

Photometric Test Report

Relevant Standards

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

Prepared For

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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		2515
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	136.3
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		18.4
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	1.32%
		20.00%	277V	19.44%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.995
		0.9	277V	0.798
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3045±175	3116
		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		4
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%		99.89%
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		0.155
(Goniophotometer - Section 4.2)		Non-Worst Case		0.082
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		18.4
(Goniophotometer - Section 4.2)		Non-Worst Case		18.1

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/11/22	FFLEDS @ 18W / 3000K	A1
2	Goniophotometer Test	2021/11/22	FFLEDS @ 18W / 3000K	A1
3	THD and PF Test	2021/11/22	FFLEDS @ 18W / 3000K	A1

Remark(If any)

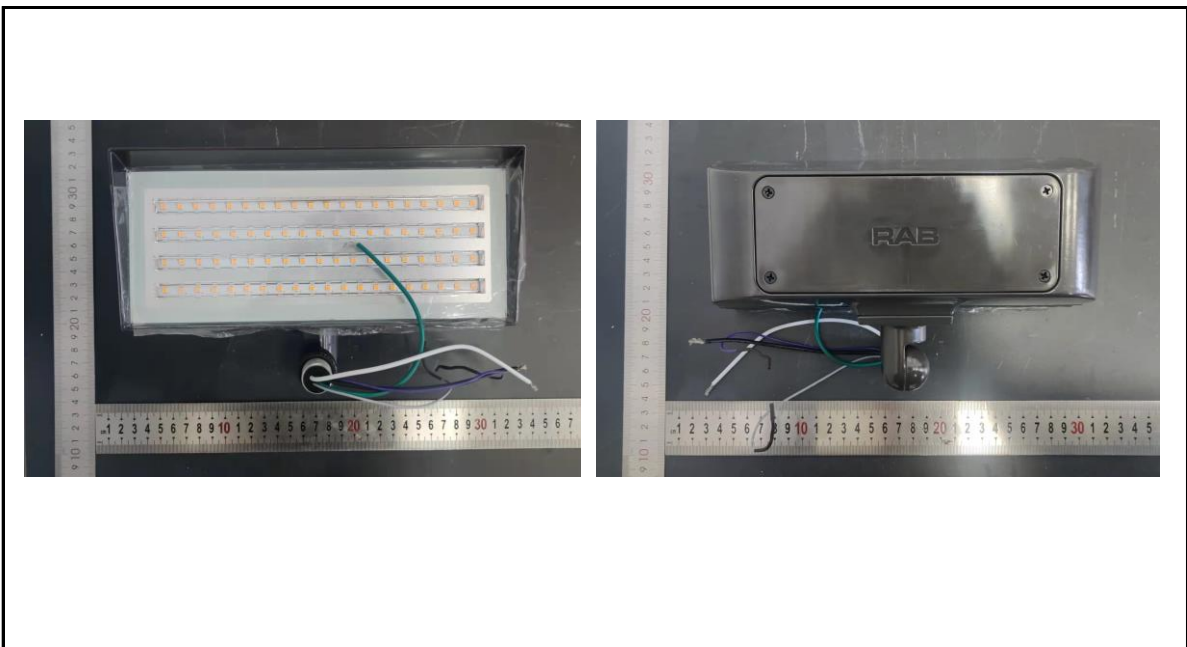
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3.0 Production Description

Luminaire Description: FFLEDS @ 18W / 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.	FFLEDS @ 18W / 3000K	Sample ID.	A1
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
119.99	60	0.155	18.5	0.995
277.02	60	0.082	18.2	0.798

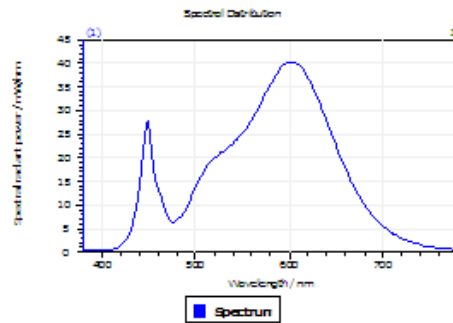
Test Result

CCT (K)	CRI	R9	Duv
3116	82	4	0.0012

Rf	Rg	IES Rcs,h1
84	98	-11%

4.1 Integrating Sphere Test

Results



Spectral values

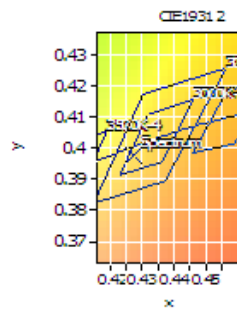
DominantWavelength	582.79 nm
Purity	0.476
PeakWavelength	602.26 nm
Radiant Power	6.06 W
Width50%	132.44 nm

Color Coordinates

Correlated Color Temperatur 3116 K

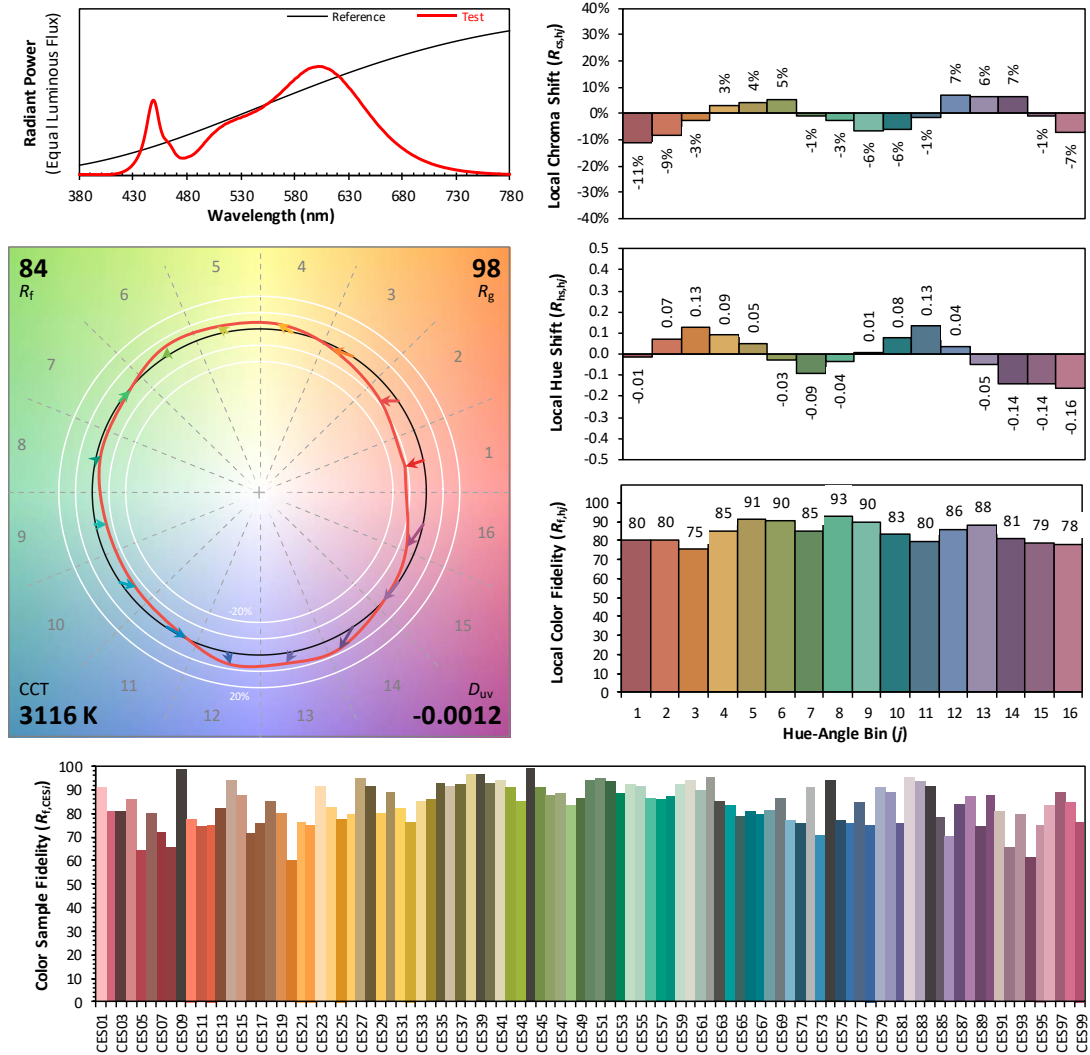
x: 0.4273 u: 0.2471 u': 0.2471
y: 0.3977 v: 0.3449 v': 0.5174

ResultsCRICRI01	80.5	ResultsCRICRI09	4.3
ResultsCRICRI02	89.9	ResultsCRICRI10	77.4
ResultsCRICRI03	96.2	ResultsCRICRI11	81.0
ResultsCRICRI04	81.0	ResultsCRICRI12	71.2
ResultsCRICRI05	81.1	ResultsCRICRI13	82.7
ResultsCRICRI06	88.1	ResultsCRICRI14	98.4
ResultsCRICRI07	82.4	ResultsCRICRI15	72.8
ResultsCRICRI08	58.4	ResultsCRICRI16	70.7
ResultsCRI	82.2		



PlanckDistance 1.2E-003

4.1 Integrating Sphere Test



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

x 0.4273
 y 0.3977
 u' 0.2471
 v' 0.5174

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.	FFLEDS @ 18W / 3000K	Sample ID.	A1
Opreate 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 paramters 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	120.05	60	0.155	18.4	0.993
NON-WORST CASE	277.01	60	0.082	18.1	0.796

Test Result

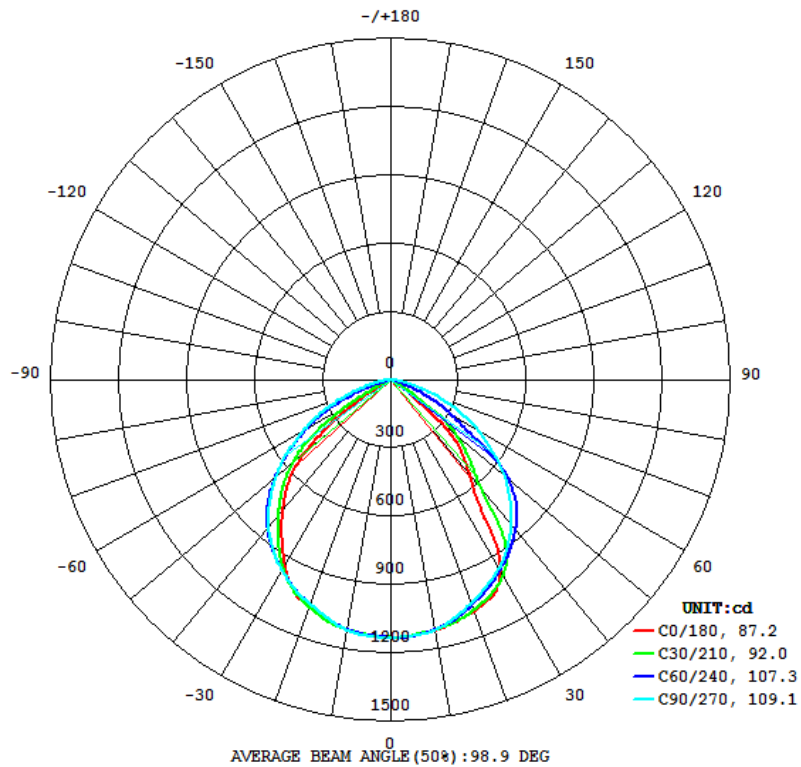
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
2515	113.2	151.0	87.2	109.1	136.3

Zonal Lumen Requirement (0°-90°)

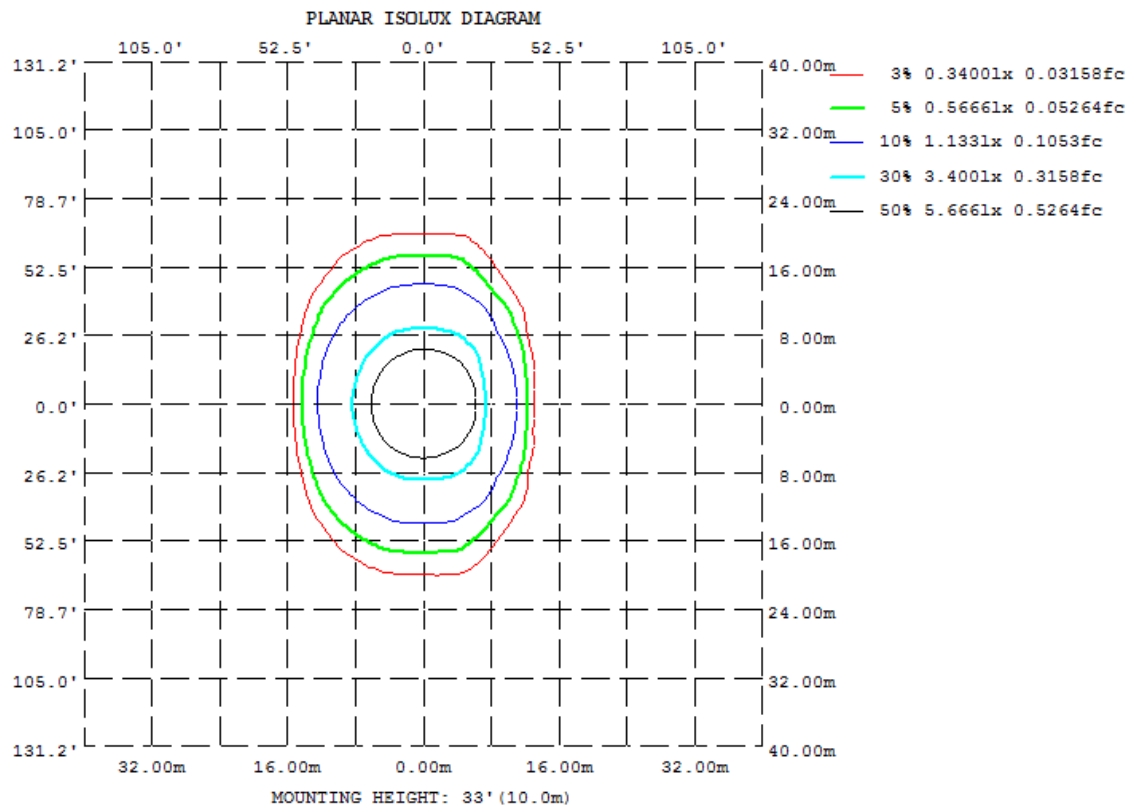
99.89%

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	1119	1116	1116	1115	1115	1115	1117	1121
20	1080	1065	1044	1060	1063	1053	1049	1066
30	974.9	981.0	957.5	962.6	938.5	966.6	964.1	989.6
40	553.1	843.5	832.8	805.7	743.0	812.7	839.8	843.4
50	260.8	458.6	661.3	611.7	501.8	618.0	662.0	454.3
60	20.90	180.6	452.2	344.1	90.31	360.8	451.1	167.6
70	0.9454	6.758	229.5	30.17	17.01	29.89	225.1	5.727
80	0.0152	0.0363	47.31	7.340	5.278	6.738	40.55	0.0198
90	0.0174	0.0593	0.1932	1.651	1.070	1.184	0.0604	0.0210
100	0.0622	0.1343	0.1825	0.4505	1.417	0.4120	0.2478	0.1268
110	0.1563	0.2006	0.2909	0.1703	0.1187	0.2599	0.3819	0.2290
120	0.2652	0.2919	0.3161	0.2888	0.1971	0.3743	0.4057	0.3300
130	0.4187	0.4251	0.4840	0.3913	0.3778	0.4894	0.5946	0.4864
140	0.5521	0.5661	0.5465	0.5004	0.6016	0.6719	0.6964	0.6505
150	0.6762	0.6809	0.5895	0.6261	0.7178	0.7395	0.7766	0.7959
160	0.7391	0.6930	0.6423	0.6769	0.8792	0.8115	0.8102	0.8499
170	0.7410	0.6745	0.6401	0.6863	0.8217	0.8279	0.7526	0.7568
180	0.8486	0.7976	0.7370	0.8347	0.8526	0.8180	0.7752	0.8088
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	107.59	0 - 10	107.59	4.28%
10-20	309.35	0 - 20	416.94	16.58%
20-30	471.80	0 - 30	888.74	35.33%
30-40	548.48	0 - 40	1437.22	57.14%
40-50	513.60	0 - 50	1950.82	77.56%
50-60	359.26	0 - 60	2310.08	91.84%
60-70	158.71	0 - 70	2468.79	98.15%
70-80	40.49	0 - 80	2509.28	99.76%
80-90	3.16	0 - 90	2512.44	99.89%
90-100	0.51	0 - 100	2512.95	99.91%
100-110	0.24	0 - 110	2513.19	99.92%
110-120	0.26	0 - 120	2513.46	99.93%
120-130	0.34	0 - 130	2513.80	99.94%
130-140	0.41	0 - 140	2514.21	99.96%
140-150	0.41	0 - 150	2514.62	99.97%
150-160	0.34	0 - 160	2514.96	99.99%
160-170	0.22	0 - 170	2515.18	100.00%
170-180	0.07	0 - 180	2515.25	100.00%

4.2 Goniophotometer Test

Axial Candela

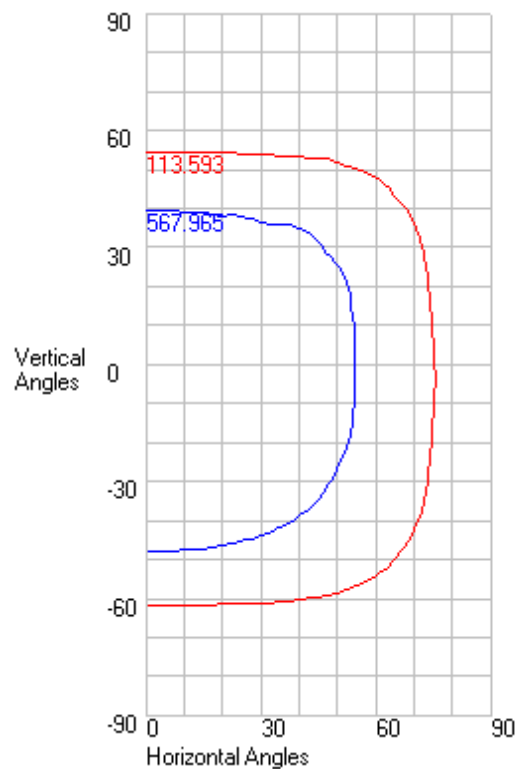
DEG.	HOR.	DEG.	VERT.
90	0.06	90	0.02
85	1.27	85	0.02
75	118.65	75	0.03
65	335.85	65	5.31
55	557.7	55	93.22
47.5	709.24	47.5	376.355
42.5	800.505	42.5	496.405
37.5	875.835	37.5	607.925
33	933.84	33	840.29
29	974.06	29	998.77
25.5	1006.775	25.5	1047.5
22.5	1031.27	22.5	1067.12
19.5	1052.295	19.5	1082.17
17	1069.57	17	1093.58
15	1084.56	15	1101.15
13	1098.7	13	1109.48
11	1112.22	11	1117.14
9	1121.46	9	1120.68
7	1128.04	7	1124.11
5	1130.57	5	1125.76
3	1132.23	3	1132.32
1	1132.86	1	1135.3
0	1133.202	0	1133.202
-1	1132.69	-1	1130.32
-3	1130.11	-3	1127.8
-5	1128	-5	1124.96
-7	1125.21	-7	1121.38
-9	1120.43	-9	1116.86
-11	1112.12	-11	1112.69
-13	1099.23	-13	1103.1
-15	1083.87	-15	1091.21
-17	1067.61	-17	1080.14
-19.5	1047.455	-19.5	1065.76
-22.5	1024.47	-22.5	1045.08
-25.5	998.96	-25.5	1012.785
-29	966.35	-29	956.54
-33	925.16	-33	878.49
-37.5	868.265	-37.5	791.265
-42.5	793.245	-42.5	693.45
-47.5	705.005	-47.5	578.72
-55	556.93	-55	285.72
-65	340.77	-65	24.88
-75	127.19	-75	9.57
-85	5.19	-85	3.03
-90	0.191	-90	1.06

4.2 Goniophotometer Test

Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	1135.93
Maximum Candela Angle	1 H 1 V
Horizontal Beam Angle (50%)	109
Vertical Beam Angle (50%)	87.2
Horizontal Field Angle (10%)	151.4
Vertical Field Angle (10%)	116.1
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	1953
Beam Efficiency	N.A.
Field Lumens	2472
Field Efficiency	N.A.
Spill Lumens	43
Luminaire Lumens	2515
Total Efficiency	N.A.
Total Luminaire Watts	18.4485
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	0.02	0.019	0.018	0.017	0.015	0.014	0.013	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.012	0.015	0.018	0.022	0.027	0.033	0.04	0.053	0.06
85	0.02	0.019	0.018	0.017	0.015	0.014	0.013	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.013	0.017	0.02	0.023	0.03	0.052	0.06
75	0.03	0.03	0.03	0.03	0.029	0.028	0.027	0.026	0.027	0.033	0.035	0.035	0.035	0.032	0.058	0.045	0.029	0.089	0.053	0.232	0.034	0.054	0.06
65	5.31	5.341	5.403	5.389	5.379	5.343	5.283	5.199	5.202	5.22	5.207	5.133	4.96	5.265	4.994	4.525	4.553	6.221	3.305	5.418	1.215	0.069	0.06
55	93.22	94.465	96.954	96.479	96.074	94.664	92.235	91.334	92.859	92.337	89.632	85.189	80.781	90.673	79.519	68.392	74.399	76.497	38.383	39.286	6.824	0.098	0.06
47.5	376.355 *	378.117 *	380.24 *	380.589 *	379.283 *	375.892 *	370.386 *	367.682 *	364.159 *	359.911 *	349.968 *	341.373 *	330.224 *	306.84 *	288.418 *	274.133 *	221.64 *	199.335 *	154.893 *	82.467	16.835	0.117	0.06
42.5	496.405 *	497.846 *	499.402 *	499.067 *	496.708 *	493.206 *	489.808 *	489.532 *	485.071 *	480.327 *	469.269 *	459.479 *	447.056 *	431.484 *	408.832 *	392.898 *	336.007 *	290.609 *	243.66 *	118.798 *	30.251	0.129	0.06
37.5	607.925 *	610.26 *	612.795 *	611.912 *	608.825 *	602.315 *	608.114 *	608.177 *	598.803 *	586.917 *	571.548 *	592.439 *	583.886 *	538.559 *	516.602 *	527.93 *	463.453 *	370.273 *	318.231 *	170.923 *	43.593	0.142	0.06
33	840.29 *	847.234 *	853.57 *	854.498 *	849.657 *	845.58 *	833.062 *	827.565 *	821.961 *	810.252 *	780.582 *	758.964 *	760.76 *	730.468 *	655.238 *	637.766 *	604.718 *	462.748 *	382.078 *	223.478 *	55.401	0.319	0.06
29	998.77 *	1000.946 *	1002.049 *	1000.885 *	997.355 *	989.387 *	980.351 *	969.821 *	959.024 *	945.143 *	925.964 *	905.163 *	887.284 *	850.308 *	785.284 *	744.392 *	681.447 *	553.602 *	435.86 *	256.914 *	65.612	0.494	0.06
25.5	1047.5 *	1048.523 *	1049.702 *	1049.775 *	1047.308 *	1039.288 *	1029.134 *	1018.688 *	1006.714 *	992.713 *	974.55 *	955.916 *	932.081 *	893.549 *	850.463 *	809.308 *	717.06 *	612.285 *	481.648 *	278.285 *	75.199	0.636	0.06
22.5	1067.12 *	1068.011 *	1069.16 *	1069.625 *	1065.815 *	1058.814 *	1050.435 *	1039.15 *	1026.432 *	1013.123 *	996.053 *	975.133 *	950.99 *	919.34 *	879.376 *	825.762 *	743.799 *	645.227 *	517.96 *	293.706 *	82.803	0.75	0.06
19.5	1082.17 *	1083.066 *	1084.152 *	1084.298 *	1080.463 *	1074.851 *	1067.125 *	1053.916 *	1040.026 *	1025.838 *	1009.221 *	988.337 *	964.65 *	933.215 *	892.786 *	838.298 *	759.505 *	667.066 *	528.855 *	306.493 *	89.76	0.856	0.06
17	1093.58 *	1094.441 *	1095.263 *	1094.882 *	1091.439 *	1086.638 *	1077.368 *	1063.906 *	1049.249 *	1034.924 *	1018.7 *	997.383 *	973.707 *	942.928 *	901.559 *	846.713 *	770.594 *	680.628 *	536.989 *	315.629 *	95.035	0.936	0.06
15	1101.15 *	1102.251 *	1103.106 *	1102.024 *	1099.479 *	1094.196 *	1083.579 *	1071.145 *	1057.074 *	1042.86 *	1025.771 *	1003.792 *	979.929 *	949.759 *	907.714 *	852.14 *	777.108 *	688.923 *	542.905 *	321.638 *	98.941	0.995	0.06
13	1109.48 *	1110.302 *	1110.597 *	1109.327 *	1106.814 *	1100.475 *	1090.754 *	1077.465 *	1063.802 *	1049.537 *	1031.942 *	1009.801 *	985.817 *	955.32 *	912.789 *	856.587 *	784.898 *	695.591 *	548.502 *	326.491 *	102.561	1.05	0.06
11	1117.14 *	1117.795 *	1117.899 *	1116.656 *	1113.232 *	1106.534 *	1097.203 *	1083.887 *	1069.22 *	1054.553 *	1037.089 *	1015.534 *	990.941 *	959.708 *	917.43 *	861.333 *	789.436 *	700.474 *	552.489 *	330.358 *	105.886	1.195	0.06
9	1120.68 *	1121.329 *	1121.389 *	1119.67 *	1116.651 *	1111.029 *	1101.704 *	1087.923 *	1073.205 *	1058.767 *	1041.232 *	1019.382 *	995.171 *	963.045 *	923.482 *	866.588 *	794.156 *	704.354 *	555.886 *	333.276 *	108.912	1.208	0.06
7	1124.11 *	1124.583 *	1124.094 *	1122.24 *	1120.807 *	1113.664 *	1105.087 *	1091.929 *	1076.66 *	1061.612 *	1044.072 *	1022.078 *	998.491 *	967.008 *	927.174 *	871.568 *	797.701 *	707.302 *	558.197 *	335.286 *	111.631	1.222	0.06
5	1125.76 *	1127.051 *	1125.871 *	1124.322 *	1122.798 *	1116.442 *	1108.738 *	1095.54 *	1079.027 *	1063.096 *	1046.216 *	1025.636 *	1002.448 *	970.431 *	930.639 *	873.78 *	799.983 *	709.276 *	559.417 *	336.433 *	115.061 *	1.236	0.06
3	1132.32 *	1133.744 *	1132.824 *	1131.344 *	1127.999 *	1121.991 *	1112.104 *	1097.843 *	1081.989 *	1066.621 *	1049.527 *	1028.689 *	1005.11 *	972.765 *	932.905 *	875.494 *	801.108 *	710.127 *	560.761 *	337.566 *	116.495 *	1.249	0.06
1	1135.3 *	1135.93 *	1135.028 *	1133.15 *	1129.577 *	1122.793 *	1113.041 *	1099.282 *	1084.518 *	1069.219 *	1051.685 *	1030.722 *	1006.53 *	974.089 *	934.049 *	876.017 *	801.02 *	709.827 *	558.721 *	336.422 *	117.931 *	1.27	0.06
0	1133.202 *	1132.86 *	1132.23 *	1130.57 *	1128.04 *	1121.46 *	1112.22 *	1098.7 *	1084.56 *	1069.57 *	1052.295 *	1031.27 *	1006.775 *	974.06 *	933.84 *	875.835 *	800.505 *	709.24 *	557.7 *	335.85 *	118.65 *	1.27	0.06
-1	1130.32 *	1129.694 *	1129.191 *	1127.644 *	1125.931 *	1120.081 *	1111.173 *	1097.743 *	1083.4 *	1068.461 *	1051.18 *	1030.339 *	1005.95 *	973.554 *	933.627 *	875.768 *	800.877 *	710.105 *	558.656 *	336.594 *	118.795 *	1.281	0.06
-3	1127.8 *	1127.183 *	1126.548 *	1124.969 *	1122.129 *	1115.894 *	1106.536 *	1093.142 *	1078.796 *	1064.592 *	1047.902 *	1027.49 *	1003.374 *	971.148 *	931.641 *	874.77 *	800.687 *	710.958 *	560.565 *	338.081 *	119.084 *	1.304	0.06
-5	1124.96 *	1124.726 *	1123.204 *	1122.263 *	1118.854 *	1113.178 *	1103.976 *	1089.446 *	1074.434 *	1060.291 *	1043.343 *	1023.489 *	999.57 *	967.706 *	928.546 *	872.655 *	799.306 *	710.653 *	559.174 *	337.394 *	119.372 *	1.326	0.06
-7	1121.38 *	1121.206 *	1119.558 *	1117.959 *	1115.6 *	1109.204 *	1099.658 *	1085.403 *	1070.864 *	1057.398 *	1040.517 *	1018.806 *	994.269 *	963.128 *	924.274 *	870.13 *	796.805 *	709.211 *	557.97 *	336.765 *	117.643 *	1.349	0.06
-9	1116.86 *	1116.631 *	1115.552 *	1113.754 *	1110.81 *	1105.503 *	1095.263 *	1081.196 *	1066.025 *	1053.233 *	1036.601 *	1014.89 *	989.499 *	957.981 *	919.798 *	864.777 *	793.093 *	706.522 *	555.785 *	335.408 *	116.615 *	1.371	0.06
-11	1112.69 *	1112.495 *	1110.844 *	1109.758 *	1106.362 *	1099.354 *	1090.834 *	1076.201 *	1061.324 *	1047.783 *	1031.062 *	1009.569 *	984.002 *	953.038 *	912.608 *	859.172 *	788.27 *	702.392 *	552.654 *	333.312 *	115.261 *	1.393	0.06
-13	1103.1 *	1103.402 *	1102.016 *	1100.064 *	1096.78 *	1090.411 *	1081.191 *	1068.122 *	1053.493 *	1040.183 *	1024.222 *	1002.31 *	977.448 *	946.975 *	905.76 *	852.509 *	783.675 *	696.842 *	549.069 *	330.471 *	113.582	1.271	0.06
-15	1091.21 *	1091.668 *	1091 *	1089.247 *	1086.024 *	1080.531 *	1070.441 *	1057.269 *	1044.103 *	1030.887 *	1015.263 *	993.527 *	969.824 *	939.287 *	898.033 *	844.832 *	774.781 *	689.987 *	543.433 *	326.88 *	111.581	1.245	0.06
-17	1080.14 *	1080.632 *	1080.119 *	1078.477 *	1074.905 *	1069.207 *	1059.212 *	1046.821 *	1033.286 *	1020.244 *	1004.729 *	983.884 *	960.517 *	930.053 *	889.074 *	836.399 *	765.258 *	682.135 *	537.438 *	322.159 *	109.26	1.212	0.06
-19.5	1065.76 *	1066.07 *	1065.803 *	1064.311 *	1060.097 *	1053.519 *	1044.528 *	1032.481 *	1019.666 *	1006.293 *	990.7 *	970.822 *	946.493 *	916.47 *	876.302 *	823.522 *	751.48 *	667.886 *	528.709 *	314.706 *	105.917	1.161	0.06
-22.5	1045.08 *	1045.696 *	1045.905 *	1044.974 *	1040.101 *	1032.133 *	1022.106 *	1010.201 *	997.413 *	985.136 *	970.63 *	950.316 *	924.907 *	894.668 *	857.311 *	804.428 *	732.994 *	647.774 *	516.129 *	304.263 *	100.991	1.084	0.06
-25.5	1012.785 *	1013.807 *	1014.457 *	1013.278 *	1009.223 *	1000.431 *	989.459 *	977.407 *	965.405 *	954.016 *	939.118 *	920.898 *	896.281 *	863.578 *	827.53 *	781.507 *	707.164 *	623.278 *	494.073 *	290.617 *	95.045	0.992	0.06
-29	956.54 *	958.014 *	958.364 *	956.626 *	952.487 *	945.218 *	936.36 *	925.711 *	914.005 *	903.21 *	889.636 *	873.714 *	851.279 *	821.656 *	783.941 *	742.407 *	672.986 *	589.832 *	464.644 *	274.046 *	87.055	0.865	0.06
-33	878.49 *	879.761 *	879.845 *	877.923 *	873.663 *	869.209 *	861.36 *	853.365 *	843.989 *	832.482 *	820.954 *	805.984 *	786.959 *	758.79 *	727.48 *	686.037 *	626.722 *	546.263 *	430.062 *	254.078 *	78.073	0.694	0.06
-37.5	791.265 *	791.927 *	791.959 *	790.281 *	787.917 *	781.889 *	777.09 *	770.89 *	763.44 *	755.119 *	743.068 *	729.68 *	712.173 *	689.203 *	658.421 *	619.071 *	560.209 *	491.678 *	385.994 *	222.103 *	66.828	0.509	0.06
-42.5	693.45 *	694.178 *	694.522 *	693.337 *	690.574 *	686.259 *	681.686 *	679.144 *	671.926 *	664.985 *	654.174 *	641.24 *	624.667 *	603.449 *	575.603 *	537.205 *	483.951 *	422.477 *	326.896 *	177.325 *	52.718	0.481	0.06
-47.5	578.72 *	579.891 *	580.985 *	580.463 *	578.385 *	574.41 *	568.719 *	564.959 *	560.005 *	553.992 *	544.915 *	532.109 *	516.709 *	496.289 *	472.526 *	443.746 *	387.024 *	335.256 *	259.742 *	133.36 *	37.083	0.442	0.06
-55	285.72 *	288.903 *	295.265 *	294.52 *	293.996 *	291.127 *	285.904 *	282.496 *	282.801 *	282.35 *	279.474 *	271.399 *	258.195 *	251.804 *	244.094 *	225.097 *	194.005 *	174.333 *	133.913 *	74.271	20.328	0.361	0.06
-65	24.88	24.982	25.187	25.194	25.17	25.035	24.769	24.355	24.878	25.574	25.844	24.828	23.79	25.606	28.144	24.592	21.936	32.402	18.789	24.441	5.561	0.246	0.06
-75	9.57	9.593	9.638	9.684	9.613	9.58	9.526	9.449	9.391	9.426	9.418	9.341	9.187	8.882	8.87	8.							

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	0.2	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	0.5	0.5	0.4	0.2	0	0	0
55	0.54 *	1.09 *	1.09 *	1.09 *	1.07 *	1.06 *	1.04 *	1.02 *	1.01 *	1.22 *	1.41 *	1.34 *	1.47 *	1.54 *	1.54 *	1.45 *	1.21 *	1.35 *	1	0.3	0	0	0
47.5	0.67 *	1.34 *	1.34 *	1.33 *	1.32 *	1.30 *	1.28 *	1.26 *	1.24 *	1.51 *	1.74 *	1.66 *	1.81 *	1.89 *	1.93 *	1.82 *	1.44 *	1.64 *	1.20 *	0.4	0	0	0
42.5	0.84 *	1.69 *	1.69 *	1.68 *	1.66 *	1.65 *	1.64 *	1.61 *	1.58 *	1.91 *	2.24 *	2.18 *	2.38 *	2.49 *	2.60 *	2.54 *	2.00 *	2.22 *	1.67 *	0.5	0.1	0	0
37.5	1.00 *	2.00 *	2.00 *	1.99 *	1.97 *	1.95 *	1.92 *	1.90 *	1.85 *	2.23 *	2.59 *	2.53 *	2.79 *	2.87 *	2.96 *	2.95 *	2.33 *	2.49 *	1.92 *	0.61 *	0.1	0	0
33	1.12 *	2.25 *	2.25 *	2.24 *	2.22 *	2.18 *	2.15 *	2.11 *	2.07 *	2.50 *	2.87 *	2.76 *	3.06 *	3.15 *	3.16 *	3.12 *	2.49 *	2.63 *	2.00 *	0.66 *	0.1	0	0
29	1.09 *	2.18 *	2.18 *	2.17 *	2.15 *	2.12 *	2.08 *	2.04 *	2.00 *	2.42 *	2.80 *	2.68 *	2.95 *	3.08 *	3.11 *	3.01 *	2.42 *	2.60 *	1.95 *	0.64 *	0.1	0	0
25.5	0.97 *	1.93 *	1.93 *	1.92 *	1.90 *	1.88 *	1.84 *	1.81 *	1.77 *	2.15 *	2.49 *	2.38 *	2.61 *	2.76 *	2.81 *	2.70 *	2.19 *	2.41 *	1.80 *	0.59 *	0.1	0	0
22.5	0.98 *	1.96 *	1.96 *	1.95 *	1.93 *	1.91 *	1.88 *	1.84 *	1.80 *	2.19 *	2.53 *	2.42 *	2.66 *	2.82 *	2.87 *	2.76 *	2.27 *	2.52 *	1.89 *	0.62 *	0.1	0	0
19.5	0.83 *	1.66 *	1.65 *	1.64 *	1.63 *	1.61 *	1.58 *	1.55 *	1.52 *	1.84 *	2.13 *	2.04 *	2.25 *	2.38 *	2.42 *	2.33 *	1.93 *	2.15 *	1.61 *	0.54 *	0.1	0	0
17	0.67 *	1.34 *	1.33 *	1.33 *	1.32 *	1.30 *	1.28 *	1.25 *	1.22 *	1.49 *	1.72 *	1.64 *	1.81 *	1.92 *	1.96 *	1.89 *	1.57 *	1.74 *	1.31 *	0.44 *	0.1	0	0
15	0.67 *	1.35 *	1.34 *	1.34 *	1.32 *	1.31 *	1.29 *	1.26 *	1.23 *	1.50 *	1.73 *	1.66 *	1.83 *	1.94 *	1.97 *	1.90 *	1.58 *	1.76 *	1.32 *	0.45 *	0.1	0	0
13	0.68 *	1.36 *	1.35 *	1.34 *	1.33 *	1.32 *	1.29 *	1.27 *	1.24 *	1.51 *	1.74 *	1.67 *	1.84 *	1.95 *	1.98 *	1.91 *	1.59 *	1.78 *	1.34 *	0.46 *	0.1	0	0
11	0.68 *	1.36 *	1.36 *	1.35 *	1.34 *	1.32 *	1.30 *	1.27 *	1.24 *	1.51 *	1.75 *	1.67 *	1.85 *	1.96 *	1.99 *	1.93 *	1.60 *	1.79 *	1.35 *	0.46 *	0.1	0	0
9	0.68 *	1.37 *	1.36 *	1.35 *	1.34 *	1.33 *	1.31 *	1.28 *	1.25 *	1.52 *	1.76 *	1.68 *	1.85 *	1.97 *	2.00 *	1.94 *	1.61 *	1.80 *	1.36 *	0.47 *	0.1	0	0
7	0.69 *	1.37 *	1.36 *	1.36 *	1.35 *	1.33 *	1.31 *	1.28 *	1.25 *	1.52 *	1.76 *	1.68 *	1.86 *	1.97 *	2.01 *	1.94 *	1.62 *	1.81 *	1.36 *	0.47 *	0.1	0	0
5	0.69 *	1.37 *	1.37 *	1.36 *	1.35 *	1.34 *	1.31 *	1.29 *	1.26 *	1.53 *	1.77 *	1.69 *	1.86 *	1.98 *	2.01 *	1.95 *	1.62 *	1.81 *	1.37 *	0.48 *	0.1	0	0
3	0.69 *	1.38 *	1.38 *	1.37 *	1.36 *	1.34 *	1.32 *	1.29 *	1.26 *	1.53 *	1.77 *	1.69 *	1.87 *	1.98 *	2.02 *	1.95 *	1.62 *	1.81 *	1.37 *	0.48 *	0.1	0	0
1	0.35 *	0.69 *	0.69 *	0.68 *	0.68 *	0.67 *	0.66 *	0.65 *	0.63 *	0.77 *	0.89 *	0.85 *	0.93 *	0.99 *	1.01 *	0.97 *	0.81 *	0.90 *	0.68 *	0.24 *	0	0	0
0																							

-1	0.34 *	0.69 *	0.69 *	0.68 *	0.68 *	0.67 *	0.66 *	0.65 *	0.63 *	0.77 *	0.89 *	0.85 *	0.93 *	0.99 *	1.01 *	0.97 *	0.81 *	0.90 *	0.68 *	0.24 *	0	0	0
-3	0.69 *	1.37 *	1.37 *	1.36 *	1.35 *	1.34 *	1.31 *	1.29 *	1.26 *	1.53 *	1.77 *	1.69 *	1.87 *	1.98 *	2.02 *	1.95 *	1.62 *	1.81 *	1.37 *	0.48 *	0.1	0	0
-5	0.69 *	1.37 *	1.37 *	1.36 *	1.35 *	1.33 *	1.31 *	1.28 *	1.25 *	1.52 *	1.76 *	1.69 *	1.86 *	1.98 *	2.01 *	1.95 *	1.62 *	1.81 *	1.37 *	0.48 *	0.1	0	0
-7	0.68 *	1.37 *	1.36 *	1.36 *	1.34 *	1.33 *	1.31 *	1.28 *	1.25 *	1.52 *	1.76 *	1.68 *	1.86 *	1.97 *	2.01 *	1.94 *	1.62 *	1.81 *	1.36 *	0.48 *	0.1	0	0
-9	0.68 *	1.36 *	1.36 *	1.35 *	1.34 *	1.32 *	1.30 *	1.28 *	1.25 *	1.52 *	1.75 *	1.67 *	1.85 *	1.96 *	2.00 *	1.93 *	1.61 *	1.80 *	1.36 *	0.48 *	0.1	0	0
-11	0.68 *	1.36 *	1.35 *	1.35 *	1.33 *	1.32 *	1.30 *	1.27 *	1.24 *	1.51 *	1.74 *	1.67 *	1.84 *	1.95 *	1.99 *	1.92 *	1.61 *	1.80 *	1.35 *	0.47 *	0.1	0	0
-13	0.67 *	1.35 *	1.34 *	1.34 *	1.33 *	1.31 *	1.29 *	1.26 *	1.23 *	1.50 *	1.73 *	1.66 *	1.83 *	1.94 *	1.97 *	1.91 *	1.60 *	1.78 *	1.34 *	0.47 *	0.1	0	0
-15	0.67 *	1.34 *	1.33 *	1.32 *	1.31 *	1.30 *	1.28 *	1.25 *	1.22 *	1.49 *	1.72 *	1.64 *	1.81 *	1.92 *	1.96 *	1.90 *	1.58 *	1.77 *	1.33 *	0.46 *	0.1	0	0
-17	0.66 *	1.32 *	1.32 *	1.31 *	1.30 *	1.29 *	1.26 *	1.24 *	1.21 *	1.47 *	1.70 *	1.63 *	1.80 *	1.91 *	1.94 *	1.87 *	1.56 *	1.75 *	1.32 *	0.46 *	0.1	0	0
-20	0.82 *	1.63 *	1.63 *	1.62 *	1.61 *	1.59 *	1.56 *	1.53 *	1.49 *	1.82 *	2.10 *	2.01 *	2.22 *	2.35 *	2.39 *	2.31 *	1.92 *	2.16 *	1.62 *	0.56 *	0.1	0	0
-23	0.96 *	1.93 *	1.92 *	1.91 *	1.90 *	1.87 *	1.84 *	1.80 *	1.76 *	2.14 *	2.48 *	2.37 *	2.61 *	2.77 *	2.82 *	2.71 *	2.25 *	2.53 *	1.90 *	0.65 *	0.1	0	0
-26	0.94 *	1.88 *	1.88 *	1.86 *	1.85 *	1.82 *	1.79 *	1.76 *	1.72 *	2.09 *	2.41 *	2.31 *	2.54 *	2.69 *	2.74 *	2.64 *	2.18 *	2.44 *	1.84 *	0.62 *	0.1	0	0
-29	1.05 *	2.10 *	2.10 *	2.08 *	2.06 *	2.03 *	2.00 *	1.96 *	1.92 *	2.33 *	2.70 *	2.58 *	2.84 *	3.00 *	3.06 *	2.95 *	2.43 *	2.71 *	2.03 *	0.69 *	0.1	0	0
-33	1.12 *	2.24 *	2.23 *	2.22 *	2.20 *	2.17 *	2.13 *	2.09 *	2.04 *	2.49 *	2.89 *	2.76 *	3.04 *	3.22 *	3.27 *	3.16 *	2.61 *	2.90 *	2.17 *	0.73 *	0.1	0	0
-38	1.15 *	2.29 *	2.28 *	2.27 *	2.25 *	2.22 *	2.19 *	2.15 *	2.10 *	2.56 *	2.97 *	2.84 *	3.13 *	3.32 *	3.37 *	3.25 *	2.68 *	2.97 *	2.21 *	0.74 *	0.1	0	0
-43	1.13 *	2.26 *	2.26 *	2.24 *	2.22 *	2.20 *	2.17 *	2.13 *	2.09 *	2.54 *	2.95 *	2.82 *	3.10 *	3.28 *	3.32 *	3.19 *	2.62 *	2.89 *	2.11 *	0.68 *	0.1	0	0
-48	0.97 *	1.94 *	1.94 *	1.92 *	1.91 *	1.88 *	1.85 *	1.82 *	1.79 *	2.18 *	2.52 *	2.40 *	2.64 *	2.78 *	2.81 *	2.67 *	2.17 *	2.38 *	1.70 *	0.5	0.1	0	0
-55	0.99 *	1.99 *	1.99 *	1.98 *	1.96 *	1.92 *	1.89 *	1.86 *	1.83 *	2.23 *	2.58 *	2.44 *	2.67 *	2.82 *	2.86 *	2.68 *	2.17 *	2.38 *	1.70 *	0.5	0.1	0	0
-65	0.48 *	0.96 *	0.97 *	0.96 *	0.95 *	0.93 *	0.91 *	0.90 *	0.89 *	1.09 *	1.26 *	1.19 *	1.30 *	1.41 *	1.43 *	1.33 *	1.1	1.3	1	0.3	0	0	0
-75	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	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	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	29	59	59	58	58	57	56	55	54	66	76	73	80	85	86	83	68	76	57	19	2.4	0	1257

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	FFLEDS @ 18W / 3000K	Sample ID.	A1
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	0.155	18.5	0.995	1.32%
277.02	60	0.082	18.2	0.798	19.44%

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*****