

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF2111116**

## Report Number

**DLF2111116 -3a**

## Test Date

**2021/11/18**

## Issue Date

**2021/11/22**

## 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		10440
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	135.5
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		77.0
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	2.32%
		20.00%	277V	7.86%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.999
		0.9	277V	0.963
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4122
		4 step	3985±154	
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		83
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		96
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-13%
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		0.643
(Goniophotometer - Section 4.2)		Non-Worst Case		0.283
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		77.0
(Goniophotometer - Section 4.2)		Non-Worst Case		75.4

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/11/18	FFLEDMD @ 80W / 4000K	C1
2	Goniophotometer Test	2021/11/18	FFLEDMD @ 80W / 4000K	C1
3	THD and PF Test	2021/11/18	FFLEDMD @ 80W / 4000K	C1

### Remark(If any)

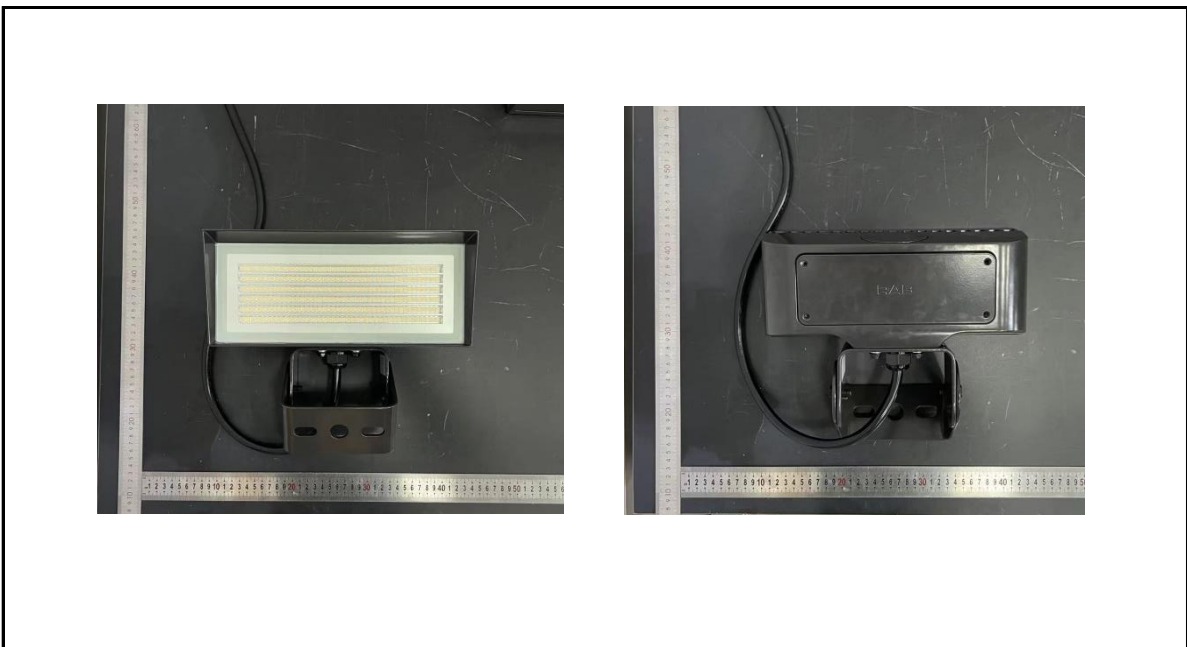
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## 3.0 Production Description

**Luminaire Description:** FFLEDMD @ 80W / 4000K

**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 / 4000K	Sample ID.	C1
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  $\pm 0.2$  percent under load.

The sample was measured using  $4\pi$  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
119.99	60	0.641	76.8	0.999
276.95	60	0.281	74.8	0.963

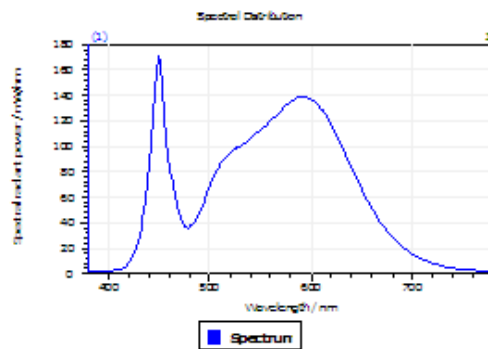
#### Test Result

CCT (K)	CRI	R9	Duv
4122	82	2	0.00039

Rf	Rg	IES Rcs,h1
83	96	-13%

## 4.1 Integrating Sphere Test

### Results



#### Spectral values

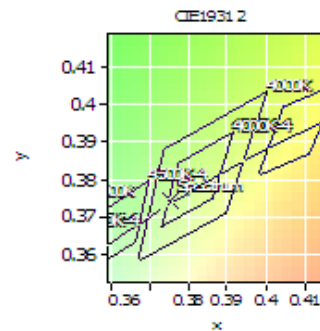
DominantWavelength	578.37 nm
Purity	0.251
PeakWavelength	449.77 nm
Radiant Power	24.22 W
Width50%	19.35 nm

#### Color Coordinates

Correlated Color Temperatur 4122 K

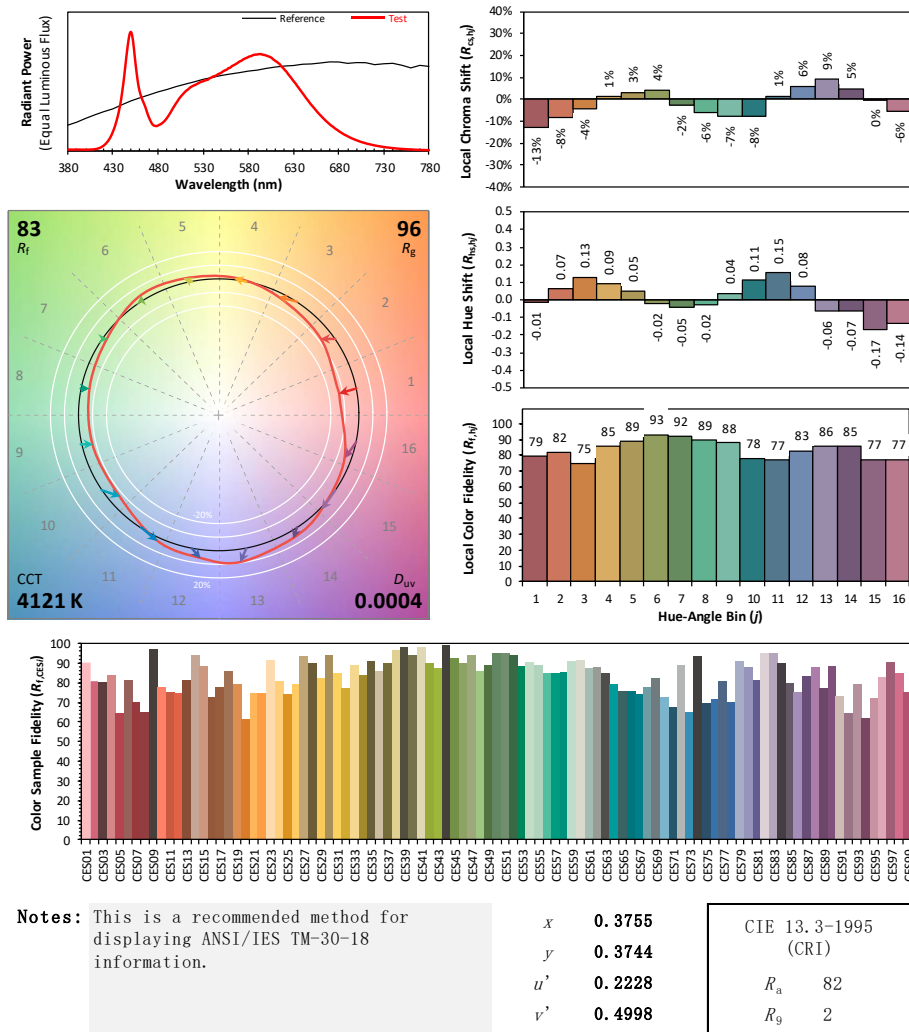
x: 0.3755 u: 0.2228 u': 0.2228  
y: 0.3744 v: 0.3332 v': 0.4998

ResultsCRICRI01	79.7	ResultsCRICRI09	1.5
ResultsCRICRI02	87.6	ResultsCRICRI10	71.2
ResultsCRICRI03	94.0	ResultsCRICRI11	80.4
ResultsCRICRI04	81.3	ResultsCRICRI12	61.5
ResultsCRICRI05	80.3	ResultsCRICRI13	81.5
ResultsCRICRI06	83.3	ResultsCRICRI14	96.8
ResultsCRICRI07	85.0	ResultsCRICRI15	72.7
ResultsCRICRI08	62.5	ResultsCRICRI16	71.1
ResultsCRI	81.7		



PlanckDistance 3.9E-004

## 4.1 Integrating Sphere Test



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 / 4000K	Sample ID.	C1
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  $\pm 0.2$  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  $0.5^{\circ}$  vertical intervals and  $10^{\circ}$  horizontal intervals.

#### Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.00	60	0.643	77.0	0.998
NON-WORST CASE	277.02	60	0.283	75.4	0.962

#### Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
10440	111.3	150.5	85.3	109.5	135.5

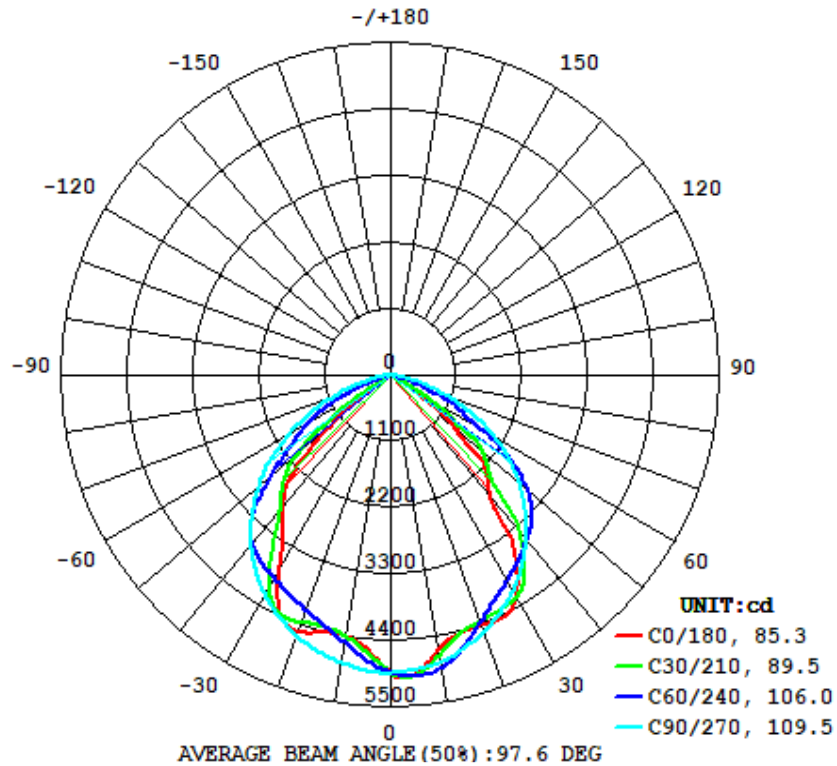
Zonal Lumen Requirement  
( $0^{\circ}$ - $90^{\circ}$ )

99.89%

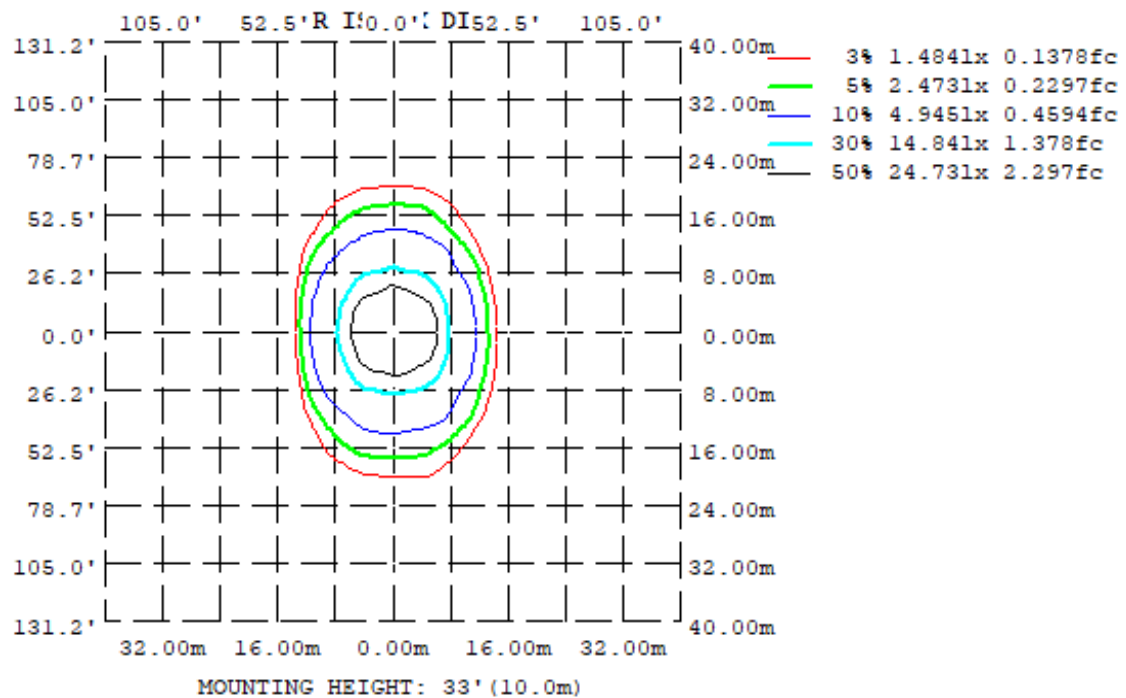


## 4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot





## 4.2 Goniophotometer Test

### Zonal Lumen Summary

$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315
10	4620	4816	4827	4424	4393	4419	4836	4773
20	4409	4285	4532	4276	4536	4222	4611	4268
30	4227	4074	4112	4191	3735	4160	4204	4114
40	2615	3683	3544	3135	2816	3246	3635	3598
50	1518	2206	2832	2301	1444	2292	2890	2089
60	150.0	1125	1986	863.0	85.09	1028	1977	1001
70	6.439	52.74	1000	62.36	43.61	62.07	969.0	27.54
80	0.8915	0.6791	183.2	15.81	12.21	16.14	152.5	0.9386
90	0.4916	0.4234	0.5070	5.478	0.0553	0.3428	0.6276	0.5836
100	0.1596	0.4641	0.6999	0.9125	0.4116	1.439	1.304	0.3529
110	0.4611	0.7541	1.079	0.7948	0.5594	1.239	1.854	0.7182
120	0.8937	1.115	1.418	1.169	1.008	1.638	1.862	1.099
130	1.546	1.560	1.885	1.649	1.709	2.102	2.562	1.761
140	2.149	2.170	2.195	2.165	2.647	2.888	2.830	2.612
150	2.679	2.638	2.345	2.602	3.138	3.243	3.304	3.277
160	3.027	2.758	2.640	2.784	11.53	3.729	3.430	9.435
170	3.082	2.774	2.683	2.847	3.384	3.358	3.127	3.110
180	3.542	3.320	3.226	3.387	3.539	3.418	3.236	3.371
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	456.46	0 - 10	456.46	4.37%
10-20	1272.48	0 - 20	1728.94	16.56%
20-30	1969.30	0 - 30	3698.24	35.42%
30-40	2300.47	0 - 40	5998.71	57.46%
40-50	2154.19	0 - 50	8152.90	78.09%
50-60	1475.19	0 - 60	9628.09	92.22%
60-70	637.65	0 - 70	10265.74	98.33%
70-80	153.92	0 - 80	10419.66	99.81%
80-90	9.01	0 - 90	10428.67	99.89%
90-100	1.36	0 - 100	10430.03	99.91%
100-110	0.83	0 - 110	10430.87	99.91%
110-120	1.04	0 - 120	10431.91	99.92%
120-130	1.38	0 - 130	10433.29	99.94%
130-140	1.69	0 - 140	10434.98	99.95%
140-150	1.70	0 - 150	10436.68	99.97%
150-160	1.80	0 - 160	10438.47	99.99%
160-170	1.05	0 - 170	10439.53	100.00%
170-180	0.30	0 - 180	10439.83	100.00%

## 4.2 Goniophotometer Test

### Axial Candela

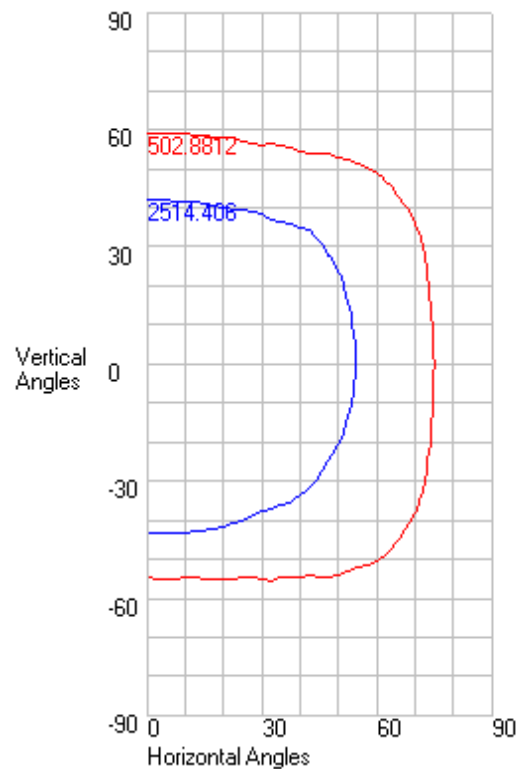
DEG.	HOR.	DEG.	VERT.
90	0.63	90	0.491
85	3.83	85	0.73
75	496.34	75	1.06
65	1472.32	65	29.43
55	2473.21	55	837.17
47.5	3083.785	47.5	2023.79
42.5	3461.655	42.5	2435.48
37.5	3793.45	37.5	3130.965
33	4052.29	33	3918.5
29	4249.75	29	4301.32
25.5	4405.375	25.5	4424.24
22.5	4521.515	22.5	4424.93
19.5	4624.435	19.5	4408.405
17	4690.66	17	4407.57
15	4737.15	15	4428.35
13	4783.03	13	4471.73
11	4819.83	11	4558.68
9	4852.75	9	4693.74
7	4889.99	7	4849.87
5	4920.22	5	4974.77
3	4936.8	3	5022.85
1	4937.34	1	4983.76
0	4928.646	0	4928.646
-1	4919.41	-1	4859.32
-3	4905.04	-3	4706
-5	4894.49	-5	4563.75
-7	4874.72	-7	4467.08
-9	4844.51	-9	4411.45
-11	4804.15	-11	4385.75
-13	4751.01	-13	4389.6
-15	4692.38	-15	4420.5
-17	4629.51	-17	4466.29
-19.5	4547.805	-19.5	4527.16
-22.5	4440.2	-22.5	4511.22
-25.5	4321.085	-25.5	4325
-29	4160.83	-29	3879.75
-33	3957.87	-33	3329.88
-37.5	3700.535	-37.5	2960.325
-42.5	3380.215	-42.5	2620.04
-47.5	3021.685	-47.5	1947.54
-55	2426.78	-55	441.34
-65	1501.86	-65	62.71
-75	538.58	-75	22
-85	12.23	-85	6.16
-90	0.51	-90	0.076

## 4.2 Goniophotometer Test

### Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	5028.812
Maximum Candela Angle	1 H 3 V
Horizontal Beam Angle (50%)	108.4
Vertical Beam Angle (50%)	85.3
Horizontal Field Angle (10%)	150.5
Vertical Field Angle (10%)	113.9
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	7954
Beam Efficiency	N.A.
Field Lumens	10179
Field Efficiency	N.A.
Spill Lumens	262
Luminaire Lumens	10440
Total Efficiency	N.A.
Total Luminaire Watts	77.0368
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	0.491	0.493	0.496	0.5	0.504	0.508	0.512	0.516	0.52	0.524	0.529	0.535	0.541	0.548	0.556	0.565	0.575	0.585	0.6	0.637	0.69	0.65	0.63
85	0.73	0.732	0.736	0.74	0.744	0.748	0.752	0.75	0.752	0.753	0.754	0.754	0.753	0.751	0.747	0.745	0.737	0.722	0.694	0.68	0.703	0.648	0.63
75	1.06	1.064	1.072	1.081	1.079	1.08	1.079	1.075	1.072	1.072	1.068	1.065	1.06	1.037	1.051	1.035	0.98	1.001	0.902	1.029	0.734	0.657	0.63
65	29.43	29.525	29.715	29.488	29.284	28.954	28.501	27.929	27.691	27.318	26.861	26.478	25.706	26.326	23.659	22.276	22.691	24.528	15.244	16.185	3.519	0.688	0.63
55	837.17 *	844.47 *	859.061 *	846.162 *	836.083 *	819.481 *	797.226 *	783.082 *	736.173 *	701.225 *	691.221 *	690.472 *	601.427 *	553.875 *	579.121 *	534.137 *	386.268	398.273	234.924	160.522	23.11	0.725	0.63
47.5	2023.79 *	2030.514 *	2034.006 *	2029.354 *	2022.656 *	1993.454 *	1923.634 *	1850.015 *	1817.645 *	1815.034 *	1827.522 *	1751.175 *	1584.408 *	1568.361 *	1555.783 *	1328.464 *	1188.892 *	1089.001 *	760.859 *	376.768	61.772	0.805	0.63
42.5	2435.48 *	2435.618 *	2432.326 *	2424.109 *	2410.798 *	2394.133 *	2377.938 *	2367.048 *	2338.221 *	2307.509 *	2262.356 *	2235.144 *	2166.994 *	2072.318 *	1939.628 *	1937.716 *	1614.021 *	1421.99 *	1115.257 *	540.67 *	93.791	0.869	0.63
37.5	3130.965 *	3145.125 *	3151.212 *	3133.251 *	3113.295 *	3021.432 *	2970.33 *	2976.644 *	2995.173 *	2949.783 *	2782.918 *	2729.698 *	2764.392 *	2702.314 *	2348.967 *	2349.203 *	2223.504 *	1732.311 *	1495.311 *	756.405 *	159.929	0.937	0.63
33	3918.5 *	3921.923 *	3914.061 *	3894.946 *	3863.235 *	3837.3 *	3800.242 *	3765.971 *	3723.155 *	3670.207 *	3596.385 *	3509.662 *	3387.115 *	3279.258 *	3067.702 *	2780.285 *	2637.791 *	2186.066 *	1735.733 *	978.932 *	217.44	1.389	0.63
29	4301.32 *	4300.13 *	4287.872 *	4269.123 *	4243.922 *	4211.503 *	4176.545 *	4138.226 *	4098.56 *	4038.223 *	3955.181 *	3875.816 *	3786.507 *	3602.186 *	3391.492 *	3210.403 *	2893.215 *	2473.091 *	1939.646 *	1108.309 *	265.385	1.834	0.63
25.5	4424.24 *	4419.492 *	4408.899 *	4396.966 *	4377.468 *	4345.409 *	4310.779 *	4278.421 *	4236.231 *	4179.203 *	4107.45 *	4033.376 *	3916.455 *	3742.284 *	3565.728 *	3392.838 *	3019.188 *	2619.865 *	2112.289 *	1201.356 *	304.742	2.199	0.63
22.5	4424.93 *	4420.207 *	4411.628 *	4403.52 *	4380.483 *	4349.855 *	4320.306 *	4287.017 *	4248.947 *	4204.978 *	4143.019 *	4058.893 *	3944.32 *	3798.875 *	3641.615 *	3424.696 *	3087.583 *	2711.805 *	2252.61 *	1274.163 *	335.953	2.49	0.63
19.5	4408.405 *	4405.145 *	4398.434 *	4391.191 *	4363.669 *	4333.357 *	4301.99 *	4271.104 *	4234.895 *	4194.085 *	4139.325 *	4051.862 *	3943.754 *	3803.35 *	3657.607 *	3438.244 *	3118.979 *	2774.29 *	2301.627 *	1328.854 *	367.979	2.761	0.63
17	4407.57 *	4405.853 *	4401.337 *	4390.628 *	4363.227 *	4329.327 *	4302.109 *	4269.463 *	4229.556 *	4191.839 *	4141.02 *	4050.529 *	3936.044 *	3822.872 *	3671.452 *	3441.472 *	3130.977 *	2806.713 *	2340.356 *	1368.625 *	394.996	2.968	0.63
15	4428.35 *	4427.848 *	4422.43 *	4407.35 *	4380.035 *	4349.466 *	4320.991 *	4283.908 *	4246.806 *	4214.81 *	4155.933 *	4055.954 *	3960.742 *	3855.865 *	3686.565 *	3442.756 *	3131.761 *	2847.963 *	2368.996 *	1395.613 *	414.234	3.12	0.63
13	4471.73 *	4473.07 *	4466.258 *	4451.115 *	4421.094 *	4395.932 *	4360.213 *	4320.513 *	4296.097 *	4255.058 *	4185.184 *	4096.937 *	4021.532 *	3894.927 *	3705.464 *	3442.735 *	3168.682 *	2888.005 *	2396.831 *	1418.392 *	431.404	3.261	0.63
11	4558.68 *	4562.001 *	4549.099 *	4539.015 *	4507.251 *	4475.21 *	4429.963 *	4408.625 *	4369.467 *	4311.682 *	4252.649 *	4186.768 *	4090.48 *	3939.783 *	3726.034 *	3473.191 *	3218.442 *	2926.529 *	2416.207 *	1437.073 *	446.552	3.634	0.63
9	4693.74 *	4701.592 *	4688.382 *	4666.216 *	4637.629 *	4588.562 *	4561.02 *	4522.883 *	4463.358 *	4419.292 *	4369.15 *	4284.192 *	4165.189 *	3989.022 *	3779.733 *	3542.208 *	3270.8 *	2962.761 *	2434.524 *	1451.769 *	459.733	3.669	0.63
7	4849.87 *	4860.048 *	4843.39 *	4821.039 *	4781.922 *	4742.21 *	4702.988 *	4650.086 *	4599.961 *	4552.121 *	4489.59 *	4384.272 *	4240.735 *	4056.981 *	3847.844 *	3610.355 *	3320.341 *	2996.058 *	2449.688 *	1462.609 *	471.003	3.705	0.63
5	4974.77 *	4983.989 *	4967.821 *	4954.871 *	4909.086 *	4866.542 *	4817.855 *	4766.569 *	4722.273 *	4676.403 *	4588.913 *	4448.962 *	4299.981 *	4121.976 *	3914 *	3666.594 *	3366.201 *	3026.005 *	2461.371 *	1469.734 *	485.633	3.74	0.63
3	5022.85 *	5028.812 *	5022.963 *	5004.996 *	4962.362 *	4922.634 *	4890.854 *	4831.153 *	4766.939 *	4700.15 *	4610.808 *	4484.519 *	4348.256 *	4178.554 *	3973.879 *	3721.192 *	3407.941 *	3052.309 *	2474.25 *	1476.925 *	489.91	3.776	0.63
1	4983.76 *	4988.936 *	4985.388 *	4968.211 *	4932.984 *	4888.785 *	4846.813 *	4802.536 *	4750.367 *	4696.883 *	4621.851 *	4511.197 *	4388.151 *	4228.415 *	4028.37 *	3770.688 *	3445.024 *	3074.444 *	2473.557 *	1473.856 *	494.196	3.83	0.63
0	4928.646 *	4937.34 *	4936.8 *	4920.22 *	4889.99 *	4852.75 *	4819.83 *	4783.03 *	4737.15 *	4690.66 *	4624.435 *	4521.515 *	4405.375 *	4249.75 *	4052.29 *	3793.45 *	3461.655 *	3083.785 *	2473.21 *	1472.32 *	496.34	3.83	0.63
-1	4859.32 *	4866.683 *	4866.49 *	4853.164 *	4822.176 *	4785.166 *	4751.72 *	4715.493 *	4671.269 *	4626.245 *	4561.806 *	4463.341 *	4351.124 *	4202.323 *	4011.931 *	3760.82 *	3438.449 *	3070.144 *	2470.911 *	1473.321 *	495.55	3.845	0.63
-3	4706 *	4714.186 *	4708.89 *	4698.161 *	4672.052 *	4641.328 *	4606.075 *	4571.221 *	4531.882 *	4490.168 *	4432.281 *	4342.124 *	4238.335 *	4101.28 *	3925.142 *	3691.816 *	3388.316 *	3039.439 *	2466.318 *	1475.32 *	493.97	3.875	0.63
-5	4563.75 *	4577.159 *	4570.093 *	4558.856 *	4534.422 *	4498.779 *	4479.844 *	4448.021 *	4409.274 *	4357.693 *	4296.752 *	4215.362 *	4120.566 *	3996.194 *	3834.514 *	3618.389 *	3333.827 *	3004.656 *	2448.126 *	1467.131 *	492.394	3.905	0.63
-7	4467.08 *	4473.937 *	4470.268 *	4456.536 *	4424.506 *	4401.953 *	4368.437 *	4337.389 *	4313.364 *	4276.129 *	4215.595 *	4111.496 *	3997.515 *	3887.047 *	3740.151 *	3544.194 *	3275.715 *	2966.377 *	2431.129 *	1459.061 *	481.149	3.935	0.63
-9	4411.45 *	4414.336 *	4410.759 *	4393.101 *	4367.031 *	4329.526 *	4307.658 *	4275.289 *	4224.436 *	4197.839 *	4154.523 *	4070.595 *	3955.784 *	3799.213 *	3646.452 *	3460.447 *	3214.603 *	2925.03 *	2410.634 *	1447.375 *	473.333	3.964	0.63
-11	4385.75 *	4385.621 *	4383.189 *	4363.312 *	4336.203 *	4304.065 *	4268.432 *	4244.791 *	4205.463 *	4154.135 *	4100.183 *	4031.771 *	3934.938 *	3794.555 *	3598.517 *	3377.652 *	3151.524 *	2881.148 *	2386.966 *	1431.955 *	464.016	3.994	0.63
-13	4389.6 *	4386.855 *	4383.685 *	4362.538 *	4331.562 *	4303.487 *	4269.783 *	4231.676 *	4200.557 *	4158.472 *	4089.595 *	3999.347 *	3917.371 *	3792.73 *	3611.385 *	3353.047 *	3091.718 *	2835.399 *	2362.231 *	1412.698 *	453.228	3.658	0.63
-15	4420.5 *	4414.185 *	4406.543 *	4387.732 *	4354.579 *	4321.707 *	4291.107 *	4252.724 *	4212.622 *	4173.803 *	4110.877 *	4005.089 *	3904.495 *	3793.995 *	3624.217 *	3370.358 *	3049.775 *	2787.839 *	2330.632 *	1389.514 *	440.995	3.567	0.63
-17	4466.29 *	4457.641 *	4446.821 *	4431.619 *	4396.979 *	4363.348 *	4330.317 *	4292.205 *	4245.064 *	4203.516 *	4141.771 *	4036.643 *	3914.284 *	3799.478 *	3636.882 *	3381.826 *	3046.677 *	2738.647 *	2298.752 *	1362.311 *	427.35	3.459	0.63
-19.5	4527.16 *	4518.93 *	4505.41 *	4495.382 *	4456.509 *	4421.155 *	4391.553 *	4340.129 *	4289.088 *	4244.313 *	4186.479 *	4066.689 *	3935.371 *	3806.509 *	3651.068 *	3386.155 *	3023.554 *	2685.168 *	2254.821 *	1322.566 *	408.355	3.301	0.63
-22.5	4511.22 *	4506.882 *	4495.582 *	4482.639 *	4450.436 *	4415.295 *	4382.484 *	4344.302 *	4282.255 *	4227.5 *	4168.693 *	4067.818 *	3912.165 *	3758.192 *	3638.384 *	3368.845 *	2970.575 *	2596.323 *	2196.838 *	1268.342 *	384.03	3.076	0.63
-25.5	4325 *	4327.869 *	4324.459 *	4311.282 *	4283.526 *	4255.09 *	4223.849 *	4195.785 *	4143.811 *	4076.283 *	4008 *	3952.258 *	3799.927 *	3610.409 *	3470.7 *	3311.582 *	2862.495 *	2479.527 *	2078.8 *	1195.759 *	357.743	2.814	0.63
-29	3879.75 *	3892.585 *	3897.771 *	3887.311 *	3859.432 *	3846.677 *	3832.267 *	3805.734 *	3764.511 *	3713.725 *	3661.664 *	3612.197 *	3512.335 *	3339.405 *	3193.529 *	3064.052 *	2684.15 *	2314 *	1931.278 *	1104.248 *	323.474	2.463	0.63
-33	3329.88 *	3340.293 *	3347.409 *	3342.595 *	3323.352 *	3313.796 *	3306.184 *	3288.835 *	3254.093 *	3201.848 *	3178.318 *	3143.191 *	3060.36 *	2905.307 *	2831.26 *	2709.648 *	2410.183 *	2100.383 *	1751.667 *	989.371 *	279.479	2.004	0.63
-37.5	2960.325 *	2961.937 *	2960.952 *	2953.929 *	2943.841 *	2922.811 *	2911.81 *	2892.542 *	2862.667 *	2825.763 *	2775.618 *	2745.661 *	2672.557 *	2556.518 *	2463.892 *	2356.739 *	2096.728 *	1848.487 *	1527.709 *	821.985 *	224.364	1.514	0.63
-42.5	2620.04 *	2623.829 *	2626.981 *	2623.996 *	2614.626 *	2595.93 *	2571.18 *	2555.295 *	2527.404 *	2501.755 *	2459.167 *	2396.785 *	2325.153 *	2223.508 *	2128.848 *	1999.866 *	1744.527 *	1540.638 *	1249.865 *	615.468 *	157.804	1.414	0.63
-47.5	1947.54 *	1961.27 *	1979.807 *	1986.885 *	1983.066 *	1967.329 *	1939.702 *	1929.596 *	1917.343 *	1898.871 *	1866.647 *	1816.724 *	1738.811 *	1669.954 *	1612.928 *	1492.355 *	1254.732 *	1124.669 *	876.458 *	442.321	93.974	1.298	0.63
-55	441.34	453.448	477.649	480.617	483.074	477.023	461.889	459.119	487.367	502.699	505.312 *	475.153	424.07	492.075	523.869 *	425.706	422.481	470.604	270.655				

## 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	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	0
75	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	0.3	0.3	0.1	0	0	0	0
65	1.3	2.7	2.7	2.7	2.7	2.6	2.5	2.5	2.4	2.9	3.4	3.2	3.4	3.6	3.8	3.5	2.9	3.2	2.3	0.8	0.1	0	0	0
55	3.28 *	6.60 *	6.61 *	6.58 *	6.52 *	6.38 *	6.20 *	5.99 *	5.79 *	7.08 *	8.33 *	7.82 *	8.30 *	8.85 *	9.16 *	8.46 *	6.86 *	7.73 *	5.4	1.6	0.1	0	0	0
47.5	3.40 *	6.81 *	6.79 *	6.76 *	6.70 *	6.60 *	6.46 *	6.31 *	6.16 *	7.52 *	8.79 *	8.41 *	9.09 *	9.54 *	9.86 *	9.51 *	7.66 *	8.51 *	6.14 *	1.8	0.2	0	0	0
42.5	4.25 *	8.52 *	8.52 *	8.48 *	8.37 *	8.21 *	8.09 *	8.00 *	7.88 *	9.56 *	10.98 *	10.59 *	11.83 *	12.30 *	12.45 *	12.39 *	10.14 *	11.06 *	8.17 *	2.5	0.2	0	0	0
37.5	4.84 *	9.71 *	9.70 *	9.65 *	9.53 *	9.35 *	9.20 *	9.08 *	8.93 *	10.84 *	12.42 *	11.87 *	13.23 *	13.85 *	13.77 *	13.54 *	11.23 *	12.12 *	9.01 *	2.85 *	0.3	0	0	0
33	5.01 *	10.01 *	9.98 *	9.91 *	9.81 *	9.68 *	9.53 *	9.36 *	9.16 *	11.12 *	12.84 *	12.28 *	13.49 *	14.10 *	14.16 *	13.75 *	11.30 *	12.23 *	9.14 *	2.97 *	0.3	0	0	0
29	4.65 *	9.29 *	9.25 *	9.19 *	9.09 *	8.97 *	8.84 *	8.68 *	8.50 *	10.32 *	11.93 *	11.42 *	12.51 *	13.10 *	13.31 *	12.88 *	10.53 *	11.60 *	8.75 *	2.85 *	0.3	0	0	0
25.5	4.04 *	8.07 *	8.04 *	7.99 *	7.91 *	7.80 *	7.69 *	7.56 *	7.40 *	9.00 *	10.42 *	9.96 *	10.92 *	11.51 *	11.73 *	11.33 *	9.31 *	10.46 *	7.98 *	2.61 *	0.3	0	0	0
22.5	4.03 *	8.05 *	8.03 *	7.97 *	7.89 *	7.80 *	7.68 *	7.55 *	7.40 *	9.02 *	10.45 *	9.98 *	10.97 *	11.62 *	11.84 *	11.44 *	9.47 *	10.76 *	8.29 *	2.74 *	0.3	0	0	0
19.5	3.36 *	6.70 *	6.68 *	6.63 *	6.57 *	6.49 *	6.40 *	6.28 *	6.16 *	7.52 *	8.71 *	8.32 *	9.16 *	9.74 *	9.93 *	9.58 *	7.97 *	9.11 *	7.06 *	2.37 *	0.3	0	0	0
17	2.69 *	5.37 *	5.36 *	5.32 *	5.27 *	5.21 *	5.13 *	5.04 *	4.95 *	6.04 *	6.99 *	6.67 *	7.38 *	7.86 *	7.99 *	7.69 *	6.42 *	7.38 *	5.74 *	1.94 *	0.2	0	0	0
15	2.71 *	5.42 *	5.40 *	5.36 *	5.31 *	5.25 *	5.17 *	5.08 *	4.99 *	6.09 *	7.04 *	6.74 *	7.48 *	7.94 *	8.03 *	7.72 *	6.48 *	7.47 *	5.81 *	1.98 *	0.2	0	0	0
13	2.75 *	5.50 *	5.48 *	5.44 *	5.39 *	5.32 *	5.25 *	5.16 *	5.07 *	6.17 *	7.15 *	6.87 *	7.60 *	8.03 *	8.09 *	7.79 *	6.56 *	7.55 *	5.87 *	2.01 *	0.3	0	0	0
11	2.82 *	5.63 *	5.61 *	5.58 *	5.52 *	5.45 *	5.37 *	5.28 *	5.17 *	6.30 *	7.32 *	7.03 *	7.74 *	8.14 *	8.19 *	7.90 *	6.65 *	7.63 *	5.91 *	2.04 *	0.3	0	0	0
9	2.91 *	5.81 *	5.78 *	5.75 *	5.69 *	5.62 *	5.53 *	5.43 *	5.31 *	6.48 *	7.52 *	7.18 *	7.87 *	8.25 *	8.31 *	8.01 *	6.73 *	7.70 *	5.95 *	2.06 *	0.3	0	0	0
7	2.99 *	5.98 *	5.95 *	5.91 *	5.85 *	5.77 *	5.67 *	5.57 *	5.46 *	6.65 *	7.68 *	7.30 *	7.97 *	8.36 *	8.42 *	8.12 *	6.80 *	7.75 *	5.97 *	2.08 *	0.3	0	0	0
5	3.05 *	6.08 *	6.06 *	6.01 *	5.95 *	5.87 *	5.77 *	5.66 *	5.54 *	6.73 *	7.74 *	7.35 *	8.04 *	8.44 *	8.52 *	8.21 *	6.87 *	7.80 *	6.00 *	2.09 *	0.3	0	0	0
3	3.05 *	6.08 *	6.06 *	6.01 *	5.95 *	5.87 *	5.78 *	5.66 *	5.53 *	6.72 *	7.75 *	7.37 *	8.08 *	8.52 *	8.60 *	8.29 *	6.92 *	7.84 *	6.00 *	2.09 *	0.3	0	0	0
1	1.51 *	3.01 *	3.00 *	2.98 *	2.95 *	2.91 *	2.86 *	2.81 *	2.75 *	3.35 *	3.87 *	3.69 *	4.06 *	4.28 *	4.33 *	4.17 *	3.48 *	3.93 *	3.00 *	1.04 *	0.1	0	0	0
0	1.49 *	2.98 *	2.97 *	2.94 *	2.91 *	2.88 *	2.83 *	2.78 *	2.73 *	3.32 *	3.84 *	3.67 *	4.04 *	4.27 *	4.32 *	4.17 *	3.48 *	3.93 *	3.00 *	1.04 *	0.1	0	0	0

-1	2.91 *	5.82 *	5.79 *	5.76 *	5.70 *	5.63 *	5.54 *	5.44 *	5.33 *	6.50 *	7.53 *	7.20 *	7.94 *	8.41 *	8.53 *	8.26 *	6.91 *	7.85 *	5.99 *	2.08 *	0.3	0	0
-3	2.82 *	5.64 *	5.62 *	5.58 *	5.53 *	5.46 *	5.39 *	5.29 *	5.18 *	6.31 *	7.32 *	7.01 *	7.75 *	8.23 *	8.38 *	8.14 *	6.85 *	7.81 *	5.98 *	2.07 *	0.3	0	0
-5	2.75 *	5.50 *	5.47 *	5.44 *	5.39 *	5.33 *	5.25 *	5.16 *	5.06 *	6.17 *	7.14 *	6.83 *	7.55 *	8.04 *	8.22 *	8.02 *	6.78 *	7.77 *	5.95 *	2.06 *	0.3	0	0
-7	2.70 *	5.40 *	5.38 *	5.34 *	5.29 *	5.23 *	5.16 *	5.07 *	4.98 *	6.08 *	7.04 *	6.72 *	7.40 *	7.86 *	8.05 *	7.89 *	6.70 *	7.71 *	5.92 *	2.03 *	0.3	0	0
-9	2.68 *	5.35 *	5.33 *	5.29 *	5.24 *	5.18 *	5.11 *	5.02 *	4.92 *	6.01 *	6.98 *	6.68 *	7.35 *	7.76 *	7.91 *	7.75 *	6.62 *	7.65 *	5.87 *	2.01 *	0.3	0	0
-11	2.67 *	5.33 *	5.31 *	5.28 *	5.23 *	5.17 *	5.09 *	5.01 *	4.91 *	5.98 *	6.94 *	6.66 *	7.35 *	7.76 *	7.85 *	7.65 *	6.53 *	7.58 *	5.82 *	1.97 *	0.3	0	0
-13	2.68 *	5.35 *	5.33 *	5.29 *	5.25 *	5.19 *	5.11 *	5.02 *	4.93 *	6.01 *	6.95 *	6.65 *	7.36 *	7.80 *	7.88 *	7.60 *	6.45 *	7.50 *	5.75 *	1.94 *	0.3	0	0
-15	2.70 *	5.40 *	5.38 *	5.34 *	5.29 *	5.23 *	5.15 *	5.06 *	4.96 *	6.05 *	7.00 *	6.68 *	7.38 *	7.83 *	7.91 *	7.58 *	6.38 *	7.42 *	5.67 *	1.89 *	0.2	0	0
-17	3.42 *	6.83 *	6.80 *	6.75 *	6.69 *	6.61 *	6.51 *	6.39 *	6.26 *	7.64 *	8.82 *	8.40 *	9.25 *	9.82 *	9.91 *	9.44 *	7.87 *	9.12 *	6.95 *	2.29 *	0.3	0	0
-20	4.13 *	8.24 *	8.21 *	8.15 *	8.06 *	7.97 *	7.85 *	7.69 *	7.52 *	9.17 *	10.60 *	10.06 *	11.03 *	11.73 *	11.85 *	11.18 *	9.20 *	10.65 *	8.12 *	2.64 *	0.3	0	0
-23	4.04 *	8.07 *	8.03 *	7.97 *	7.89 *	7.79 *	7.68 *	7.53 *	7.35 *	8.94 *	10.36 *	9.84 *	10.72 *	11.36 *	11.56 *	10.89 *	8.84 *	10.19 *	7.77 *	2.49 *	0.3	0	0
-26	4.38 *	8.76 *	8.73 *	8.65 *	8.56 *	8.46 *	8.34 *	8.19 *	8.00 *	9.72 *	11.29 *	10.77 *	11.72 *	12.36 *	12.65 *	12.01 *	9.71 *	11.14 *	8.46 *	2.70 *	0.3	0	0
-29	4.40 *	8.81 *	8.78 *	8.71 *	8.62 *	8.54 *	8.43 *	8.28 *	8.09 *	9.86 *	11.48 *	10.98 *	11.99 *	12.68 *	13.04 *	12.46 *	10.16 *	11.66 *	8.84 *	2.79 *	0.3	0	0
-33	4.31 *	8.63 *	8.61 *	8.55 *	8.46 *	8.38 *	8.28 *	8.14 *	7.96 *	9.70 *	11.30 *	10.83 *	11.84 *	12.55 *	12.91 *	12.37 *	10.18 *	11.66 *	8.74 *	2.70 *	0.3	0	0
-38	4.25 *	8.50 *	8.47 *	8.42 *	8.34 *	8.23 *	8.12 *	7.99 *	7.83 *	9.53 *	11.04 *	10.54 *	11.54 *	12.18 *	12.41 *	11.80 *	9.67 *	10.95 *	7.97 *	2.4	0.2	0	0
-43	3.48 *	6.99 *	6.98 *	6.94 *	6.86 *	6.75 *	6.64 *	6.54 *	6.42 *	7.81 *	9.00 *	8.52 *	9.30 *	9.81 *	9.90 *	9.23 *	7.50 *	8.34 *	5.90 *	1.7	0.2	0	0
-48	2.74 *	5.54 *	5.58 *	5.55 *	5.48 *	5.35 *	5.24 *	5.18 *	5.14 *	6.30 *	7.22 *	6.71 *	7.39 *	8.05 *	8.05 *	7.44 *	6.32 *	6.89 *	4.9	1.6	0.1	0	0
-55	0.8	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.9	2.2	2	2.3	2.7	2.7	2.6	2.5	2.7	2.1	0.9	0.1	0	0
-65	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.4	0.3	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.2	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	0.2	0.2	0.1	0.2	0.1	0.1	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
-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	122	245	244	242	240	236	233	229	224	273	316	301	331	350	355	341	284	321	243	80	9.34	0.02	5220.1

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

Model No.	FFLED @ 80W / 4000K	Sample ID.	C1
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
119.99	60	0.641	76.8	0.999	2.32%
276.95	60	0.281	74.8	0.963	7.86%



## 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\*\*\*\*\*