

Photometric Test Report

Relevant Standards

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

Prepared For

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2021/11/22

Issue Date

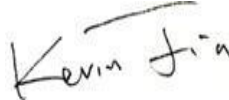
2021/11/23

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		9758
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	128.5
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		76.0
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	2.30%
		20.00%	277V	7.95%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.999
		0.9	277V	0.962
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3045±175	3150
		4 step	3045±100	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		82
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥-40		2
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		97
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-12%
Zonal Lumen Requirement (0°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	85%		99.89%
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		0.634
(Goniophotometer - Section 4.2)		Non-Worst Case		0.278
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		76.0
(Goniophotometer - Section 4.2)		Non-Worst Case		74.0

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/11/22	FFLEDMD @ 80W / 3000K	E1
2	Goniophotometer Test	2021/11/22	FFLEDMD @ 80W / 3000K	E1
3	THD and PF Test	2021/11/22	FFLEDMD @ 80W / 3000K	E1

Remark(If any)

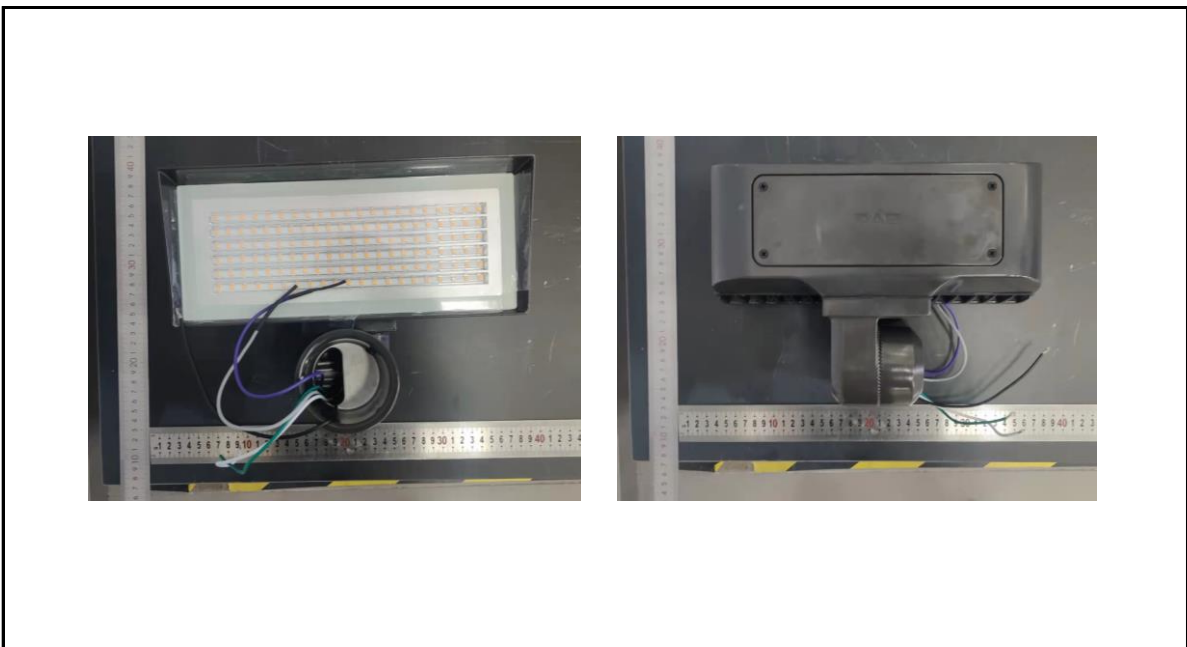
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3.0 Production Description

Luminaire Description: FFLEDMD @ 80W / 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.	FFLED @ 80W / 3000K	Sample ID.	E1
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	0.633	75.9	0.999
276.93	60	0.278	73.9	0.962

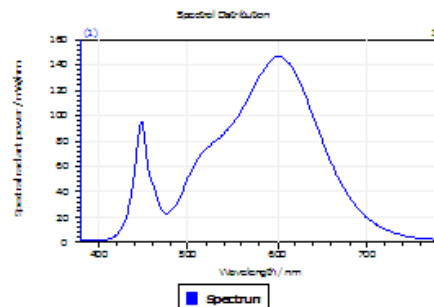
Test Result

CCT (K)	CRI	R9	Duv
3150	82	2	0.000041

Rf	Rg	IES Rcs,h1
84	97	-12%

4.1 Integrating Sphere Test

Results



Spectral values

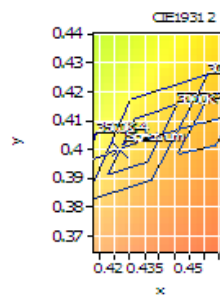
DominantWavelength	582.22 nm
Purity	0.482
PeakWavelength	601.13 nm
Radiant Power	22.06 W
Width50%	134.04 nm

Color Coordinates

Correlated Color Temperatur 3150 K

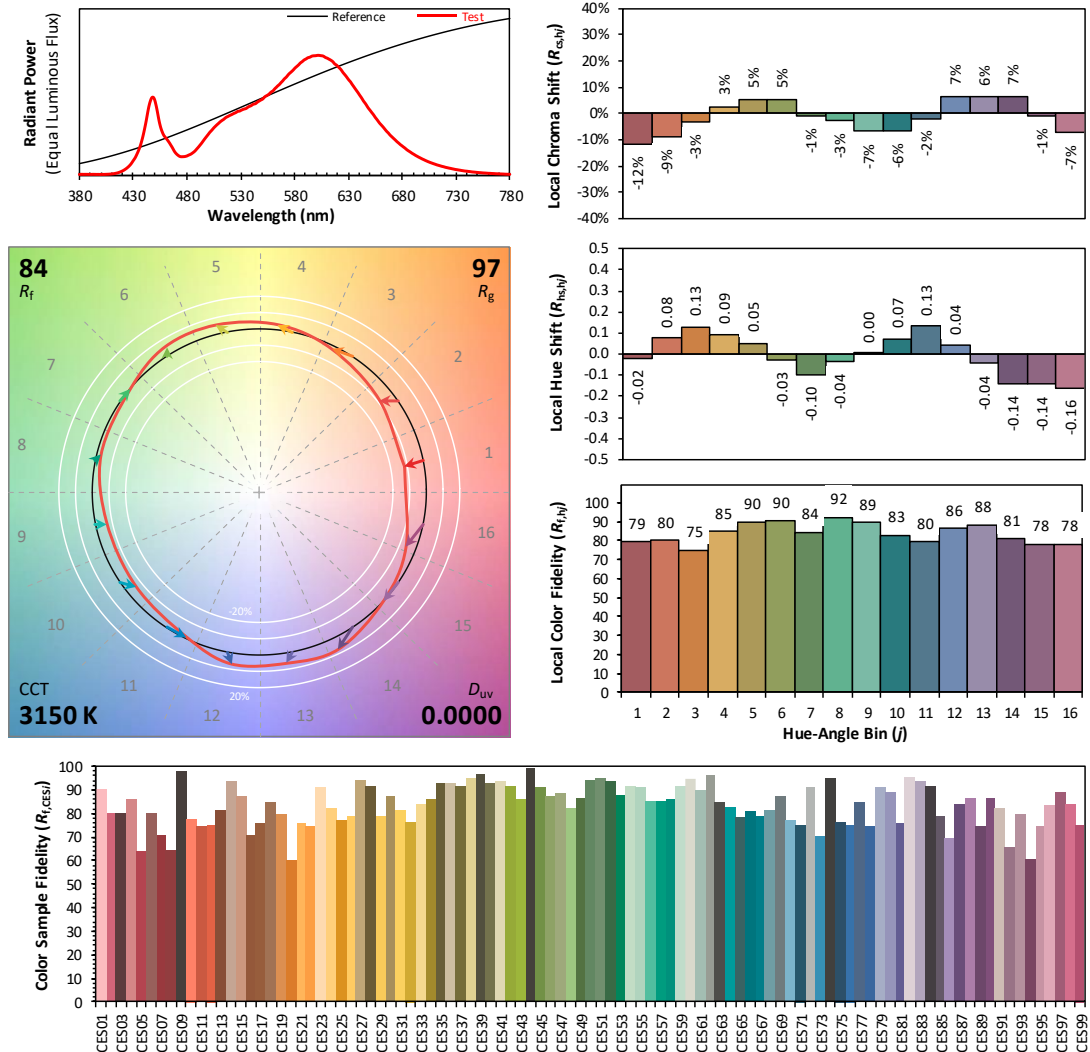
x: 0.4266 u: 0.2456 u': 0.2456
y: 0.4002 v: 0.3455 v': 0.5183

ResultsCRICRI01	79.9	ResultsCRICRI09	2.1
ResultsCRICRI02	89.1	ResultsCRICRI10	75.3
ResultsCRICRI03	96.5	ResultsCRICRI11	80.6
ResultsCRICRI04	80.8	ResultsCRICRI12	69.1
ResultsCRICRI05	80.0	ResultsCRICRI13	82.0
ResultsCRICRI06	86.2	ResultsCRICRI14	98.3
ResultsCRICRI07	83.2	ResultsCRICRI15	72.1
ResultsCRICRI08	58.5	ResultsCRICRI16	70.3
ResultsCRI	81.8		



PlanckDistance 4.1E-005

4.1 Integrating Sphere Test



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

x 0.4266
 y 0.4002
 u' 0.2456
 v' 0.5183

CIE 13.3-1995
 (CRI)

R_a 82
 R_g 2

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.	FFLED @ 80W / 3000K	Sample ID.	E1
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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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	120.00	60	0.634	76.0	0.998
NON-WORST CASE	277.00	60	0.278	74.0	0.961

Test Result

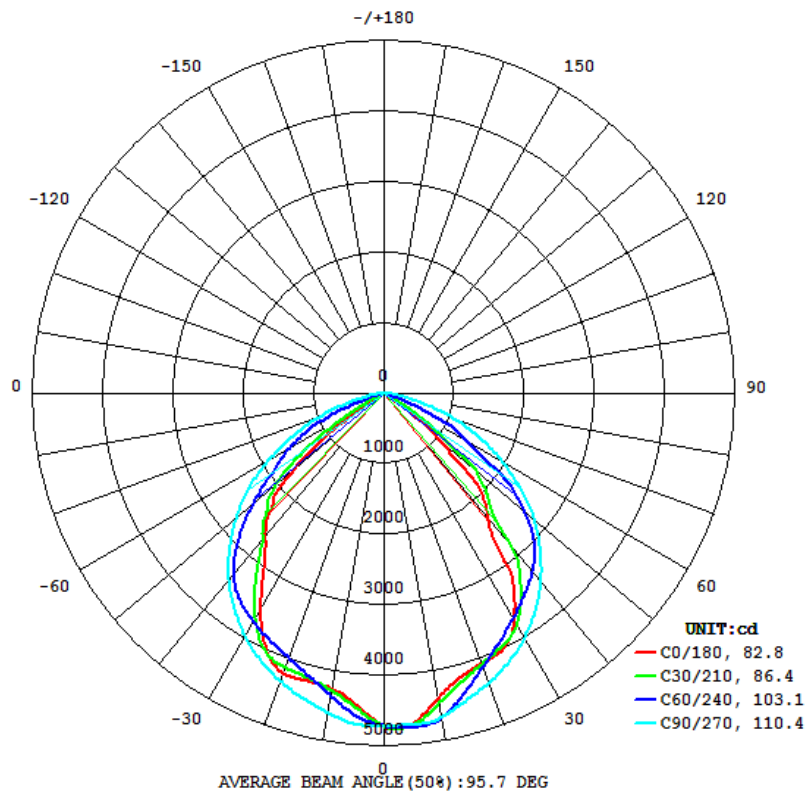
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
9758	111.3	152.0	82.8	110.4	128.5

Zonal Lumen Requirement
(0° - 90°)

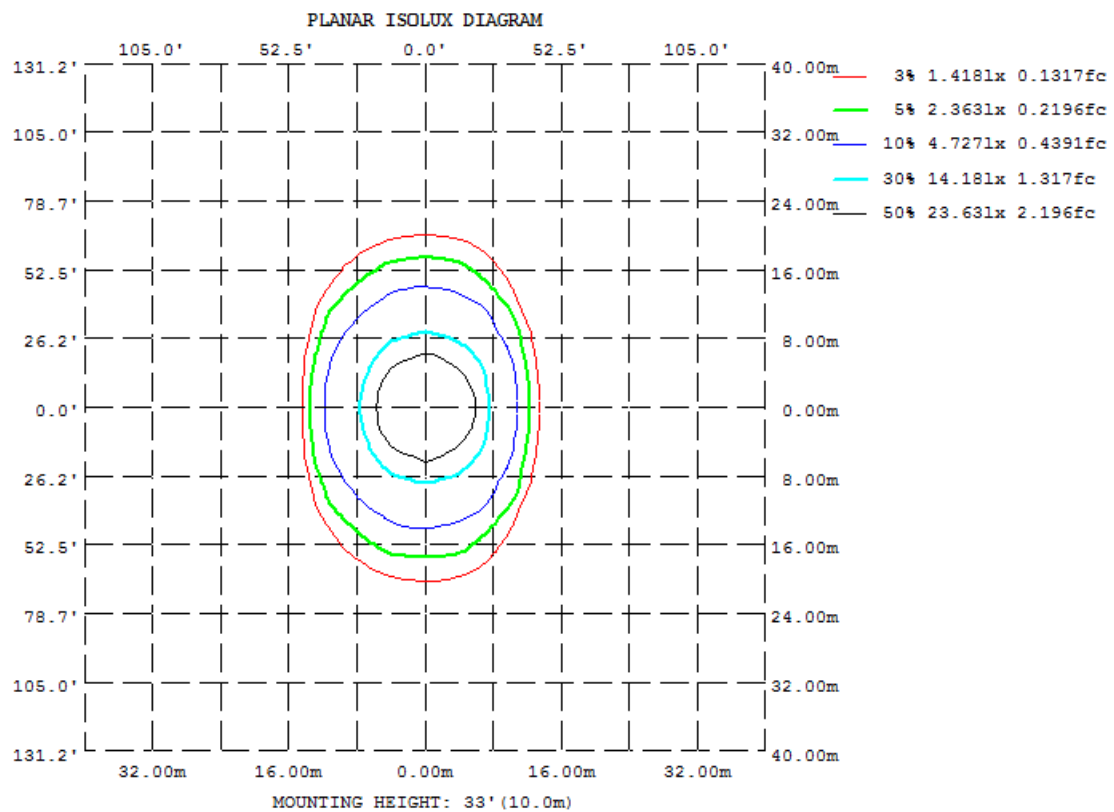
99.89%

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	4405	4575	4667	4338	4261	4301	4598	4538
20	4079	4048	4368	4061	4220	4042	4339	4001
30	3723	3746	4006	3824	3512	3817	3968	3713
40	2320	3213	3488	3013	2641	2989	3440	3199
50	1046	1918	2810	2167	1666	2141	2746	1903
60	62.75	729.6	1959	1182	174.3	1180	1902	736.7
70	5.853	28.94	1047	65.87	43.20	61.44	987.6	28.13
80	1.534	1.196	213.6	20.53	13.50	18.31	189.3	1.480
90	1.244	1.044	0.7901	4.845	1.723	4.211	0.9475	1.249
100	1.147	0.6501	0.6645	1.306	3.661	1.819	1.215	0.5399
110	0.5271	0.7629	1.426	0.8407	0.6364	1.342	2.239	0.7885
120	0.9254	1.078	1.756	1.122	0.7908	1.478	2.430	1.148
130	1.527	1.518	2.174	1.484	1.505	1.991	2.943	1.805
140	2.082	2.093	2.417	1.953	2.384	2.678	3.276	2.512
150	2.629	2.600	2.464	2.453	2.881	2.980	3.340	3.083
160	2.947	2.673	2.544	2.643	3.548	3.252	3.200	3.312
170	2.943	2.636	2.519	2.668	3.290	3.280	2.954	2.943
180	3.365	3.176	3.075	3.234	3.362	3.258	3.091	3.187
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	437.94	0 - 10	437.94	4.49%
10-20	1212.92	0 - 20	1650.86	16.92%
20-30	1835.52	0 - 30	3486.38	35.73%
30-40	2120.35	0 - 40	5606.73	57.46%
40-50	1984.05	0 - 50	7590.78	77.79%
50-60	1374.04	0 - 60	8964.82	91.88%
60-70	609.51	0 - 70	9574.33	98.12%
70-80	160.64	0 - 80	9734.97	99.77%
80-90	11.65	0 - 90	9746.62	99.89%
90-100	1.64	0 - 100	9748.26	99.90%
100-110	1.08	0 - 110	9749.35	99.92%
110-120	1.09	0 - 120	9750.44	99.93%
120-130	1.37	0 - 130	9751.81	99.94%
130-140	1.64	0 - 140	9753.46	99.96%
140-150	1.63	0 - 150	9755.09	99.97%
150-160	1.36	0 - 160	9756.46	99.99%
160-170	0.85	0 - 170	9757.31	100.00%
170-180	0.29	0 - 180	9757.60	100.00%

4.2 Goniophotometer Test

Axial Candela

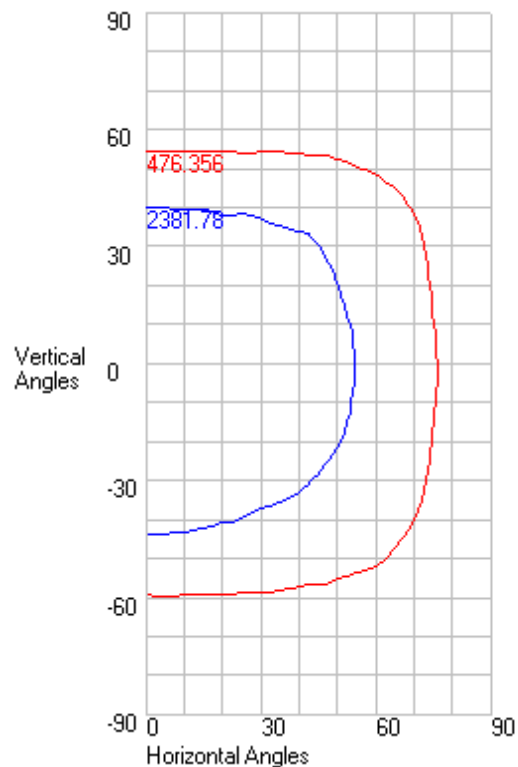
DEG.	HOR.	DEG.	VERT.
90	0.95	90	1.24
85	12.18	85	1.4
75	530.35	75	1.63
65	1438.83	65	26.74
55	2353.7	55	381.5
47.5	2927.535	47.5	1415.08
42.5	3279.83	42.5	2156.535
37.5	3584.195	37.5	2570.175
33	3822.14	33	3429.65
29	4010.96	29	3805.48
25.5	4155.075	25.5	3990.705
22.5	4259.815	22.5	4052.56
19.5	4353.23	19.5	4085.055
17	4424.55	17	4128.2
15	4475.86	15	4178.87
13	4525.27	13	4250.53
11	4569.75	11	4346.01
9	4621.36	9	4465.19
7	4673.35	7	4596.12
5	4707.86	5	4709.06
3	4723.98	3	4763.56
1	4719.5	1	4753.69
0	4716.365	0	4716.365
-1	4712.36	-1	4680.66
-3	4712.9	-3	4566
-5	4714.4	-5	4448.71
-7	4711.27	-7	4347.56
-9	4688.63	-9	4283.22
-11	4638.77	-11	4243.12
-13	4574.28	-13	4226.45
-15	4511.96	-15	4226.08
-17	4452.81	-17	4232.12
-19.5	4382.43	-19.5	4226.67
-22.5	4290.7	-22.5	4141.345
-25.5	4189.49	-25.5	3942.72
-29	4051.86	-29	3616.96
-33	3868.56	-33	3178.62
-37.5	3634.785	-37.5	2780.205
-42.5	3328.895	-42.5	2484.015
-47.5	2987.585	-47.5	2094.44
-55	2406.51	-55	795.12
-65	1513.4	-65	66.19
-75	583.12	-75	24.89
-85	24.12	-85	7.97
-90	0.793	-90	1.707

4.2 Goniophotometer Test

Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	4763.56
Maximum Candela Angle	0 H 3 V
Horizontal Beam Angle (50%)	109.5
Vertical Beam Angle (50%)	83.6
Horizontal Field Angle (10%)	152.7
Vertical Field Angle (10%)	113.7
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	7217
Beam Efficiency	N.A.
Field Lumens	9503
Field Efficiency	N.A.
Spill Lumens	255
Luminaire Lumens	9758
Total Efficiency	N.A.
Total Luminaire Watts	75.9594
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	1.24	1.242	1.246	1.25	1.254	1.258	1.262	1.266	1.27	1.271	1.273	1.275	1.277	1.279	1.274	1.265	1.255	1.24	1.21	1.153	1.08	0.993	0.95
85	1.4	1.402	1.406	1.41	1.414	1.418	1.422	1.421	1.423	1.423	1.422	1.422	1.421	1.42	1.412	1.4	1.381	1.342	1.276	1.181	1.072	0.986	0.95
75	1.63	1.633	1.64	1.647	1.649	1.652	1.653	1.652	1.653	1.659	1.657	1.648	1.633	1.598	1.621	1.603	1.523	1.775	1.444	2.492	1.125	0.982	0.95
65	26.74	26.881	27.161	26.906	26.743	26.504	26.222	25.934	25.85	25.537	25.11	25.012	24.878	24.851	23.322	22.68	24.14	26.726	17.66	29.201	7.529	1.003	0.95
55	381.5	394.295	419.869	423.287	424.122	413.429	389.659	369.563	391.699	408.986	425.216	427.68	353.924	377.936	401.84	372.071	345.219	322.034	210.332	196.662	39.988	1.048	0.95
47.5	1415.08 *	1436.247 *	1466.628 *	1481.563 *	1481.691 *	1471.413 *	1441.274 *	1429.325 *	1437.54 *	1456.601 *	1452.947 *	1368.535 *	1280.832 *	1283.822 *	1274.274 *	1076.564 *	988.521 *	950.361 *	655.957 *	378.698	85.579	1.08	0.95
42.5	2156.535 *	2157.344 *	2155.143 *	2148.129 *	2136.654 *	2119.457 *	2103.176 *	2095.411 *	2068.334 *	2044.803 *	2015.286 *	1994.044 *	1927.422 *	1841.596 *	1742.694 *	1740.638 *	1463.457 *	1292.332 *	1075.037 *	578.49 *	135.231	1.101	0.95
37.5	2570.175 *	2583.95 *	2596.459 *	2583.902 *	2554.02 *	2512.125 *	2550.419 *	2596.08 *	2601.47 *	2533.85 *	2405.53 *	2440.183 *	2488.288 *	2413.072 *	2129.89 *	2133.108 *	2042.616 *	1634.438 *	1358.752 *	817.401 *	198.499	1.122	0.95
33	3429.65 *	3432.632 *	3426.334 *	3410.272 *	3382.996 *	3361.89 *	3335.57 *	3309.179 *	3275.196 *	3231.466 *	3186.139 *	3107.386 *	2983.801 *	2937.377 *	2758.555 *	2506.131 *	2399.899 *	2064.033 *	1579.657 *	982.786 *	258.313	2.862	0.95
29	3805.48 *	3805.391 *	3794.031 *	3774.892 *	3747.649 *	3716.677 *	3684.348 *	3649.778 *	3614.27 *	3565.401 *	3500.448 *	3437.813 *	3362.176 *	3215.54 *	3043.585 *	2877.37 *	2621.097 *	2273.646 *	1759.879 *	1088.972 *	308.747	4.576	0.95
25.5	3990.705 *	3987.315 *	3977.21 *	3962.948 *	3938.769 *	3901.022 *	3860.482 *	3821.609 *	3778.88 *	3728.598 *	3667.012 *	3602.473 *	3504.805 *	3359.014 *	3205.305 *	3052.782 *	2744.653 *	2403.058 *	1913.747 *	1169.619 *	350.043	5.979	0.95
22.5	4052.56 *	4049.24 *	4040.999 *	4031.018 *	4002.219 *	3962.336 *	3922.038 *	3882.346 *	3839.132 *	3792.613 *	3735.272 *	3665.292 *	3567.51 *	3439.199 *	3294.137 *	3114.562 *	2829.898 *	2491.259 *	2035.45 *	1231.27 *	382.168	7.099	0.95
19.5	4085.055 *	4082.749 *	4075.943 *	4065.947 *	4034.219 *	3994.323 *	3951.003 *	3918.024 *	3876.837 *	3829.187 *	3775.143 *	3707.119 *	3611.305 *	3480.707 *	3354.816 *	3167.33 *	2883.858 *	2559.576 *	2097.618 *	1283.006 *	411.281	8.134	0.95
17	4128.2 *	4127.672 *	4120.764 *	4106.101 *	4075.577 *	4035.689 *	3999.813 *	3961.884 *	3916.809 *	3871.638 *	3824.92 *	3748.554 *	3646.058 *	3539.955 *	3409.054 *	3208.879 *	2920.762 *	2603.178 *	2147.449 *	1321.32 *	433.487	8.926	0.95
15	4178.87 *	4179.549 *	4172.101 *	4156.877 *	4129.321 *	4090.907 *	4054.75 *	4010.706 *	3969.712 *	3933.036 *	3876.219 *	3789.725 *	3702.4 *	3604.527 *	3456.415 *	3240.676 *	2945.303 *	2653.656 *	2184.936 *	1347.431 *	449.886	9.509	0.95
13	4250.53 *	4251.879 *	4241.702 *	4230.283 *	4202.237 *	4168.377 *	4124.355 *	4074.846 *	4045.651 *	4003.444 *	3935.287 *	3855.442 *	3786.366 *	3673.033 *	3505.603 *	3272.401 *	2994.756 *	2701.18 *	2221.053 *	1369.525 *	465.029	10.045	0.95
11	4346.01 *	4348.345 *	4333.743 *	4331.459 *	4302.907 *	4262.29 *	4208.222 *	4178.409 *	4136.898 *	4082.823 *	4019.652 *	3956.306 *	3873.273 *	3743.737 *	3556.721 *	3317.44 *	3045.415 *	2745.645 *	2248.755 *	1388.525 *	478.878 *	11.484	0.95
9	4465.19 *	4465.759 *	4451.965 *	4445.179 *	4421.001 *	4370.843 *	4332.679 *	4286.778 *	4235.211 *	4190.177 *	4133.026 *	4057.903 *	3961.86 *	3814.173 *	3618.956 *	3377.341 *	3097.779 *	2787.091 *	2275.366 *	1404.448 *	491.397 *	11.61	0.95
7	4596.12 *	4593.582 *	4585.343 *	4578.435 *	4546.158 *	4501.123 *	4455.045 *	4399.554 *	4350.249 *	4305.342 *	4243.939 *	4157.238 *	4042.53 *	3873.139 *	3671.614 *	3435.476 *	3146.335 *	2825.186 *	2298.943 *	1417.317 *	502.549 *	11.736	0.95
5	4709.06 *	4702.454 *	4702.221 *	4694.7 *	4655.072 *	4606.463 *	4550.557 *	4497.623 *	4453.743 *	4409.636 *	4331.758 *	4211.385 *	4085.431 *	3921.656 *	3722.081 *	3482.167 *	3190.248 *	2859.572 *	2319.216 *	1427.164 *	516.952 *	11.862	0.95
3	4763.56 *	4748.303 *	4757.633 *	4745.981 *	4705.42 *	4655.646 *	4610.051 *	4552.999 *	4493.401 *	4429.97 *	4346.823 *	4235.868 *	4118.525 *	3962.44 *	3766.439 *	3526.848 *	3229.635 *	2889.976 *	2340.531 *	1437.274 *	522.304 *	11.989	0.95
1	4753.69 *	4740.129 *	4748.317 *	4734.386 *	4697.064 *	4642.643 *	4586.807 *	4537.764 *	4484.632 *	4429.087 *	4352.855 *	4253.493 *	4144.435 *	3997.02 *	3805.637 *	3566.364 *	3264.31 *	2916.131 *	2349.307 *	1438.311 *	527.667 *	12.18	0.95
0	4716.365 *	4719.5 *	4723.98 *	4707.86 *	4673.35 *	4621.36 *	4569.75 *	4525.27 *	4475.86 *	4424.55 *	4353.23 *	4259.815 *	4155.075 *	4010.96 *	3822.14 *	3584.195 *	3279.83 *	2927.535 *	2353.7 *	1438.83 *	530.35 *	12.18	0.95
-1	4680.66 *	4677.896 *	4681.315 *	4666.736 *	4628.916 *	4575.784 *	4523.886 *	4477.354 *	4428.018 *	4377.359 *	4307.011 *	4215.667 *	4114.398 *	3975.66 *	3792.583 *	3560.897 *	3264.607 *	2919.741 *	2352.581 *	1436.99 *	529.505 *	12.18	0.95
-3	4566 *	4566.731 *	4566.926 *	4550.822 *	4517.966 *	4469.522 *	4419.643 *	4371.726 *	4324.322 *	4275.591 *	4210.095 *	4123.261 *	4029.356 *	3899.24 *	3727.859 *	3510.816 *	3230.738 *	2900.893 *	2350.346 *	1433.314 *	527.818 *	12.181	0.95
-5	4448.71 *	4456.456 *	4448.987 *	4439.606 *	4405.05 *	4355.051 *	4319.368 *	4273.663 *	4227.616 *	4174.175 *	4106.838 *	4026.479 *	3939.893 *	3818.965 *	3659.518 *	3456.668 *	3192.794 *	2878.055 *	2335.317 *	1420.536 *	526.133 *	12.182	0.95
-7	4347.56 *	4354.896 *	4354.022 *	4342.41 *	4306.362 *	4270.628 *	4220.69 *	4178.753 *	4144.553 *	4103.998 *	4039.518 *	3943.097 *	3844.743 *	3734.778 *	3587.604 *	3401.844 *	3151.367 *	2851.661 *	2321.121 *	1408.005 *	515.357 *	12.183	0.95
-9	4283.22 *	4288.212 *	4287.638 *	4275.491 *	4247.26 *	4199.972 *	4163.388 *	4118.611 *	4066.97 *	4036.961 *	3985.199 *	3905.506 *	3808.136 *	3665.42 *	3516.068 *	3338.726 *	3106.807 *	2821.87 *	2303.263 *	1392.422 *	507.811 *	12.184	0.95
-11	4243.12 *	4247.751 *	4251.132 *	4238.157 *	4208.615 *	4166.161 *	4118.523 *	4085.687 *	4043.783 *	3992.442 *	3935.173 *	3872.36 *	3785.598 *	3655.851 *	3473.423 *	3276.288 *	3060.293 *	2788.949 *	2281.917 *	1373.745 *	498.859 *	12.184	0.95
-13	4226.45 *	4228.695 *	4231.861 *	4216.188 *	4189.271 *	4151.283 *	4107.616 *	4062.915 *	4028.999 *	3983.677 *	3916.498 *	3841.468 *	3765.741 *	3645.162 *	3471.001 *	3245.836 *	3016.687 *	2753.462 *	2259.024 *	1351.943 *	488.528 *	10.827	0.95
-15	4226.08 *	4227.237 *	4229.962 *	4216.868 *	4185.084 *	4148.415 *	4107.894 *	4065.18 *	4022.925 *	3981.148 *	3918.288 *	3831.65 *	3749.043 *	3634.909 *	3465.066 *	3235.266 *	2970.814 *	2715.782 *	2227.75 *	1326.993 *	476.847 *	10.392	0.95
-17	4232.12 *	4232.389 *	4233.307 *	4225.197 *	4190.056 *	4152.801 *	4112.567 *	4068.935 *	4024.623 *	3982.649 *	3919.544 *	3828.073 *	3734.846 *	3624.824 *	3454.445 *	3215.653 *	2935.749 *	2676.126 *	2194.759 *	1298.681 *	463.846	9.902	0.95
-19.5	4226.67 *	4226.963 *	4226.442 *	4224.296 *	4185.282 *	4145.614 *	4106.408 *	4056.515 *	4008.704 *	3966.824 *	3908.728 *	3805.025 *	3698.387 *	3592.981 *	3432.217 *	3177.284 *	2877.027 *	2602.091 *	2147.619 *	1258.547 *	445.785	9.215	0.95
-22.5	4141.345 *	4143.574 *	4142.322 *	4135.096 *	4104.157 *	4064.84 *	4023.728 *	3976.94 *	3924.414 *	3876.439 *	3823.71 *	3730.57 *	3606.588 *	3490.963 *	3367.697 *	3104.777 *	2789.743 *	2495.149 *	2082.999 *	1205.321 *	422.153	8.284	0.95
-25.5	3942.72 *	3946.673 *	3946.136 *	3935.099 *	3910.234 *	3877.935 *	3838.132 *	3792.251 *	3742.119 *	3696.914 *	3642.636 *	3568.976 *	3453.309 *	3322.409 *	3187.39 *	2998.843 *	2663.066 *	2369.206 *	1963.258 *	1138.722 *	396.201	7.243	0.95
-29	3616.96 *	3623.347 *	3621.333 *	3608.122 *	3582.515 *	3557.327 *	3526.417 *	3487.55 *	3441.699 *	3398.308 *	3347.592 *	3286.543 *	3191.655 *	3075.638 *	2932.721 *	2774.168 *	2485.63 *	2202.692 *	1817.499 *	1055.355 *	362.462	5.897	0.95
-33	3178.62 *	3184.615 *	3184.053 *	3173.27 *	3150.589 *	3133.243 *	3108.693 *	3080.901 *	3042.304 *	2997.56 *	2961.003 *	2900.36 *	2839.091 *	2714.987 *	2605.481 *	2489.87 *	2240.156 *	1986.71 *	1646.025 *	954.273 *	318.096	4.199	0.95
-37.5	2780.205 *	2779.434 *	2772.852 *	2760.883 *	2748.597 *	2738.035 *	2733.541 *	2710.247 *	2674.495 *	2640.545 *	2599.771 *	2574.718 *	2495.484 *	2382.281 *	2309.379 *	2187.258 *	1976.303 *	1758.06 *	1446.152 *	817.1 *	262.849	2.441	0.95
-42.5	2484.015 *	2481.541 *	2473.934 *	2463.242 *	2450.023 *	2430.713 *	2417.064 *	2408.214 *	2374.651 *	2337.766 *	2286.699 *	2259.358 *	2201.384 *	2111.208 *	2018.115 *	1892.974 *	1709.292 *	1504.537 *	1211.812 *	643.727 *	198.814	2.311	0.95
-47.5	2094.44 *	2095.079 *	2092.069 *	2085.039 *	2076.008 *	2058.661 *	2036.739 *	2016.766 *	1977.938 *	1940.496 *	1915.209 *	1889.359 *	1802.249 *	1698.344 *	1613.5 *	1557.606 *	1320.061 *	1164.93 *	907.051 *	475.73 *	130.646	2.13	0.95
-55	795.12 *	806.945 *	830.58 *	826.436 *	825.038 *	810.331 *	788.22 *	774.839 *	784.679 *	790.937 *	788.187 *	763.324 *	715.218 *	697.885 *	636.953 *	552.509 *	544.874 *	4					

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	0	0	0	0	0	0	0	0	0	0	0	0
75	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0	0	0
65	0.6	1.3	1.4	1.4	1.3	1.3	1.2	1.2	1.3	1.6	1.9	1.7	1.8	2.1	2.3	2.2	1.9	2.1	1.8	0.7	0.1	0	0
55	2.07 *	4.24 *	4.31 *	4.31 *	4.26 *	4.14 *	4.02 *	3.99 *	4.05 *	5.08 *	5.86 *	5.33 *	5.83 *	6.54 *	6.58 *	6.06 *	5.25 *	5.79 *	4.2	1.4	0.1	0	0
47.5	2.73 *	5.49 *	5.51 *	5.49 *	5.43 *	5.34 *	5.25 *	5.18 *	5.13 *	6.32 *	7.29 *	6.85 *	7.50 *	8.05 *	8.20 *	7.70 *	6.32 *	7.13 *	5.20 *	1.6	0.2	0	0
42.5	3.61 *	7.23 *	7.22 *	7.16 *	7.05 *	6.99 *	6.99 *	6.94 *	6.79 *	8.16 *	9.47 *	9.26 *	10.29 *	10.63 *	10.87 *	10.80 *	8.68 *	9.61 *	7.37 *	2.3	0.2	0	0
37.5	4.12 *	8.26 *	8.24 *	8.17 *	8.06 *	7.98 *	7.94 *	7.86 *	7.69 *	9.26 *	10.72 *	10.37 *	11.56 *	12.05 *	12.04 *	11.97 *	9.89 *	10.72 *	8.22 *	2.71 *	0.3	0	0
33	4.41 *	8.82 *	8.78 *	8.72 *	8.62 *	8.51 *	8.37 *	8.22 *	8.04 *	9.78 *	11.32 *	10.79 *	11.88 *	12.52 *	12.57 *	12.19 *	10.12 *	11.04 *	8.34 *	2.82 *	0.3	0	0
29	4.16 *	8.30 *	8.27 *	8.22 *	8.13 *	8.01 *	7.87 *	7.73 *	7.56 *	9.19 *	10.64 *	10.19 *	11.19 *	11.77 *	11.99 *	11.59 *	9.52 *	10.52 *	8.00 *	2.73 *	0.3	0	0
25.5	3.67 *	7.34 *	7.32 *	7.27 *	7.19 *	7.09 *	6.97 *	6.84 *	6.69 *	8.13 *	9.42 *	9.02 *	9.90 *	10.47 *	10.69 *	10.33 *	8.50 *	9.55 *	7.34 *	2.51 *	0.3	0	0
22.5	3.72 *	7.43 *	7.40 *	7.36 *	7.28 *	7.18 *	7.06 *	6.93 *	6.78 *	8.25 *	9.56 *	9.15 *	10.07 *	10.69 *	10.92 *	10.56 *	8.75 *	9.92 *	7.69 *	2.65 *	0.3	0	0
19.5	3.13 *	6.25 *	6.23 *	6.19 *	6.13 *	6.04 *	5.95 *	5.83 *	5.70 *	6.95 *	8.06 *	7.71 *	8.50 *	9.05 *	9.25 *	8.93 *	7.43 *	8.47 *	6.60 *	2.30 *	0.3	0	0
17	2.53 *	5.06 *	5.04 *	5.01 *	4.96 *	4.90 *	4.81 *	4.72 *	4.62 *	5.63 *	6.53 *	6.24 *	6.90 *	7.35 *	7.49 *	7.23 *	6.03 *	6.91 *	5.40 *	1.90 *	0.3	0	0
15	2.57 *	5.13 *	5.11 *	5.08 *	5.04 *	4.97 *	4.88 *	4.79 *	4.69 *	5.72 *	6.62 *	6.34 *	7.03 *	7.47 *	7.58 *	7.31 *	6.12 *	7.03 *	5.49 *	1.94 *	0.3	0	0
13	2.62 *	5.23 *	5.21 *	5.19 *	5.14 *	5.07 *	4.98 *	4.89 *	4.78 *	5.82 *	6.75 *	6.48 *	7.17 *	7.59 *	7.68 *	7.41 *	6.23 *	7.15 *	5.58 *	1.98 *	0.3	0	0
11	2.68 *	5.36 *	5.34 *	5.32 *	5.27 *	5.19 *	5.10 *	5.00 *	4.89 *	5.96 *	6.91 *	6.63 *	7.31 *	7.72 *	7.80 *	7.53 *	6.33 *	7.25 *	5.65 *	2.02 *	0.3	0	0
9	2.76 *	5.51 *	5.49 *	5.46 *	5.41 *	5.33 *	5.24 *	5.13 *	5.02 *	6.12 *	7.09 *	6.78 *	7.45 *	7.85 *	7.93 *	7.66 *	6.43 *	7.35 *	5.71 *	2.04 *	0.3	0	0
7	2.83 *	5.66 *	5.64 *	5.61 *	5.55 *	5.47 *	5.37 *	5.25 *	5.14 *	6.26 *	7.24 *	6.90 *	7.56 *	7.96 *	8.05 *	7.78 *	6.52 *	7.43 *	5.76 *	2.07 *	0.3	0	0
5	2.88 *	5.76 *	5.74 *	5.71 *	5.65 *	5.56 *	5.46 *	5.34 *	5.22 *	6.35 *	7.32 *	6.97 *	7.65 *	8.06 *	8.16 *	7.88 *	6.61 *	7.51 *	5.81 *	2.09 *	0.3	0	0
3	2.90 *	5.78 *	5.77 *	5.73 *	5.67 *	5.59 *	5.48 *	5.36 *	5.24 *	6.37 *	7.35 *	7.01 *	7.72 *	8.15 *	8.26 *	7.98 *	6.68 *	7.58 *	5.85 *	2.11 *	0.3	0	0
1	1.44 *	2.88 *	2.87 *	2.86 *	2.83 *	2.78 *	2.73 *	2.68 *	2.62 *	3.18 *	3.68 *	3.52 *	3.88 *	4.10 *	4.16 *	4.02 *	3.36 *	3.81 *	2.93 *	1.06 *	0.2	0	0
0																							

-1	1.43 *	2.86 *	2.85 *	2.84 *	2.81 *	2.76 *	2.71 *	2.66 *	2.60 *	3.17 *	3.67 *	3.51 *	3.87 *	4.10 *	4.16 *	4.02 *	3.36 *	3.81 *	2.93 *	1.06 *	0.2	0	0
-3	2.81 *	5.62 *	5.61 *	5.57 *	5.52 *	5.44 *	5.34 *	5.23 *	5.12 *	6.23 *	7.21 *	6.91 *	7.62 *	8.08 *	8.22 *	7.97 *	6.68 *	7.59 *	5.85 *	2.11 *	0.3	0	0
-5	2.75 *	5.48 *	5.47 *	5.44 *	5.38 *	5.31 *	5.21 *	5.11 *	5.00 *	6.08 *	7.05 *	6.75 *	7.47 *	7.93 *	8.08 *	7.86 *	6.62 *	7.55 *	5.83 *	2.10 *	0.3	0	0
-7	2.68 *	5.35 *	5.34 *	5.31 *	5.26 *	5.19 *	5.09 *	5.00 *	4.89 *	5.96 *	6.90 *	6.60 *	7.30 *	7.77 *	7.94 *	7.75 *	6.55 *	7.48 *	5.78 *	2.08 *	0.3	0	0
-9	2.63 *	5.25 *	5.24 *	5.21 *	5.16 *	5.09 *	5.00 *	4.90 *	4.80 *	5.86 *	6.79 *	6.49 *	7.16 *	7.61 *	7.79 *	7.62 *	6.46 *	7.42 *	5.73 *	2.05 *	0.3	0	0
-11	2.60 *	5.19 *	5.18 *	5.15 *	5.10 *	5.03 *	4.94 *	4.84 *	4.74 *	5.78 *	6.71 *	6.44 *	7.09 *	7.51 *	7.65 *	7.49 *	6.38 *	7.34 *	5.67 *	2.02 *	0.3	0	0
-13	2.58 *	5.15 *	5.14 *	5.11 *	5.06 *	4.99 *	4.90 *	4.81 *	4.71 *	5.74 *	6.65 *	6.39 *	7.06 *	7.47 *	7.57 *	7.38 *	6.29 *	7.25 *	5.60 *	1.99 *	0.3	0	0
-15	2.57 *	5.14 *	5.13 *	5.10 *	5.05 *	4.98 *	4.89 *	4.80 *	4.70 *	5.72 *	6.63 *	6.35 *	7.03 *	7.45 *	7.54 *	7.30 *	6.20 *	7.16 *	5.52 *	1.96 *	0.3	0	0
-17	2.58 *	5.15 *	5.13 *	5.10 *	5.05 *	4.98 *	4.89 *	4.79 *	4.70 *	5.72 *	6.62 *	6.33 *	7.00 *	7.43 *	7.51 *	7.24 *	6.11 *	7.05 *	5.43 *	1.91 *	0.3	0	0
-20	3.22 *	6.43 *	6.42 *	6.37 *	6.30 *	6.22 *	6.11 *	5.98 *	5.86 *	7.14 *	8.25 *	7.87 *	8.70 *	9.23 *	9.33 *	8.94 *	7.50 *	8.64 *	6.65 *	2.33 *	0.3	0	0
-23	3.82 *	7.64 *	7.62 *	7.57 *	7.48 *	7.38 *	7.25 *	7.10 *	6.94 *	8.46 *	9.78 *	9.31 *	10.25 *	10.91 *	11.03 *	10.51 *	8.74 *	10.05 *	7.74 *	2.68 *	0.4	0	0
-26	3.70 *	7.39 *	7.37 *	7.32 *	7.24 *	7.13 *	7.01 *	6.86 *	6.71 *	8.17 *	9.46 *	9.01 *	9.89 *	10.51 *	10.68 *	10.17 *	8.38 *	9.61 *	7.39 *	2.55 *	0.4	0	0
-29	4.03 *	8.07 *	8.05 *	8.00 *	7.91 *	7.80 *	7.66 *	7.50 *	7.33 *	8.93 *	10.36 *	9.89 *	10.85 *	11.49 *	11.71 *	11.22 *	9.23 *	10.52 *	8.08 *	2.78 *	0.4	0	0
-33	4.14 *	8.30 *	8.28 *	8.22 *	8.13 *	8.03 *	7.90 *	7.74 *	7.56 *	9.21 *	10.69 *	10.23 *	11.25 *	11.89 *	12.16 *	11.74 *	9.68 *	11.03 *	8.47 *	2.91 *	0.4	0	0
-38	4.09 *	8.17 *	8.14 *	8.09 *	8.01 *	7.93 *	7.82 *	7.67 *	7.50 *	9.13 *	10.61 *	10.19 *	11.17 *	11.81 *	12.14 *	11.76 *	9.72 *	11.09 *	8.47 *	2.87 *	0.4	0	0
-43	4.01 *	8.00 *	7.96 *	7.90 *	7.83 *	7.76 *	7.67 *	7.53 *	7.35 *	8.93 *	10.40 *	9.98 *	10.91 *	11.53 *	11.79 *	11.37 *	9.40 *	10.68 *	7.99 *	2.61 *	0.3	0	0
-48	3.49 *	6.96 *	6.93 *	6.88 *	6.81 *	6.72 *	6.63 *	6.50 *	6.33 *	7.68 *	8.93 *	8.52 *	9.27 *	9.72 *	9.92 *	9.47 *	7.71 *	8.68 *	6.33 *	2	0.3	0	0
-55	3.31 *	6.65 *	6.66 *	6.62 *	6.54 *	6.43 *	6.30 *	6.18 *	6.05 *	7.37 *	8.54 *	8.08 *	8.78 *	9.29 *	9.51 *	8.97 *	7.33 *	8.27 *	6.06 *	1.9	0.2	0	0
-65	1.3	2.7	2.7	2.7	2.7	2.6	2.5	2.5	2.5	3.1	3.6	3.3	3.7	4.1	4.1	3.9	3.4	4	3.2	1.2	0.1	0	0
-75	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.7	0.3	0	0	0
-85	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0	0	0
-90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	113	227	227	225	223	220	216	212	208	253	293	280	308	327	332	321	267	303	233	80.7	10.6	0.04	4879.17

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	FFLED @ 80W / 3000K	Sample ID.	E1
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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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	0.633	75.9	0.999	2.30%
276.93	60	0.278	73.9	0.962	7.95%

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*****