	6764.72	13	6958.19
11	6810.9	11	6966.04
9	6850.8	9	6962.75
7	6888.35	7	6958.17
5	6920.61	5	6960.05
3	6945.88	3	6965.18
1	6959.92	1	6963.78
0	6960.219	0	6960.219
-1	6961.3	-1	6953.92
-3	6952.42	-3	6942.34
-5	6935.37	-5	6932.4
-7	6911.35	-7	6926.2
-9	6881.52	-9	6911.57
-11	6846.26	-11	6872.46
-13	6802.45	-13	6833.4
-15	6753.55	-15	6781.38
-17	6693.65	-17	6719.19
-19.5	6600.49	-19.5	6655.89
-22.5	6472.14	-22.5	6580.51
-25.5	6327.295	-25.5	6495.785
-29	6139.08	-29	6415
-33	5884.14	-33	6258.92
-37.5	5565.475	-37.5	5590.245
-42.5	5162.615	-42.5	4420.98
-47.5	4701.495	-47.5	3438.475
-55	3843.17	-55	1751.4
-65	2462.2	-65	148.21
-75	1024.93	-75	58.31
-85	67.76	-85	16.48
-90	0.523	-90	4.115

4.2 Goniophotometer Test

Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	6967.527
Maximum Candela Angle	1 H 3 V
Horizontal Beam Angle (50%)	114.9
Vertical Beam Angle (50%)	95
Horizontal Field Angle (10%)	156.3
Vertical Field Angle (10%)	124.6
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	13988
Beam Efficiency	N.A.
Field Lumens	17164
Field Efficiency	N.A.
Spill Lumens	247
Luminaire Lumens	17411
Total Efficiency	N.A.
Total Luminaire Watts	115.456
Ballast Factor	1

ISOCANDELA CURVES





Axial Candela

	0	1	3	5	7	9	11	13	15	17	19.5	22.5	25.5	29	33	37.5	42.5	47.5	55	65	75	85	90
90	0.13	0.127	0.122	0.117	0.111	0.106	0.101	0.095	0.09	0.093	0.096	0.1	0.104	0.109	0.12	0.135	0.152	0.173	0.213	0.26	0.3	0.633	0.8
85	0.14	0.138	0.134	0.13	0.126	0.122	0.118	0.114	0.11	0.111	0.113	0.115	0.117	0.119	0.126	0.135	0.143	0.154	0.182	0.26	0.282	0.654	0.8
75	10.01	10.229	10.668	11.107	11.083	11.187	11.186	11.07	10.98	11.246	11.449	11.439	11.246	10.899	11.461	11.581	10.904	12.493	11.711	21.598	4.633	0.73	0.8
65	300.75	308.329	323.484	328.424	333.119	333.709	329.902	321.42	335.052	359.355	380.358	386.575	348.576	331.116	368.022	365.936	304.779	332.869	263.534	183.126	58.38	1.667	0.8
55	2200.75	2217.853	2252.039	2251.735	2255.004	2250.138	2238.249	2223.549	2164.787	2121.757	2103.919	2104.255	2079.035	1894.855	1813.888	1762.186	1595.148	1398.53	1119.376	634.481	207.258	7.476	0.8
47.5	3516.86	3522.305	3527.233	3523.771	3511.426	3486.174	3461.476	3452.277	3417.272	3367.267	3289.901	3234.674	3239.704	3045.569	2901.459	2786.808	2601.338	2315.951	1778.581	1123.195	344.911	14.806	0.801
42.5	4309.745	4340.863	4385.1	4396.192	4363.526	4325.003	4303.685	4355.888	4384.992	4395.544	4290.088	4075.915	4060.352	4043.577	3913.34	3453.8	3338.316	3038.631	2179.54	1455.422	438.426	20.202	0.801
37.5	5643.615	5655.724	5668.509	5664.233	5650.392	5602.411	5556.778	5519.954	5493.281	5448.18	5351.197	5183.396	5027.74	4908.346	4695.9	4365.217	3897.96	3647.579	2639.497	1736.082	537.719	25.978	0.801
33	6103.5	6109.138	6112.337	6101.604	6069.432	6043.188	6072.885	6072.66	5984.795	5848.564	5768.428	5724.982	5648.033	5325.644	5097.323	4799.81	4519.311	3900.564	3023.903	1922.648	634.806	30.385	0.801
29	6596.45	6592.299	6580.325	6564.277	6542.737	6504.457	6458.936	6398.181	6341.004	6277.946	6164.332	5975.178	5870.489	5694.285	5324.021	5058.27	4696.836	4132.325	3259.138	2037.499	713.317	34.528	0.801
25.5	6697.965	6691.589	6676.01	6656.448	6631.673	6596.447	6554.057	6504.729	6444.023	6370.356	6265.674	6121.875	5972.998	5784.925	5530.241	5198.562	4806.655	4318.662	3420.19	2125.597	772.179	37.829	0.801
22.5	6775.285	6769.196	6753.794	6734.679	6706.023	6671.681	6632.201	6581.824	6516.347	6442.66	6340.898	6201.317	6047.03	5858.216	5601.078	5284.158	4893.941	4401.199	3527.76	2192.969	816.033	40.407	0.801
19.5	6836.745	6830.85	6816.669	6798.588	6769.391	6734.648	6696.072	6645.043	6580.94	6507.085	6409.244	6275.776	6117.281	5913.531	5668.241	5354.839	4955.212	4464.071	3598.927	2247.144	855.333	42.745	0.801
17	6873.02	6870.403	6859.796	6842.404	6816.738	6782.056	6742.775	6695.927	6633.902	6559.009	6463.356	6331.583	6170.059	5960.886	5713.645	5401.234	5001.843	4508.365	3649.167	2286.585	884.647	44.505	0.801
15	6919.93	6918.842	6908.925	6889.97	6863.488	6828.436	6785.845	6739.874	6681.316	6599.29	6500.99	6369.736	6204.542	5994.488	5744.186	5430.941	5031.293	4545.772	3682.884	2313.746	904.699	45.787	0.801
13	6958.19	6955.495	6946.095	6925.139	6899.331	6859.295	6817.55	6772.977	6704.143	6627.958	6530.907	6396.892	6229.958	6020.522	5768.681	5453.488	5063.111	4576.987	3713.577	2337.415	921.777	46.954	0.801
11	6966.04	6962.65	6954.945	6931.159	6903.076	6864.916	6824.747	6775.702	6713.706	6643.173	6545.284	6406.375	6244.269	6037.926	5785.592	5472.054	5075.884	4601.386	3733.001	2356.236	935.936	49.857	0.801
9	6962.75	6960.025	6949.633	6927.792	6893.659	6858.132	6818.819	6770.323	6711.388	6645.702	6546.377	6406.166	6247.702	6045.869	5804.125	5486.922	5089.324	4618.744	3749.331	2370.189	947.238	50.182	0.801
7	6958.17	6956.79	6945.231	6919.608	6885.056	6851.653	6812.433	6767.047	6712.276	6645.197	6542.95	6399.712	6246.076	6056.741	5810.805	5499.854	5096.408	4628.157	3759.729	2379.256	955.751	50.508	0.801
5	6960.05	6961.998	6948.958	6919.027	6886.936	6850.757	6813.454	6768.259	6712.036	6640.698	6538.781	6405.071	6255.995	6064.355	5815.699	5498.136	5096.641	4629.893	3764.103	2383.435	969.32	50.836	0.801
3	6965.18	6967.527	6947.956	6922.291	6890.632	6853.954	6813.172	6768.219	6713.108	6644.51	6544.705	6408.592	6258.919	6065.219	5813.935	5493.973	5090.701	4625.103	3769.333	2388.166	967.479	51.165	0.801
1	6963.78	6961.416	6948.681	6924.852	6891.866	6854.489	6814.457	6768.795	6712.963	6644.365	6542.817	6405.437	6254.541	6059.873	5806.124	5483.23	5078.397	4613.819	3755.27	2377.765	965.633	51.66	0.801
0	6960.219	6959.92	6945.88	6920.61	6888.35	6850.8	6810.9	6764.72	6708.22	6639.53	6538.815	6400.885	6249.48	6052.99	5798.18	5475.315	5069.805	4605.76	3748.23	2372.56	964.71	51.66	0.801
-1	6953.92	6952.435	6937.569	6915.721	6885.562	6849.429	6810.007	6764.204	6709.085	6641.704	6541.166	6403.944	6252.625	6056.528	5800.711	5477.048	5071.882	4607.689	3752.794	2378.653	962.434	51.489	0.801
-3	6942.34	6937.67	6929.252	6906.005	6876.267	6841.013	6799.805	6754.709	6701.737	6636.646	6539.961	6404.004	6253.03	6054.939	5797.513	5475.411	5071.048	4606.79	3761.911	2390.829	957.886	51.146	0.801
-5	6932.4	6929.078	6915.986	6899.893	6870.37	6835.669	6799.779	6751.666	6694.893	6626.989	6531.208	6397.094	6245.726	6046.513	5787.813	5467.156	5063.527	4599.629	3751.899	2387.787	953.347	50.804	0.801
-7	6926.2	6922.826	6909.938	6890.742	6865.88	6829.844	6792.15	6747.442	6688.54	6618.116	6516.947	6381.351	6230.719	6030.314	5770.702	5456.452	5049.309	4586.322	3742.88	2385.228	933.839	50.464	0.801
-9	6911.57	6908.858	6894.548	6872.805	6844.526	6813.458	6771.22	6727.011	6672.642	6599.033	6495.839	6359.906	6206.773	6005.654	5751.169	5431.189	5028.296	4566.606	3728.071	2377.665	919.469	50.124	0.801
-11	6872.46	6870.446	6858.092	6837.47	6808.449	6777.158	6739.339	6694.817	6638.068	6567.418	6466.331	6328.912	6172.534	5972.969	5717.445	5404.102	5000.747	4541.003	3707.624	2365.065	902.607	49.787	0.801
-13	6833.4	6830.903	6818.339	6796.73	6766.821	6734.125	6697.285	6655.736	6595.021	6523.462	6425.654	6286.81	6130.011	5934.032	5687.355	5374.351	4973.816	4510.275	3684.884	2347.416	883.25	46.956	0.801
-15	6781.38	6779.525	6765.946	6743.585	6713.995	6677.915	6642.865	6600.281	6546.108	6473.134	6377.342	6239.574	6080.334	5890.531	5652.751	5342.379	4930.914	4474.355	3650.587	2324.71	861.395	45.82	0.801
-17	6719.19	6716.509	6703.639	6683.899	6655.189	6618.57	6583.383	6541.247	6485.512	6417.369	6325.907	6192.221	6033.17	5844.193	5612.217	5305.543	4900.857	4434	3614.234	2296.794	837.045	44.583	0.801
-19.5	6655.89	6651.233	6638.312	6620.548	6593.055	6558.805	6520.252	6477.63	6420.286	6353.394	6263.372	6131.552	5980.978	5789.96	5553.918	5252.547	4859.554	4394.476	3561.252	2253.919	803.113	42.901	0.801
-22.5	6580.51	6576.049	6563.537	6546.888	6520.745	6487.958	6448.85	6401.612	6344.819	6280.12	6185.799	6058.61	5916.722	5738.721	5477.714	5178.909	4806.849	4325.892	3487.561	2193.38	757.788	40.69	0.801
-25.5	6495.785	6491.215	6478.905	6462.283	6440.15	6406.568	6367.454	6321.962	6266.633	6202.332	6113.352	5986.991	5849.944	5671.358	5411.07	5101.192	4728.113	4225.139	3343.951	2109.562	707.111	38.28	0.801
-29	6415	6409.448	6395.629	6379.876	6362.064	6327.878	6284.287	6236.193	6187.384	6125.684	6026.269	5899.182	5722.762	5584.845	5287.733	4964.153	4619.138	4054.737	3143.147	1993.151	640.712	35.233	0.801
-33	6258.92	6256.464	6241.809	6221.012	6194.329	6164.255	6105.019	6051.152	5995.098	5938.903	5821.652	5657.196	5513.371	5372.405	4999.238	4628.951	4374.146	3761.039	2871.309	1828.185	558.181	31.461	0.801
-37.5	5590.245	5596.39	5593.991	5572.848	5545.224	5469.192	5426.508	5379.198	5324.431	5252.976	5136.321	4985.104	4861.126	4711.232	4380.635	4074.769	3796.691	3304.855	2509.784	1560.514	457.224	27.519	0.802
-42.5	4420.98	4427.613	4428.54	4412.589	4379.336	4331.794	4290.264	4284.992	4230.966	4173.549	4079.402	3989.697	3897.384	3745.12	3516.366	3319.191	3054.585	2649.237	2049.716	1203.61	342.658	21.634	0.802
-47.5	3438.475	3443.545	3444.439	3433.143	3409.864	3373.707	3324.82	3301.978	3270.734	3228.31	3160.906	3060.396	2976.945	2859.218	2694.959	2505.294	2253.331	1974.498	1519.663	870.149	245.341	16.072	0.802
-55	1751.4	1760.546	1778.828	1759.495	1741.748	1712.137	1670.796	1640.869	1628.62	1611.042	1574.17												



LUMEN TABULATION

	0	1	3	5	7	9	11	13	15	17	20	23	26	29	33	38	43	48	55	65	75	85	90 Total
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0
75	0.5	1	1	1	1	1	1	1	1	1.3	1.5	1.4	1.5	1.7	1.8	1.7	1.5	1.9	1.5	0.6	0.1	0	0
65	3.83 *	7.76 *	7.81 *	7.78 *	7.71 *	7.58 *	7.40 *	7.24 *	7.13 *	8.81 *	10.38 *	9.84 *	10.53 *	11.18 *	11.64 *	11.11 *	9.16 *	10.29 *	7.6	2.5	0.3	0	0
55	6.54 *	13.14 *	13.15 *	13.07 *	12.94 *	12.75 *	12.55 *	12.31 *	12.02 *	14.63 *	17.07 *	16.37 *	17.78 *	18.68 *	19.20 *	18.63 *	15.39 *	17.02 *	12.59 *	4.2	0.5	0	0
47.5	5.97 *	11.98 *	11.98 *	11.90 *	11.76 *	11.61 *	11.53 *	11.43 *	11.22 *	13.60 *	15.66 *	15.07 *	16.78 *	17.73 *	17.88 *	17.50 *	14.76 *	16.21 *	12.16 *	4.18 *	0.5	0	0
42.5	7.59 *	15.23 *	15.22 *	15.13 *	14.95 *	14.76 *	14.64 *	14.51 *	14.27 *	17.35 *	19.92 *	19.03 *	21.20 *	22.51 *	22.47 *	21.71 *	18.45 *	20.23 *	15.14 *	5.32 *	0.7	0	0
37.5	8.06 *	16.12 *	16.08 *	15.99 *	15.85 *	15.70 *	15.54 *	15.29 *	14.96 *	18.24 *	21.18 *	20.23 *	22.22 *	23.53 *	23.78 *	22.92 *	19.26 *	21.16 *	15.92 *	5.65 *	0.7	0	0
33	7.74 *	15.46 *	15.42 *	15.33 *	15.21 *	15.08 *	14.91 *	14.66 *	14.35 *	17.47 *	20.27 *	19.45 *	21.42 *	22.54 *	22.93 *	22.35 *	18.63 *	20.57 *	15.66 *	5.57 *	0.8	0	0
29	7.08 *	14.15 *	14.10 *	14.02 *	13.90 *	13.75 *	13.56 *	13.34 *	13.10 *	15.95 *	18.42 *	17.65 *	19.51 *	20.56 *	20.90 *	20.43 *	17.08 *	19.11 *	14.62 *	5.20 *	0.7	0	0
25.5	6.15 *	12.29 *	12.24 *	12.16 *	12.06 *	11.94 *	11.78 *	11.60 *	11.38 *	13.87 *	16.07 *	15.38 *	16.99 *	18.01 *	18.34 *	17.92 *	15.05 *	17.00 *	13.09 *	4.67 *	0.7	0	0
22.5	6.22 *	12.41 *	12.36 *	12.29 *	12.18 *	12.06 *	11.90 *	11.72 *	11.50 *	14.02 *	16.25 *	15.55 *	17.17 *	18.23 *	18.59 *	18.15 *	15.30 *	17.40 *	13.47 *	4.85 *	0.7	0	0
19.5	5.22 *	10.42 *	10.38 *	10.32 *	10.23 *	10.13 *	10.00 *	9.85 *	9.66 *	11.79 *	13.67 *	13.08 *	14.43 *	15.33 *	15.65 *	15.27 *	12.90 *	14.72 *	11.44 *	4.16 *	0.6	0	0
17	4.20 *	8.39 *	8.36 *	8.31 *	8.24 *	8.15 *	8.05 *	7.93 *	7.78 *	9.49 *	11.01 *	10.53 *	11.62 *	12.34 *	12.60 *	12.30 *	10.40 *	11.90 *	9.27 *	3.39 *	0.5	0	0
15	4.23 *	8.44 *	8.41 *	8.36 *	8.29 *	8.20 *	8.10 *	7.98 *	7.82 *	9.54 *	11.07 *	10.58 *	11.67 *	12.40 *	12.66 *	12.36 *	10.47 *	11.98 *	9.36 *	3.44 *	0.5	0	0
13	4.24 *	8.47 *	8.44 *	8.39 *	8.32 *	8.23 *	8.13 *	8.00 *	7.85 *	9.58 *	11.10 *	10.61 *	11.71 *	12.44 *	12.71 *	12.41 *	10.52 *	12.05 *	9.42 *	3.48 *	0.5	0	0
11	4.24 *	8.47 *	8.44 *	8.39 *	8.32 *	8.23 *	8.13 *	8.00 *	7.86 *	9.59 *	11.11 *	10.63 *	11.73 *	12.47 *	12.74 *	12.44 *	10.55 *	12.10 *	9.47 *	3.51 *	0.5	0	0
9	4.24 *	8.47 *	8.43 *	8.38 *	8.31 *	8.22 *	8.12 *	8.00 *	7.85 *	9.58 *	11.11 *	10.63 *	11.74 *	12.49 *	12.77 *	12.46 *	10.57 *	12.13 *	9.50 *	3.54 *	0.5	0	0
7	4.24 *	8.47 *	8.43 *	8.38 *	8.30 *	8.22 *	8.11 *	7.99 *	7.85 *	9.58 *	11.10 *	10.63 *	11.75 *	12.50 *	12.77 *	12.47 *	10.58 *	12.14 *	9.51 *	3.56 *	0.6	0	0
5	4.24 *	8.47 *	8.43 *	8.38 *	8.31 *	8.22 *	8.12 *	7.99 *	7.85 *	9.58 *	11.10 *	10.64 *	11.76 *	12.50 *	12.77 *	12.46 *	10.57 *	12.14 *	9.52 *	3.57 *	0.6	0	0
3	4.24 *	8.47 *	8.44 *	8.38 *	8.31 *	8.22 *	8.12 *	7.99 *	7.85 *	9.58 *	11.10 *	10.63 *	11.75 *	12.49 *	12.75 *	12.44 *	10.55 *	12.12 *	9.50 *	3.56 *	0.6	0	0
1	2.12 *	4.23 *	4.22 *	4.19 *	4.15 *	4.11 *	4.06 *	4.00 *	3.92 *	4.79 *	5.55 *	5.31 *	5.87 *	6.24 *	6.36 *	6.21 *	5.26 *	6.04 *	4.73 *	1.78 *	0.3	0	0
0																							



-1	2.12 *	4.23 *	4.21 *	4.19 *	4.15 *	4.11 *	4.06 *	3.99 *	3.92 *	4.79 *	5.55 *	5.31 *	5.87 *	6.23 *	6.36 *	6.20 *	5.26 *	6.04 *	4.73 *	1.78 *	0.3	0	0
-3	4.23 *	8.45 *	8.42 *	8.37 *	8.30 *	8.21 *	8.10 *	7.98 *	7.84 *	9.57 *	11.09 *	10.62 *	11.74 *	12.46 *	12.71 *	12.40 *	10.52 *	12.08 *	9.47 *	3.56 *	0.6	0	0
-5	4.23 *	8.44 *	8.41 *	8.35 *	8.28 *	8.20 *	8.09 *	7.97 *	7.83 *	9.55 *	11.08 *	10.61 *	11.72 *	12.45 *	12.70 *	12.39 *	10.50 *	12.07 *	9.47 *	3.56 *	0.6	0	0
-7	4.22 *	8.43 *	8.40 *	8.35 *	8.28 *	8.19 *	8.09 *	7.96 *	7.82 *	9.53 *	11.05 *	10.58 *	11.69 *	12.42 *	12.67 *	12.36 *	10.48 *	12.03 *	9.44 *	3.54 *	0.6	0	0
-9	4.21 *	8.42 *	8.38 *	8.33 *	8.26 *	8.18 *	8.07 *	7.95 *	7.80 *	9.51 *	11.02 *	10.55 *	11.65 *	12.38 *	12.63 *	12.32 *	10.44 *	11.99 *	9.41 *	3.52 *	0.5	0	0
-11	4.20 *	8.38 *	8.35 *	8.30 *	8.23 *	8.15 *	8.04 *	7.92 *	7.78 *	9.48 *	10.98 *	10.51 *	11.60 *	12.32 *	12.56 *	12.25 *	10.38 *	11.92 *	9.36 *	3.49 *	0.5	0	0
-13	4.17 *	8.34 *	8.31 *	8.26 *	8.19 *	8.10 *	8.00 *	7.88 *	7.73 *	9.43 *	10.92 *	10.45 *	11.53 *	12.24 *	12.49 *	12.18 *	10.32 *	11.84 *	9.29 *	3.46 *	0.5	0	0
-15	4.15 *	8.28 *	8.25 *	8.20 *	8.13 *	8.04 *	7.94 *	7.82 *	7.68 *	9.36 *	10.84 *	10.37 *	11.45 *	12.16 *	12.41 *	12.10 *	10.24 *	11.75 *	9.21 *	3.41 *	0.5	0	0
-17	4.11 *	8.21 *	8.18 *	8.13 *	8.06 *	7.98 *	7.88 *	7.76 *	7.61 *	9.28 *	10.76 *	10.29 *	11.35 *	12.06 *	12.32 *	12.01 *	10.15 *	11.63 *	9.11 *	3.36 *	0.5	0	0
-20	5.09 *	10.17 *	10.13 *	10.07 *	9.99 *	9.88 *	9.75 *	9.60 *	9.42 *	11.49 *	13.33 *	12.75 *	14.06 *	14.94 *	15.26 *	14.89 *	12.58 *	14.37 *	11.22 *	4.12 *	0.6	0	0
-23	6.05 *	12.07 *	12.03 *	11.96 *	11.86 *	11.73 *	11.58 *	11.40 *	11.18 *	13.64 *	15.81 *	15.13 *	16.70 *	17.73 *	18.09 *	17.65 *	14.92 *	16.99 *	13.20 *	4.80 *	0.7	0	0
-26	5.97 *	11.93 *	11.89 *	11.82 *	11.72 *	11.59 *	11.44 *	11.26 *	11.05 *	13.47 *	15.61 *	14.94 *	16.51 *	17.51 *	17.83 *	17.38 *	14.67 *	16.60 *	12.81 *	4.63 *	0.7	0	0
-29	6.88 *	13.74 *	13.68 *	13.61 *	13.50 *	13.35 *	13.17 *	12.96 *	12.72 *	15.51 *	17.97 *	17.20 *	19.00 *	20.12 *	20.41 *	19.86 *	16.71 *	18.69 *	14.31 *	5.14 *	0.7	0	0
-33	7.72 *	15.41 *	15.35 *	15.26 *	15.13 *	14.96 *	14.74 *	14.50 *	14.24 *	17.35 *	20.05 *	19.14 *	21.17 *	22.35 *	22.46 *	21.84 *	18.34 *	20.21 *	15.32 *	5.46 *	0.7	0	0
-38	8.12 *	16.24 *	16.20 *	16.10 *	15.95 *	15.74 *	15.50 *	15.25 *	14.98 *	18.24 *	21.01 *	20.00 *	22.15 *	23.35 *	23.29 *	22.58 *	19.02 *	20.79 *	15.56 *	5.50 *	0.7	0	0
-43	7.63 *	15.29 *	15.27 *	15.18 *	15.02 *	14.81 *	14.63 *	14.43 *	14.15 *	17.23 *	19.87 *	18.98 *	21.01 *	22.16 *	22.21 *	21.56 *	18.17 *	19.87 *	14.73 *	5.12 *	0.7	0	0
-48	5.99 *	12.01 *	12.00 *	11.93 *	11.81 *	11.64 *	11.51 *	11.36 *	11.15 *	13.57 *	15.68 *	15.01 *	16.60 *	17.51 *	17.68 *	17.18 *	14.37 *	15.80 *	11.70 *	4	0.5	0	0
-55	5.94 *	11.95 *	11.96 *	11.89 *	11.76 *	11.56 *	11.37 *	11.21 *	11.03 *	13.46 *	15.52 *	14.77 *	16.27 *	17.22 *	17.41 *	16.75 *	13.92 *	15.46 *	11.59 *	4	0.5	0	0
-65	2.91 *	5.88 *	5.91 *	5.87 *	5.80 *	5.68 *	5.56 *	5.48 *	5.42 *	6.66 *	7.71 *	7.28 *	8.00 *	8.62 *	8.8	8.4	7.1	8.2	6.5	2.5	0.3	0	0
-75	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.8	0.9	0.9	1	1.2	1.3	1.2	1.2	1.6	1.5	0.8	0.1	0	0
-85	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.2	0	0	0
-90	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0	0.1	0	0	0	0	0
Total	199	399	398	395	392	387	382	376	369	451	522	499	551	584	593	577	487	549	422	153	21.8	0.16	8705.44

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	FFLEDL @ 120W / 3000K	Sample ID.	F1
Temperature (°C)	25.4	Humidity (%RH)	54.0

Test Method

The samples were tested according to the ANSI C82.77:2002.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at 25° C ± 1° C. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.00	60	0.976	116.4	0.994	5.02%
276.98	60	0.479	114.8	0.866	16.31%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2020/12/26	2021/12/25
DLF108	Auxiliary Lamp	2020/12/26	2021/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF116	AC Power Source	2020/12/26	2021/12/25
DLF113	Power Meter	2020/12/26	2021/12/25
DLF112	Temperature Recorder	2020/12/26	2021/12/25
DLF114	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF101	Goniophotometer	2020/12/26	2021/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF104	AC Power Source	2020/12/26	2021/12/25
DLF507	DC Power Source	2020/12/26	2021/12/25
DLF102	Power Meter	2020/12/26	2021/12/25
DLF111	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF119	Power Meter	2020/12/26	2021/12/25
DLF031	Temperature data logger	2020/12/26	2021/12/25
DLF022	Digital power meter	2020/12/26	2021/12/25
DLF003	Temperature & Humidity Datalogger	2020/12/26	2021/12/25

***** End of Test Report*****